2.6.1 Relevant documents pertaining to learning outcomes & graduate attributes

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राष्ट्रीय आयुर्विज्ञान आयोग
National Medical Commission
(Undergraduate Medical Education Board)

No.U.14021-8-2023-UGMEB/ **Dated the 12th June 2023**

CIRCULAR

Subject : Guidelines under Graduate Medical Education Regulation 2023

Consequent upon publication of Graduate Medical Education Regulations 2023 in Gazette of India vide Notification dated 2nd June 2023 and in suppression of Graduate Medical Education Regulations 1997(as amended), Under Graduate Medical Education Board(UGMEB) hereby issues following new Guidelines for the MBBS Course :

(i) CBME Curriculum
(ii) Manpower Requirement for Research Facilities in a Medical College.
(iii) Family Adoption Program
(iv) Admission of students under "Disability Category" in MBBS Course.
(v) Format for submission of information regarding admission of in a medical college

2. All previously issued Notifications/circulars/clarifications shall now be void and superseded by these new guidelines.

3. These new guidelines shall be applicable to all the admission made in MBBS Course in a medical college in the academic year 2023-24.

4. This issues with the approval of the competent authority in UGMEB, National Medical Commission.

12/6/2023

(Shambhu Sharan Kumar)
Director, UGMEB

CBME CURRICULUM

1. Preamble

The new Graduate Medical Education Regulations attempts to stand on the shoulder of the contributions and the efforts of resource persons, teachers and students (past and present). It intends to take the learner to provide health care to the evolving needs of the nation and the world.

About 25 years have passed since the existing Regulations on Graduate Medical Education, 1997 were notified, necessitating a relook at all aspects of the various components in the existing regulations and adapt them to the changing demography, socio-economic context, perceptions, values, advancements in medical education and expectations of stakeholders. Emerging health care issues particularly in the context of emerging diseases, impact of advances in science and technology and shorter distances on diseases and their management also need consideration. The strong and forward-looking fundamentals enshrined in the Regulations on Graduate Medical Education, 1997 has made this job easier. A comparison between the 1997 Regulations and proposed Graduate Medical Education Regulations, 2019 will reveal that the 2019 Regulations have evolved from several key principles enshrined in the 1997 Regulations.

The thrust in the new regulations is continuation and evolution of thought in medical education making it more learner-centric, patient-centric, gender- sensitive, outcome -oriented and environment appropriate. The result is an outcome driven curriculum which conforms to global trends. Emphasis is made on alignment and integration of subjects both horizontally and vertically while respecting the strengths and necessity of subject-based instruction and assessment. This has necessitated a deviation from using "broad competencies"; instead, the reports have written end of phase subject (sub) competencies. These "sub-competencies" can be mapped to the global competencies in the Graduate Medical Education Regulations.

The importance of ethical values, responsiveness to the needs of the patient and acquisition of communication skills is underscored by providing dedicated curriculum time in the form of a longitudinal program based on Attitude, Ethics and Communication (AETCOM) competencies. Great emphasis has been placed on collaborative and inter-disciplinary teamwork, professionalism, altruism and respect in professional relationships with due sensitivity to differences in thought, social and economic position and gender.

2. Objectives of the Indian Graduate Medical Training Programme

The undergraduate medical education program is designed with a goal to create an "Indian Medical Graduate" (IMG) possessing requisite knowledge, skills, attitudes, values and responsiveness, so that she or he may function appropriately and effectively as a Physician of first contact of the community while being globally relevant. To achieve this, the following national and institutional goals for the learner of the Indian Medical Graduate training program are hereby prescribed.

3. National Goals

At the end of undergraduate program, the Indian Medical Graduate should be able to:

a. Recognize "health for all" as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his social obligations towards realization of this goal.

b. Learn key aspects of National policies on health and devote himself to its practical implementation.

c. Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.

d. Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.

e. Become exemplary citizen by observance of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

4. Institutional Goals

In consonance with the national goals, each medical institution should evolve institutional goals to define the kind of trained manpower (or professionals) they intend to produce. The Indian Medical Graduates coming out of a medical institute should:

a. Be competent in diagnosis and management of common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.

b. Be competent to practice preventive, promotive, curative, palliative and rehabilitative medicine in respect to the commonly encountered health problems.

c. Appreciate rationale for different therapeutic modalities; be familiar with the administration of the "essential drugs" and their common side effects.

d. Appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in discharging one's professional responsibilities.

e. Possess the attitude for continued self-learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.

f. Be familiar with the basic factors which are essential for the implementation of the National Health Programs including practical aspects of the following:

i) Family Welfare and Maternal and Child Health (MCH);

ii) Sanitation and water supply;

iii) Prevention and control of communicable and non-communicable diseases;

iv) Immunization;

v) Health Education and advocacy;

vi) Indian Public Health Standards (IPHS) at various level of service delivery;

vii) Bio-medical waste disposal

viii) Organizational and or institutional arrangements.

g. Acquire basic management skills in the area of human resources, materials and resource management related to health care delivery, general and hospital management, principal inventory skills and counseling.

h. Be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures with maximum community participation.

i. Be able to work as a leading partner in health care teams and acquire proficiency in communication skills.

j. Be competent to work in a variety of health care settings.

k. Have personal characteristics and attitudes required for professional life including personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

5. Goals for the Learner

In order to fulfill these goals, the Indian Medical Graduate must be able to function in the following roles appropriately and effectively:-

a. Clinician who understands and provides preventive, promotive, curative, palliative and holistic care with compassion.

b. Leader and member of the health care team and system with capabilities to collect, analyze, synthesize and communicate health data appropriately.

c. Communicator with patients, families, colleagues and community.

d. Lifelong learner committed to continuous improvement of skills and knowledge.

e. Professional, who is committed to excellence, is ethical, responsive and accountable to patients, community and profession.

f. Critical thinker who demonstrates problem solving skills in professional practice

g. Researcher who generates and interprets evidence

6. Competency Based Training Programme of the Indian Medical Graduate

Competency based learning would include designing and implementing medical education curriculum that focuses on the desired and observable ability in real life situations. In order to effectively fulfill the roles, the Indian Medical Graduate would have obtained the following set of competencies at the time of graduation:

Clinician, who understands and provides preventive, promotive, curative, palliative and holistic care with compassion

- Demonstrate knowledge of normal human structure, function and development from a molecular, cellular, biologic, clinical, behavioral and social perspective.
- Demonstrate knowledge of abnormal human structure, function and development from a molecular, cellular, biological, clinical, behavioral and social perspective.
- Demonstrate knowledge of medico-legal, societal, ethical and humanitarian principles that influence healthcare.
- Demonstrate knowledge of national and regional health care policies including the National Health Mission that incorporates National Rural Health Mission (NRHM) and National Urban Health Mission (NUHM), frameworks, economics and systems that influence health promotion, health care delivery, disease prevention, effectiveness, responsiveness, quality and patient safety.
- Demonstrate ability to elicit and record from the patient, and other relevant sources including relatives and caregivers, a history that is complete and relevant to disease identification, disease prevention and health promotion.
- Demonstrate ability to elicit and record from the patient, and other relevant sources including relatives and caregivers, a history that is contextual to gender, age, vulnerability, social and economic status, patient preferences, beliefs and values.
- Demonstrate ability to perform a physical examination that is complete and relevant to disease identification, disease prevention and health promotion.
- Demonstrate ability to perform a physical examination that is contextual to gender, social and economic status, patient preferences and values.
- Demonstrate effective clinical problem solving, judgment and ability to interpret and integrate available data in order to address patient problems, generate differential diagnoses and develop individualized management plans that include preventive, promotive and therapeutic goals.
- Maintain accurate, clear and appropriate record of the patient in conformation with

legal and administrative frameworks.

- Demonstrate ability to choose the appropriate diagnostic tests and interpret these tests based on scientific validity, cost effectiveness and clinical context.
- Demonstrate ability to prescribe and safely administer appropriate therapies including nutritional interventions, pharmacotherapy and interventions based on the principles of rational drug therapy, scientific validity, evidence and cost that conform to established national and regional health programmers and policies for the following:
    - Disease prevention,
    - Health promotion and cure,
    - Pain and distress alleviation, and
    - Rehabilitation and palliation.
- Demonstrate ability to provide a continuum of care at the primary (including home care) and/or secondary level that addresses chronicity, mental and physical disability.
- Demonstrate ability to appropriately identify and refer patients who may require specialized or advanced tertiary care.
- Demonstrate familiarity with basic, clinical and translational research as it applies to the care of the patient.

Leader and member of the health care team and system

- Work effectively and appropriately with colleagues in an inter-professional health care team respecting diversity of roles, responsibilities and competencies of other professionals.
- Recognize and function effectively, responsibly and appropriately as a health care team leader in primary and secondary health care settings.
- Educate and motivate other members of the team and work in a collaborative and collegial fashion that will help maximize the health care delivery potential of the team.
- Access and utilize components of the health care system and health delivery in a manner that is appropriate, cost effective, fair and in compliance with the national health care priorities and policies, as well as be able to collect, analyze and utilize health data.
- Participate appropriately and effectively in measures that will advance quality of health care and patient safety within the health care system.
- Recognize and advocate health promotion, disease prevention and health care quality improvement through prevention and early recognition: in a) life style diseases and b) cancer, in collaboration with other members of the health care team.

Communicator with patients, families, colleagues and community

- Demonstrate ability to communicate adequately, sensitively, effectively and respectfully with patients in a language that the patient understands and in a manner that will improve patient satisfaction and health care outcomes.
- Demonstrate ability to establish professional relationships with patients and families that are positive, understanding, humane, ethical, empathetic, and trustworthy.

- Demonstrate ability to communicate with patients in a manner respectful of patient's preferences, values, prior experience, beliefs, confidentiality and privacy.
- Demonstrate ability to communicate with patients, colleagues and families in a manner that encourages participation and shared decision- making.

7. Lifelong learner committed to continuous improvement of skills and knowledge

- Demonstrate ability to perform an objective self-assessment of knowledge and skills, continue learning, refine existing skills and acquire new skills.
- Demonstrate ability to apply newly gained knowledge or skills to the care of the patient.
- Demonstrate ability to introspect and utilize experiences, to enhance personal and professional growth and learning.
- Demonstrate ability to search (including through electronic means), and critically re-evaluate the medical literature and apply the information in the care of the patient.
- Be able to identify and select an appropriate career pathway that is professionally rewarding and personally fulfilling.

Professional who is committed to excellence, is ethical, responsive and accountable to patients, community and the profession

- Practice selflessness, integrity, responsibility, accountability and respect.
- Respect and maintain professional boundaries between patients, colleagues and society.
- Demonstrate ability to recognize and manage ethical and professional conflicts.
- Abide by prescribed ethical and legal codes of conduct and practice.
- Demonstrate a commitment to the growth of the medical profession as awhile.

A. CURRICULUM

➢ 1st Professional Year:

1. ANATOMY

a. Competencies:

The undergraduate must demonstrate:

- Understanding of the gross and microscopic structure and development of human body,
- Comprehension of the normal regulation and integration of the functions of the organs and systems on basis of the structure and genetic pattern,
- Understanding of the clinical correlation of the organs and structures involved and interpret the anatomical basis of the disease presentations.

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b. Broad subject specific objectives

Knowledge: At the end of the course the student should be able to

- Comprehend the normal disposition, clinically relevant interrelationships, functional and cross -sectional Anatomy of the various organs and structures of the body.
- Identify the microscopic structure and correlate elementary ultra structure of various organs and tissues with the functions as a prerequisite for understanding the altered state in various disease processes.
- Comprehend the basic structure and connections of the central nervous system to analyze the integrative and regulative functions of the organs and systems. He should be able to locate the site of gross lesions according to the deficits encountered
- Demonstrate knowledge of the basic principles and sequential development of the organs and systems; recognize the critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards. He should be able to explain the developmental basis of the major variations and abnormalities.

c. Skills:

At the end of the course the student should be able to --

- Identify and locate all the structures of the body and mark the topography of the Living Anatomy.
- Understand clinical basis of some common clinical procedures i.e. intramuscular and intravenous injection, lumbar puncture and kidney biopsy etc.
- Identify the organs and tissues under the microscope.
- Understand the principles of karyotyping and identify the gross congenital anomalies.
- Understand principles of newer imaging techniques and interpretation of CT scan, sonogram, MRI & Angiography.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in organ systems with clinical correlation that will provide a context for the learner to understand the relationship between structure and function and interpret the anatomical basis of various clinical conditions and procedures.

2. PHYSIOLOGY

a. Competencies: The undergraduates must demonstrate:

- Understanding of the normal functioning of the organs and organ systems of the body,
- Comprehension of the normal structure and organization of the organs and systems on basis of the functions,
- Understanding of age-related physiological changes in the organ functions that reflect normal growth and development,

- Understand the physiological basis of diseases.

b. Broad subject specific objectives

Knowledge : At the end of the course, the student will be able to:

- Describe the normal functions of all the systems, the regulatory mechanisms and interactions of the various systems for well coordinated total body functions.
- Understanding the relative contribution of each organ system in the maintenance of the milieu interior (homeostasis)
- Explain the physiological aspects of the normal growth and development.
- Analyze the physiological responses and adaptation to environmental stress. Comprehend the physiological principles underlying pathogenesis and treatment of disease.
- Correlate knowledge of physiology of human reproductive system in relation to National Family welfare program.

c. Skills : At the end of the course the student shall be able to:

- Conduct experiments designed for study of physiological phenomenon.
- Interpret experimental /investigative data.
- Distinguish between normal and abnormal data derived as a result of clinical examination and tests, which he has performed and observed in the laboratory.
- Recognize and get familiar with newer computerized and advanced instruments like medspiror, semen quality analyzer, EMG and TMT

d. Integration: The teaching should be aligned and integrated horizontally and vertically in organ systems in order to provide a context in which normal function can be correlated both with structure and with the biological basis, its clinical features, diagnosis and therapy.

3. BIOCHEMISTRY

a. Competencies: The learner must demonstrate an understanding of:

- Biochemical and molecular processes involved in health and disease,
- Importance of nutrition in health and disease,
- Biochemical basis and rationale of clinical laboratory tests, and demonstrate ability to interpret these in the clinical context.

b. Broad subject specific objectives:

Knowledge: At the end of the course, the student shall be able to

- Enlist and describe the cell organelles with their molecular ad functional organization.
- Delineate structure, function and interrelationships of various biomolecules and consequences of deviation from the normal.
- Understand basic enzymology and emphasize on its clinical applications wherein regulation of enzymatic activity is disturbed.
- Describe digestion and assimilation of nutrients and consequences of malnutrition.
- Describe and integrate metabolic pathways of various biomolecules with their regulatory mechanisms.
- Explain the biochemical basis of inherited disorders with their associated squeal.
- Describe mechanisms involved in maintenance in water, electrolyte and acid base balance and consequences of their imbalances.
- Outline the molecular mechanisms of gene expression and regulation, basic principles of biotechnology and their applications in medicine.

c. Skills : At the end of the course, the student shall be able to:

- Make use of conventional techniques / instruments to perform biochemical analysis relevant to clinical screening and diagnosis;
- Analysis and interpret investigative data;
- Demonstrate the skills of solving scientific and clinical problems and decision making.

d. Integration: The teaching/learning programme should be integrated horizontally and vertically, as much as possible, to enable learners to make clinical correlations and to acquire an understanding of the cellular and molecular basis of health and disease.

2nd Professional Year:

4. PATHOLOGY

a. Competencies: The undergraduate must demonstrate:

- Comprehension of the causes, evolution and mechanisms of diseases,
- Knowledge of alterations in gross and cellular morphology of organs in disease states,
- Ability to correlate the natural history, structural and functional changes with the clinical manifestations of diseases, their diagnosis and therapy.

b. Broad subject specific objectives

Knowledge: At the end of one and half years, the student shall be able to:

- Describe the structure and ultra structure of a sick cell, causes and mechanisms of cell Injury, cell death and repair.
- Correlate structural and functional alterations in the sick cell.
- Explain the path physiological processes, which govern the maintenance of

homeostasis, mechanisms of their disturbance and the morphological and clinical manifestation associated with it.

- Describe the mechanisms and patterns of tissue response to injury so as to appreciate the path physiology of disease processes and their application to clinical science.
- Correlate the gross and microscopic alterations of different organ systems in common disease to the extent needed for understanding disease processes and their clinical significance.
- Develop an understanding of steps in neoplastic changes in the body and their effects in order to appreciate need for early diagnosis and further management of neoplasia.
- Understand mechanisms of common hematological disorders and develop a logical approach in their diagnosis and management.
- Develop understanding of the blood banking, blood donors & transfusion of blood & blood products, (components).
- Understand pathophysiology of infectious diseases in relation with tissue changes.
- Describe the various immunological reactions in understanding the disease process & tissue transplant.
- Develop an understanding for genetic disorders.
- Understand the vital organ function test of Kidney, liver & thyroid.

c. Skills : At the end of one and half years, the student shall be able to:

- Describe the rationale and principles of routine technical procedures of the diagnostic laboratory tests & perform it.
- Interpret routine diagnostic laboratory tests and correlate with clinical, hematological and morphological changes.
- Perform the simple bed-side tests on blood, urine and other biological fluid samples:
- Draw a rational scheme of investigations aimed at diagnosing and managing the cases of common disorders.
- Able to understand the microscopic and macroscopic features of common diseases.
- Develop different type of skills such as observation skills, communication skill and presentation skill.
- Understand biochemical/physiological disturbances that occur as a result of disease in collaboration with preclinical department.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in organ systems recognizing deviations from normal structure and function and clinically correlated so as to provide an overall understanding of the etiology, mechanisms, laboratory diagnosis, and management of diseases.

5. MICROBIOLOGY

a. Competencies: The undergraduate learner demonstrates:

- Understanding of role of microbial agents in health and disease,
- Understanding of the immunological mechanisms in health and disease,
- Ability to correlate the natural history, mechanisms and clinical manifestations of infectious diseases as they relate to the properties of microbial agents,
- Knowledge of the principles and application of infection control measures,
- An understanding of the basis of choice of laboratory diagnostic tests and their interpretation, antimicrobial therapy, control and prevention of infectious diseases.
- Knowledge of outbreak investigation and its control.

b. Broad subject specific objectives : At the end of the course the student will be able to :

- Explain how the different microorganisms can cause human infection.
- Understand commercial, opportunistic and pathogenic organisms and describe host parasite relationship.
- Describe the characteristics (morphology, cultural characteristics, resistance, virulence factors, incubation period, mode of transmission etc.) of different microorganisms.
- Explain the various defense mechanisms of the host against the microorganisms which can cause human infection.
- Describe the laboratory diagnosis of microorganisms causing human infections and disease.
- Describe the prophylaxis for the particular infecting microorganisms

c. Skills : At the end of the course the student shall be able to

- Plan the laboratory investigations for the diagnosis of infectious diseases.
- Perform laboratory procedures to arrive at the etiological diagnosis of infectious diseases caused by bacteria, fungi, viruses and parasites including the drug sensitivity profile.
- Perform and interpret immunological and serological tests.
- Operate routine and sophisticated instruments in the laboratory.
- Develop microteaching skills and Pedagogy
- Successfully implement the chosen research methodology

d. Integration: The teaching should be aligned and integrated horizontally and vertically in organ systems with emphasis on host-microbe-environment interactions and their alterations in disease and clinical correlations so as to provide an overall understanding of the etiological agents, their laboratory diagnosis and prevention.

6. PHARMACOLOGY

a. Competencies: The undergraduate must demonstrate:

- Knowledge about essential and commonly used drugs and an understanding of the pharmacologic basis of therapeutics,
- Ability to select and prescribe medicines based on clinical condition and the pharmacologic properties, efficacy, safety, suitability and cost of medicines for common clinical conditions of national importance,
- Knowledge of pharmacovigilance, essential medicine concept and sources of drug information and industry-doctor relationship,
- Ability to counsel patients regarding appropriate use of prescribed drug and drug delivery systems.

b. Broad subject specific objectives :

Knowledge: At the end of the course, the student shall be able to

- Describe the Pharmacokinetics and Pharmacodynamics of essential and commonly used drugs.
- Enlist the indications, contraindications, interactions and adverse reactions of commonly used drugs.
- Tailor the use of appropriate drugs in disease with consideration of its cost, efficacy and safety for individual needs and Mass therapy, under National Health Programs.
- Integrate the list of drugs of addiction and recommend the management of drug addiction.
- Explain pharmacological basis of prescribing drugs in special medical situations such as pregnancy, lactation, infancy, old age, renal damage, hepatic damage and immuno-
- compromised patients.
- Explain the concept of rational drug therapy in clinical pharmacology.
- State the principles underlying the concept of 'Essential Drugs'.
- Evaluate the ethics and modalities involved in the development and introduction of new drugs.

c. Skills : At the end of the course, the student shall be able to

- Prescribe drugs for common ailments.
- Identify adverse reactions and drug interactions of commonly used drugs.
- Interpret the data obtained from the experiments designed for the study of effect of drugs in various experimental and clinical studies.
- Analyze the information regarding common pharmaceutical preparations and critically evaluate drug formulations.
- Appraise the Principles of Clinical Pharmacy and Dispense the Medications giving

proper instructions.

d. **Integration:** Practical knowledge of use of drugs in Clinical Practice will be acquired through Integrated Teaching vertically with Preclinical and Clinical subjects and horizontally with other Para clinical subjects.

3rd PROFESSIONALYEAR

7. FORENSIC MEDICINE AND TOXICOLOGY

a. Competencies : The learner must demonstrate:

- Understanding of medico-legal responsibilities of Physicians in primary and secondary care settings,
- Understanding of the rational approach to the investigation of crime, based on scientific and legal principles,
- Ability to manage medical and legal issues in cases of poisoning /overdose,
- Understanding the medico-legal framework of medical practice and medical negligence,
- Understanding of codes of conduct and medical ethics.

b. Broad subject specific objectives:

Knowledge: At the end of the course, the student shall be able to

- Identify the basic Medico-legal aspects of hospital and general practice.
- Define the Medico-legal responsibilities of a general Physician while rendering community service either in a rural primary health centre or an urban health centre.
- Appreciate the Physician's responsibilities in criminal matters and respect for the codes of Medical ethics.
- Diagnose, manage and identify legal aspect of common acute and chronic poisonings.
- Describe the Medico-legal aspects and findings of post-mortem examination in cases of death due to common unnatural conditions and poisonings.
- Detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen's Compensation Act.
- Describe the general principles of analytical toxicology.

c. Skills : At the end of the course, the student shall be able to :

- As recommended by Medical Council of India Regulation, 1997 desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate for Forensic Medicine and Toxicology.
- Make observations and draw logical inferences in order to initiate enquiries in criminal

matters and Medico-legal problems and be able to -

- Carry on proper Medico-legal examination and documentation/Reporting of Injury and Age.
- Conduct examination for sexual offences and intoxication.
- Preserve relevant ancillary materials for medico-legal examination.
- Identify important post-mortem findings in common unnatural deaths.
- Diagnose and treat common emergencies in poisoning and chronic toxicity.
- Make observations and interpret findings at post-mortem examination.
- Observe the principles of medical ethics in the practice of his profession.

d. Integration: The teaching should be aligned and integrated horizontally and vertically recognizing the importance of medico-legal, ethical and toxicological issues as they relate to the practice of medicine.

8. COMMUNITY MEDICINE

a. Competencies: The undergraduate must demonstrate :

- Understanding of the concept of health and disease,
- Understanding of demography, population dynamics and disease burden in National and global context,
- Comprehension of principles of health economics and hospital management,
- Understanding of interventions to promote health and prevent diseases as envisioned in National and State Health Programmes.
- Understanding of physical, social, psychological, economic and environmental determinants of health and disease,
- Ability to recognize and manage common health problems including physical, emotional and social aspects at individual family and community level in the context of National Health Programmes,
- Ability to Implement and monitor National Health Programmes in the primary care setting,
- Knowledge of maternal and child wellness as they apply to national health care priorities and programmes,
- Ability to recognize, investigate, report, plan and manage community health problems including malnutrition and emergencies.

b. Broad subject specific objectives:

Knowledge: At the end of the course the student shall be able

- Explain the principles of sociology including demographic population dynamics.
- Identify social factors related to health, disease and disability in the context of urban and rural societies.

- Appreciate the impact of urbanization on health and disease.
- Observe and interpret the dynamic of community behaviors.
- Describe the elements of normal psychology and social psychology.
- Observe the principles of practice of medicine in hospital and community settings.
- Describe the health care delivery systems including rehabilitation of the disabled in the country.
- Describe the National Health Programmes with particular emphasis on maternal and child health programmes, family welfare planning and population control.
- Describe the epidemiological methods and techniques.
- Outline the demographic pattern of the country and appreciate the roles of the individuals, family, community and socio-cultural milieu in health and disease.
- Describe the health information systems.
- Acquire, understand, integrate, apply and manage information in context to health care problems and health care delivery system in various communities, health care settings and hospitals.
- Describe the principles and components of primary health care, National Rural Health Mission and the national health policies to achieve the goal of "Health for all" with regards to identify the environmental, bio-waste and occupational hazards and their control.
- Describe the importance of water and sanitation in human health.
- Describe the principles of health economies, health administration, health education in relation to community.
- Critically analyze the problem (s) and apply his/her knowledge to solve the problem in holistic manner.
- Describe and apply principles of prevention, promotion and maintenance of health.

c. Skills : At the end of the course, the student shall be able to :

- Use the principles and practice of medicine in hospital and community settings and familiarization with elementary practices.
- Use the Art of communication with patients including history taking and medico social work.
- Use epidemiology as a scientific tool to make rational decisions relevant to community and individual patient intervention.
- Organize health care services for vulnerable and disadvantages groups.
- Organize health care services in case of calamities.
- Collect, analyze, interpret and present simple community and hospital base data.
- Diagnose and manage common health problems (including communicable and non-communicable diseases) and emergencies at the individual, family and community levels keeping in mind the existing health care resources and in the context of the prevailing socio-culture beliefs.
- Diagnose and manage common nutritional problems at the individual and community

level.

- Plan, implement and evaluate a health education Programme with skill to use simple audio-visual aids.
- Interact with other members of the health care team and participate in the organization of health care services, health advocacy and implementation of national health programmes.
- Perform Administrative functions at health centers
- Observe the principles of medical ethics in the practice of his profession.

d. **Integration:** Department shall adopt an integrated approach towards other clinical disciplines, public health services, NGOs, environmental sciences, social sciences, management, hospital administration, research, etc. to impart training to enable the graduate to work at all levels of health care. The teaching should be aligned and integrated horizontally and vertically in order to allow the learner to understand the impact of environment, society and national health priorities as they relate to the promotion of health and prevention and cure of disease.

9. GENERAL MEDICINE

a. Competencies: The student must demonstrate ability to do the following in relation to common medical problems of the adult in the community:

- Demonstrate understanding of the pathophysiologic basis, epidemiological profile, signs and symptoms of disease and their investigation and management,
- Competently interview and examine an adult patient and make a clinical diagnosis,
- Appropriately order and interpret laboratory tests,
- Initiate appropriate cost-effective treatment based on an understanding of the rational drug prescriptions, medical interventions required and preventive measures,
- Follow up of patients with medical problems and refer whenever required,
- Communicate effectively, educate and counsel the patient and family,
- Manage common medical emergencies and refer when required,
- Independently perform common medical procedures safely and understand patient safety issues.

b. Broad subject specific objectives:

Knowledge: At the end of the course, the student shall be able to:

- Diagnose common clinical disorders with special reference to infectious diseases, nutritional disorders, tropical and environmental diseases;

- Outline various modes of management including drug therapeutics especially dosage, side effects, toxicity, interactions, indications and contra-indications;
- Propose diagnostic and investigative procedures and ability to interpret them;
- Provide first level management of acute emergencies promptly and efficiently and decide the timing and level of referral, if required;
- Recognize geriatric disorders and their management.

c. Skills : At the end of the course, the student shall be able to :

- Develop clinical skills (history taking. clinical examination and other instruments of examination) to diagnose various common medical disorders and emergencies;
- Refer a patient to secondary and/or tertiary level of health care after having instituted primary care;
- Perform simple routine investigations like hemogram, stool, urine, sputum and biological fluid examinations;
- Assist the common bedside investigative procedure like pleural tap. Lumbar puncture, bone marrow aspiration/biopsy and liver biopsy.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to provide sound biologic basis and incorporating the principles of general medicine into a holistic and comprehensive approach to the care of the patient. With other relevant academic inputs which provide scientific basis of clinical medicine e.g. anatomy, physiology, biochemistry, microbiology, pathology and pharmacology.

10. DERMATOLOGY

a. Competencies: The undergraduate student must demonstrate:

- Understanding of the principles of diagnosis of diseases of the skin, hair, nail and mucosa,
- Ability to recognize, diagnose, order appropriate investigations and treat common diseases of the skin including leprosy in the primary care setting and refer as appropriate,
- A syndromic approach to the recognition, diagnosis, prevention, counseling, testing and management of common sexually transmitted diseases including HIV based on national health priorities,
- Ability to recognize and treat emergencies including drug reactions and refer as appropriate.

b. Broad subject specific objectives:

Knowledge: At the end of the course of Dermatology the student shall be able to :

- Demonstrate sound knowledge of common diseases, their clinical manifestations,

including emergent situations and of investigative procedures to confirm their diagnosis

- Demonstrate comprehensive knowledge of various modes of therapy used in treatment of cutaneous, sexually transmitted diseases and leprosy
- Describe the mode of action of commonly used drugs, their doses, side effects/toxicity, indications and contra-indications and interactions
- Describe commonly used modes of management including the medical and surgical procedures available for the treatment of various diseases and to offer a comprehensive plan of management for a given disorder

c. Skills: The student shall be able to :

- Interview the patient, elicit relevant and correct information and describe the history in a chronological order:
- Conduct clinical examination, elicit and interpret physical findings and diagnose common disorders and emergencies.
- Demonstrate simple, routine investigative and laboratory procedures required for making the bed-side diagnosis, especially the examination of scrapings for fungus, preparation of slit smears and staining for AFB for leprosy patients and for STD cases and take a skin biopsy for diagnostic purposes.
- Manage common diseases and recognizing the need for referral for specialized care, in case of inappropriateness of therapeutic response.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to emphasize the biologic basis of diseases of the skin, sexually transmitted diseases and leprosy

11. PSYCHIATRY

a. Competencies: The student must demonstrate:

- Ability to promote mental health and mental hygiene,
- Knowledge of etiology (bio-psycho-social-environmental interactions), clinical features, diagnosis and management of common psychiatric disorders across all ages,
- Ability to recognize and manage common psychological and psychiatric disorders in a primary care setting, institute preliminary treatment in disorders difficult to manage, and refer appropriately,
- Ability to recognize alcohol/ substance abuse disorders and refer them to appropriate centers,
- Ability to assess risk for suicide and refer appropriately,
- Ability to recognize temperamental difficulties and personality disorders,
- Assess mental disability and rehabilitate appropriately,

- Understanding of National and State programmes that address mental health and welfare of patients and community.

b. Broad subject specific objectives:

Knowledge: At the end of the course the student shall be able to:

- Understand the comprehensive nature & development of different aspects of normal human behavior like learning, memory, motivation, personality & intelligence
- Recognize differences between normal & abnormal behavior
- Classify psychiatric disorders
- Recognize clinical manifestations of the following common syndromes & plan their appropriate management of organic psychosis, functional psychosis, schizophrenia, affective disorders, neurotic disorders, personality disorders, psycho physiological disorders, drug & alcohol dependence, psychiatric disorders of childhood & adolescence
- Describe rational use of different mode of therapy in psychiatric disorders.

c. Skills: The student shall be able to:

- Interview the patient & understand different methods of communications in patient-doctor relationship
- Elicit detailed psychiatric case history & conduct clinical examination for assessment of mental status
- Define, elicit & interpret psychopathological symptoms & signs
- Diagnose & manage common psychiatric disorders
- Identify & manage common psychological reactions & psychiatric disorders in medical & surgical patients in clinical practice & in community setting

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to allow the student to understand bio-psycho-social-environmental interactions that lead to diseases/ disorders for preventive, promotive, curative, rehabilitative services and medico-legal implications in the care of patients both in family and community.

12. RESPIRATORY MEDICINE

a. Competencies: The student must demonstrate:

- Knowledge of common chest diseases, their clinical manifestations, diagnosis and management,
- Ability to recognize, diagnose and manage pulmonary tuberculosis as contemplated in National Tuberculosis Elimination programme,

- Ability to manage common respiratory emergencies in primary care setting and refer appropriately.

b. Broad subject specific objectives:

Knowledge: At the end of the course of Pulmonary Medicine, the student shall be able to:

- Demonstrate sound knowledge of common chest diseases, their manifestations, including emergency situations and of investigative procedures to confirm their diagnosis.
- Demonstrate comprehensive knowledge of various modes of therapy used in treatment of respiratory diseases.
- Describe the modes of action of commonly used drugs, their doses, side effects/ toxicity, indications and contra indications and interactions.
- Describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of Revised National Tuberculosis Control programme.

c. Skills : The student shall be able to :

- Interview the patient, elicit relevant and correct information and describe the history in chronological order;
- Conduct clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies;
- Perform simple, routine investigative and office procedures required for making the bed side diagnosis especially sputum collection and examination for etiologic organisms especially Acid fast Bacilli (AFB), interpretation of the chest x-rays and respiratory function tests;
- Interpret and manage various blood gases and PH abnormalities in various respiratory diseases;
- Manage common diseases recognizing need for referral for specialized care, in case of inappropriateness of therapeutic responses;
- Assist in the performance of common procedures. like laryngoscopic examination, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage/aspiration

d. **Integration**: The teaching should be aligned and integrated horizontally and vertically in order to allow the student to recognize diagnose and treat TB and other lung diseases in the context of the society, national health priorities, drug resistance and co-morbid conditions like HIV.

13. PEDIATRICS

a. Competencies: The student must demonstrate:

- Ability to assess and promote optimal growth, development and nutrition of children and adolescents and identify deviations from normal,
- Ability to recognize and provide emergency and routine ambulatory and First Level Referral Unit care for neonates, infants, children and adolescents and refer as may be appropriate,
- Ability to perform procedures as indicated for children of all ages in the primary care setting,
- Ability to recognize children with special needs and refer appropriately,
- Ability to promote health and prevent diseases in children,
- Ability to participate in National Programmes related to child health and in conformation with the Integrated Management of Neonatal and Childhood Illnesses (IMNCI) Strategy,
- Ability to communicate appropriately and effectively.

b. Broad subject specific objectives:

Knowledge:-At the end of the course, the students shall be able to:-

- Describe the normal Growth and Development during fetal life, Neonatal period, Childhood and Adolescence and the deviations thereof.
- Describe the common Pediatric disorders and emergencies in terms of Epidemiology, Etiopathogenesis, Clinical manifestations, Diagnosis and also describe the rational therapy and rehabilitation services.
- Workout age related requirements of calories, nutrients, fluids, dosages of drugs etc. in health and disease.
- Describe preventive strategies for common infectious disorders, Malnutrition, Genetic and Metabolic disorders, Poisonings, Accidents and Child abuse.
- Outline national programs related to child health including Immunization programs.

c. Skills : At the end of the course, the students shall be able to:-

- Take detailed Pediatric and Neonatal history and conduct an appropriate physical examination of children and neonates, make clinical diagnosis, conduct common bedside investigative procedures, interpret common laboratory investigations, plan and institute therapy.
- Take anthropometric measurements, resuscitate newborn, prepare oral rehydration solution, perform tuberculin test, administer vaccines available under current National programs, perform venesection, start intravenous fluids and provide nasogastric feeding.

- Conduct diagnostic procedures such as lumbar puncture, liver and kidney biopsy, bone marrow aspiration, pleural and ascitic tap.
- Distinguish between normal Newborn babies and those requiring special care and institute early care to all newborn babies including care of preterm and low birth weight babies, provide correct guidance and counseling about breastfeeding and Complementary feeding.
- Provide ambulatory care to all not so sick children, identify indications for specialized/ inpatient care and ensure timely referral to those who require hospitalization.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to provide comprehensive care for neonates, infants, children and adolescents based on a sound knowledge of growth, development, disease and their clinical, social, emotional, psychological correlates in the context of national health priorities.

14. GENERAL SURGERY

a. Competencies: The student must demonstrate:

- Understanding of the structural and functional basis, principles of diagnosis and management of common surgical problems in adults and children
- Ability to choose, calculate and administer appropriately intravenous fluids, electrolytes, blood and blood products based on the clinical condition
- Ability to apply the principles of asepsis, sterilization, disinfection, rational use of prophylaxis, therapeutic utilities of antibiotics and universal precautions in surgical practice
- Knowledge of common malignancies in India and their prevention, early detection and therapy
- Ability to perform common diagnostic and surgical procedures at the primary care level
- Ability to recognize, resuscitate, stabilize and provide Basic & Advanced Life Support to patients following trauma
- Ability to administer informed consent and counsel patient prior to surgical procedures,
- Commitment to advancement of quality and patient safety in surgical practice.

b. Broad subject specific objectives.

Knowledge: At the end of course, the student should be able to:

- Describe aetiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies in adult and children.
- Define indications and methods for fluid and electrolytes replacement therapy

including blood transfusion.

- Define asepsis, disinfection and sterilization and recommend judicious use of antibiotics.
- Describe common malignancies in the country and their management including prevention.
- Enumerate different types of anaesthetic agents, their indications, contraindications, mode of administration, and side effects.

c. Skills : At the end of the course, the student should be able to:

- Diagnose common surgical conditions both acute and chronic, in adults and children.
- Plan various laboratory tests for surgical conditions and interpret the results.
- Identify and manage patients of hemorrhagic, septicanemia and other types of shock.
- Be able to maintain patent air-way and resuscitate.
- Monitor patient of head, chest, spinal and abdominal injuries, both in adults and children.
- Provide primary care for a patient of burns.
- Acquire principles of operative surgery including preoperative, operative and post operative care and monitoring.
- Treat open wound including preventive measures against tetanus and gas gangrene.
- Diagnose neonatal and pediatric surgical emergencies and provide sound primary care before referring the patient to secondary/tertiary centres.
- Identify congenital anomalies and refer them for appropriate management.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to provide a sound biologic basis and a holistic approach to the care of the surgical patient.

- Apply knowledge of basic medical sciences and other relevant subjects to support understanding of various pathologies, facilitate examination of and intervention for the patients.
- To apply the principles of quality of health care, legal and ethical principles and regulations as recommended by Medical Council of India and WHO.

15. ORTHOPAEDICS (INCLUDING PHYSICAL MEDICINE & REHABILITATION)

a. Competencies: The student must demonstrate:

- Ability to recognize and assess bone injuries, dislocation and poly-trauma and provide first contact care prior to appropriate referral,

- Knowledge of the medico-legal aspects of trauma,
- Ability to recognize and manage common infections of bone and joints in the primary care setting,
- Recognize common congenital, metabolic, neoplastic, degenerative and inflammatory bone diseases and refer appropriately,
- Ability to perform simple orthopedic techniques as applicable to a primary care setting,
- Ability to recommend rehabilitative services for common orthopaedic problems across all ages.

b. Broad subject specific objectives

Knowledge: The student shall be able to understand:

- The principles, diagnosis and primary management and be able to give appropriate referral for further definitive management of bones and joint injuries.
- Osteogenesis, manifestation and diagnosis, primary management and give their referral for appropriate correction or rehabilitation of common musculoskeletal disorders including infections of bones and joints; congenital skeletal anomalies, metabolic bone diseases and neoplasm affecting bones.

c. Skills : At the end of the course, the student shall be able to:

- Detect soft tissue injuries such as sprains and strains.
- Detect common fractures of extremities.
- Deliver first aid measures for common fractures and sprains.
- Deliver emergency measures to poly trauma patients.
- Manage uncomplicated fractures of clavicle, forearm, phalanges etc.
- Use techniques of splinting such as application of Thomas splint, plaster slab and casts, immobilization by skin tractions etc.
- Learn indications for closed reductions, open reductions, internal fixation and external fixations of fracture.
- Manage common bone infection; learn indications for sequestration, amputation and corrective measures for bone deformities.
- Advice and counsel patient for rehabilitation for post traumatic, poliomyelitis, cerebral palsy and amputation.
- Be able to perform certain orthopedic skills, provide sound advice of skeletal and related conditions at primary or secondary health care level.

d. **Integration**: The teaching should be aligned and integrated horizontally and vertically in order to allow the student to understand the structural basis of orthopedic problems, their management and correlation with function, rehabilitation and quality of life.

16. ANAESTHESIOLOGY

a. Competencies: The student must demonstrate ability to:

- Describe and discuss the pre-operative evaluation, assessing fitness for surgery and the modifications in medications in relation to anesthesia /surgery,
- Describe and discuss the roles of Anesthesiologist as a peri-operative Physician including pre-medication, endotracheal intubation, general anesthesia and recovery (including variations in recovery from anesthesia and anaesthetic complications),
- Describe and discuss the management of acute and chronic pain, including labour analgesia,
- Demonstrate awareness about the maintenance of airway in children and adults in various situations,
- Demonstrate the awareness about the indications, selection of cases and execution of cardio- pulmonary
- Resuscitation in emergencies and in the intensive care and high dependency units,
- Choose cases for local / regional anesthesia and demonstrate the ability to administer the same,
- Discuss the implications and obtain informed consent for various procedures and to maintain the documents.

b. Broad subject specific objectives:

Knowledge: At the end of the course, the student shall be able to :

- Know of simple nerve block and pain relief
- Awareness of the principles of administration of general, regional and local anesthesia.
- Know importance of hypoglycemia/hyperglycemia, hypotension/hypertension, IHD, Myocardial infarction.
- Know ventilators.

c. Skills : At the end of the training, the students should be able to:

- Perform cardio-pulmonary resuscitation with the available resources and transfer the patients to a bigger hospital for advanced life support.
- Set up intravenous infusion and manage fluid therapy
- Clear and maintain airway in unconscious patient.
- Administer oxygen correctly

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to provide comprehensive care for patients undergoing various surgeries, in patients

with pain, in intensive care and in cardio respiratory emergencies. Integration with the preclinical department of Anatomy, para- clinical department of Pharmacology and horizontal integration with any/all surgical specialties is proposed.

17. RADIODIAGNOSIS

a. Competencies: The student must demonstrate:

- Understanding of indications for various radiological investigations in common clinical practice,
- Awareness of the ill effects of radiation and various radiation protective measures to be employed,
- Ability to identify abnormalities in common radiological investigations.

b. Broad subject specific objectives:

Knowledge: At the end of the course, the student shall be able to :

- Enlist and describe the various diagnostic modalities
- Delineate normal and abnormal radiological findings
- Understand basic radiology and emphasize on its clinical applications
- Describe radiographic, ultra sonographic, CT, MRI features of common pathologies.
- Describe and integrate radiological findings in CNS, GIT, RS, CVS, MSK, GUT

c. Skills At the end of the course, the student shall be able to:

- Make use of Imaging findings to reach to a diagnosis;
- Analysis and interpret radiological data;
- Demonstrate the skills of solving clinical problems by illustrative evidences and decision making.

d. Integration: Horizontal and vertical integration to understand the fundamental principles of radiologic imaging, anatomic correlation and their application in diagnosis and therapy

18. OTO-RHINOLARYNGOLOGY (ENT)

a. Competencies: The learner must demonstrate :

- Knowledge of the common Otorhinolaryngological (ENT) emergencies and problems,
- Ability to recognize, diagnose and manage common ENT emergencies and problems in primary care setting,

- Ability to perform simple ENT procedures as applicable in a primary care setting,
- Ability to recognize hearing impairment and refer to the appropriate hearing impairment rehabilitation programme.

b. Broad subject specific objectives:

Knowledge: At the end of the course, the student shall be able to :

- Describe the basic pathophysiology of common Ear, Nose & Throat (ENT) diseases &emergencies.
- Adopt the rational use of commonly used drugs keeping in mind their adverse reactions.
- Suggest common investigative procedures & their interpretation.

c. Skills: At the end of the course the student shall be able to :

- Examination & Diagnose common ENT problems including pre-malignant & Malignant disorders of the Head & Neck.
- Manage ENT problems at first level of care & be able to refer whenever necessary.
- Assist / carry out minor ENT procedures like ear syringing, ear dressing, nasal packing.
- Assist in certain procedures such as tracheotomy, endoscopy & removal of foreign bodies.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to allow the learner to understand the structural basis of ENT problems, their management and correlation with function, rehabilitation and quality of life. The undergraduate training ENT will provide an integrated approach towards other disciplines especially, neurosciences, ophthalmology & general surgery.

19. OPHTHALMOLOGY

a. Competencies: The student must demonstrate:

- Knowledge of common eye problems in the community
- Recognize, diagnose and manage common eye problems and identify indications for referral,
- Ability to recognize visual impairment and blindness in the community and implement national programmes as applicable in the primary care setting.

b. Broad subject specific objectives

Knowledge: At the end of the course, student shall have the knowledge of

- Common problems affecting the eye.
- Principles of management of major ophthalmic emergencies.
- Main systemic disease affecting the eye.
- Effects of local and systemic diseases on patient's vision and the necessary action required minimizing the sequelae of such diseases.
- Adverse drug reaction with special reference to ophthalmic manifestations.
- Magnitude of blindness in India and its main causes.
- National programme for control of blindness and its implementation at various levels.
- Eye care education for prevention of eye problems.
- Role of primary health center in organization of eye camps.
- Organization of primary health care and the functioning of the ophthalmic assistant.
- Integration of the national programme for control of blindness with the other national health programmes.
- Eye bank organization.

c. Skills

- Elicit a history pertinent to general health and ocular status.
- Assist in diagnostic procedures such as visual acuity testing, examination of eye, Schiotz tonometry, Staining of Corneal pathology, confrontation, perimetry, Subjective refraction including correction of Presbyopia and aphakia, direct ophthalmoscopy and conjunctival smear examination and Cover test.
- Diagnose and treat common problems affecting the eye.
- Interpret ophthalmic signs in relation to common systemic disorders.
- Assist/observe therapeutic procedures such as Subconjunctival injection, corneal conjunctival foreign body removal, carbolic cautery for corneal ulcers, Nasolacrimal duct syringing and tarsorrhaphy
- Provide first aid in major ophthalmic emergencies.
- Assist to organize community surveys for visual check-up.
- Assist to organize primary eye care service through primary health centers.
- Use effective means of communication with the public and individual to motivate for surgery in cataract and for eye donation.
- Establish rapport with his seniors, colleagues and paramedical workers, so as to effectively function as a member of the eye care team.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to allow the student to understand the structural basis of ophthalmologic problems, their management and correlation with function, rehabilitation and quality of life.

20. OBSTETRICS AND GYNAECOLOGY

a. Competencies: The student must demonstrate ability to:

- Provide peri-conceptional counseling and ante natal care,
- Identify high-risk pregnancies and refer appropriately,
- Conduct normal deliveries, using safe delivery practices in the primary and secondary care settings,
- Prescribe drugs safely and appropriately in pregnancy and lactation,
- Diagnose complications of labor, institute primary care and refer in a timely manner,
- Perform early neonatal resuscitation,
- Provide postnatal care, including education in breast-feeding,
- Counsel and support couples in the correct choice of contraception,
- Interpret test results of laboratory and radiological investigations as they apply to the care of the obstetric patient,
- Apply medico-legal principles as they apply to tubectomy, Medical Termination of Pregnancy (MTP), Pre-conception and Prenatal Diagnostic Techniques (PC PNDT Act) and other related Acts.
- Elicit a gynecologic history, perform appropriate physical and pelvic examinations and PAP smear in the primary care setting,
- Recognize, diagnose and manage common reproductive tract infections in the primary care setting,
- Recognize and diagnose common genital cancers and refer them appropriately.

b. Broad subject specific objectives

Knowledge : At the end of the course, the student shall be able to:

- Outline the anatomy, physiology and pathophysiology of the reproductive system and the common conditions affecting it.
- Diagnose normal pregnancy, labour, puerperium and manage the problems he is likely to encounter therein.
- List of leading causes of maternal and perinatal morbidity and mortality.
- Understand the principles of contraception and various techniques employed, methods of medical termination of pregnancy, sterilization and their complications.
- Identify the use, abuse and side effects of drugs in pregnancy, peri- menopausal and post-menopausal periods.
- Describe the national programme of maternal and child health and family welfare and their implementation at various levels.
- Identify common gynecological diseases and describe principles of their management.

- State the indications, techniques and complications of surgeries like Caesarian section, laparotomy, abdominal and vaginal hysterectomy, Fothergill's operation and vacuum
- Aspiration for Medical Termination of pregnancy (MTP) and minor surgeries like EB, D and C, Cervical Biopsy and Cervical encirclage.

c. Skills : At the end of the course, the student should be able to

- Take proper history and writing a good case sheet
- Writing a good discharge summary, proper referral letter
- Examination of patient and arrival at a diagnosis
- Planning for investigation and treatment
- Community orientation, participation in community health promoting and preventing programmes
- Examine a pregnant woman, recognize high- risk pregnancies and make appropriate referrals.
- Conduct a normal delivery, plot and inter pretepartogram
- Recognize complications and decision of referral, provide postnatal care,
- Resuscitate the newborn and recognize the congenital anomalies.
- Advise a couple on the use of various available contraceptive devices (student should see at least 5 Cu-Tinsertions and 5 cases of female sterilization operations.)
- Perform pelvic examination, diagnose and manage common. gynecological problems including early detection of genital malignancies.
- Make a vaginal cytological smear, perform a post coital test and wet vaginal smear examination for Trichomonas vaginalis, Moniliasis and gram stain for gonorrhea, catheterization of urinary bladder
- Interpretation of data of investigations like biochemical, histopathological, radiological ultrasound etc.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in order to provide comprehensive care for women in their reproductive years and beyond, based on a sound knowledge of structure, functions and disease and their clinical, social, emotional, psychological correlates in the context of national health priorities. The student shall be able to integrate clinical skills with other disciplines and bring about coordination of family welfare programme for the national goal of population control.

B. PHASE WISE TRAINING AND TIME DISTRIBUTION FOR PROFESSIONAL DEVELOPMENT

The Competency based Undergraduate Curriculum and Attitude, Ethics and Communication (AETCOM) course, as published by the Medical Council of India and also made available on the Council's website, shall be the curriculum for the batches admitted in MBBS from the academic year 2019-20 onwards.

In order to ensure that training is in alignment with the goals and competencies required for a medical graduate, there shall be a **Foundation Course** to orient medical learners to MBBS programme, and provide them with requisite knowledge, communication (including electronic), technical and language skills.

I. Training period and time distribution:

Universities shall organize admission timing and admission process in such a way that teaching in the first Professional year commences with induction through the Foundation Course by the 1st of August of each year. There shall be no admission of students in respect of any academic session beyond 30th August under any circumstance. The Universities shall not register any student admitted beyond the said date.

The National Medical Commission may direct, that any student identified as having Obtained admission after the last date for closure of admission be discharged from the Course of study, or any medical qualification granted to such a student shall not be a recognized qualification by National Medical Commission.

The institution which grants admission to any student after the last date specified from the same shall also be liable to face such action as may be prescribed by National Medical Commission.

Every learner shall undergo a period of certified study extending over 4 ½ academic years, divided into four professional years from the date of commencement of course to the date of completion of examination which shall be followed by one year of compulsory rotating internship.

Each academic year will have at least 39 teaching weeks with a minimum of eight hours of working on each day including one hour as lunch break.

Didactic lectures shall not exceed one third of the schedule; two third of the schedule shall include interactive sessions, practicals, clinical or/and group discussions. The learning process should include clinical experiences, problem- oriented approach, case studies and community health care activities.

Teaching and learning shall be aligned and integrated across specialties both vertically and horizontally for better learner comprehension. Learner centered learning methods should include Early Clinical Exposure, problem-oriented learning, case studies, community- oriented learning, self- directed, experiential learning& Electives.

At the end of each professional year University examination will be conducted. If any student fails to clear University examination, he will appear in supplementary examination.

Supplementary examinations and declaration of results shall be processed within 3-6 weeks from the date of declaration of the results of the main examination for every professional year, so that the candidates, who pass, can join the main batch for progression.

If the candidate fails in the supplementary examination of first MBBS, he shall join the batch of next academic /subsequent year. There shall be no supplementary batches. Partial attendance of examination in any subject shall be counted as an attempt.

- A candidate, who fails in the First Professional examination, shall not be allowed to join the Second Professional.
- A candidate, who fails in the second Professional examination, shall be allowed to join the third Professional Part I training, however he shall not be allowed to appear for the examination unless he has passed second professional examination.
- A candidate who fails in the third Professional (Part I) examination shall be allowed to join third Professional part II training, however he shall not be allowed to appear for the examination unless he has passed second professional examination.

II. The period of 4½ years is divided as follows:

Phase I –Total 12 months

i) First Professional phase of 12 months including Foundation Course of one week and University exams.

It shall consist of preclinical subjects – Anatomy, Physiology, Biochemistry, Introduction to Community Medicine, Humanities, Professional development including Attitude, Ethics & Communication (AETCOM) module, family adoption programme through village outreach, Pandemic module and early clinical exposure, ensuring alignment & all types of integration and simulation-based learning.

Phase II- Second Professional (12 months) including University exam.

It will consist of Pathology, Pharmacology, Microbiology, family visit under Community Medicine, General Surgery, General Medicine & Obstetrics & Gynecology Professional development including AETCOM module, simulation-based learning and introduction to clinical subjects ensuring both alignment & all types of integration.

The clinical exposure to learners will be in the form of learner-doctor method of clinical training in all phases. The emphasis will be on primary, preventive and comprehensive health care. A part of training during clinical postings should take place at the *primary level* of health care. It is desirable to provide learning experiences in secondary health care, wherever possible. This will involve:

- Experience in recognizing and managing common problems seen in outpatient, inpatient and emergency settings,
- Involvement in patient care as a team member,
- Involvement in patient management and performance of basic procedures.

iii) Phase III - 30 months

a. Third Professional Part I (12 months, including University exams)

Forensic Medicine and Toxicology, Community Medicine, Medicine & allied, Surgery & allied, Pediatrics and Obstetric & Gynecology including AETCOM, Pandemic module, Clinical teaching in General Medicine, General Surgery, Obstetrics & Gynecology, Pediatrics, Orthopedics, Dermatology, Community Medicine, Psychiatry, Respiratory Medicine, Radio-diagnosis (& Radiotherapy) and Anesthesiology & Professional development.

b. Electives (1 month) shall be included here. These will be in 2 blocks of 15 days each in Final first; 1st block after annual exam of III MBBS part 1 and 2nd block after the end of 1st elective.

c. Third Professional Part II (18 months, including University exam)

Subjects include:

- Medicine and allied specialties (General Medicine, Psychiatry, Dermatology (including Venereology and Leprosy, Respiratory Medicine (including Tuberculosis)
- Surgery and allied specialties (General Surgery, Otorhinolaryngology, Ophthalmology, Orthopedics, Dentistry, Physical Medicine and rehabilitation, Anesthesiology and Radiodiagnosis)
- Obstetrics and Gynecology (including Family Welfare)
- Pediatrics
- AETCOM module

III. Distribution of teaching hours phase wise

a. First, second and third Professional part-I, teaching hours:

Time allotted	:	12 months (approx. 52weeks)
Time available	:	Approx. **39 weeks** (excluding 13 weeks) (39 hours/ week)

Prelim / University Exam & Results:	9 weeks
Vacation:	2 weeks
Public Holidays:	2 weeks

Time distribution in weeks: 39 weeks x 39 hours = **1521** available hours for Teaching- Learning

b. Final MBBS part-2, teaching hours:

Time allotted	:	18 months (approx. 78 weeks)
Time available	:	Approx. **62 weeks** (excluding 16 weeks) (39 hours/ week)

Prelim / University Exam & Results:	10 weeks
Vacation:	3 weeks
Public Holidays:	3 weeks

Time distribution in weeks: 62 x 39 hrs = **2418 hrs** available hours for Teaching- Learning

(Clinical Postings: 15 hours/ week II MBBS onwards included in academic schedule)

These are attached in sperate annexure with all relevant tables.

- Academic calendar shall be as per the Table 1.
- Distribution of subjects for Professional Phase – wise training is given in Table 2.
- Minimum teaching hours prescribed in various disciplines are given in Tables 3-7.
- Distribution and duration of clinical postings is given in Table 8.

Time allotted excludes time reserved for internal /University examinations, and vacation.

Second professional clinical postings shall commence before / after declaration of results of the first professional phase examinations, as decided by the institution/ University.

Third Professional parts I and part II clinical postings shall start no later than two weeks after the completion of the previous professional examination.

A total of 25% of allotted time of third Professional shall be utilized for integrated learning with phase I and II subjects. This will be included in the assessment of clinical subjects.

Note :

- The period of training is minimum suggested. Adjustments where required depending on availability of time may be made by the concerned college/ institution. This period of training does not include University examination period.
- An exposure to skills lab for at least two (02) weeks prior to clinical postings shall be made available to all student.

C) New teaching /learning elements

1) Foundation Course

Goal: The goal of the Foundation Course is to prepare a learner to study medicine effectively.

Objectives:

(a) Orient the learner to:

- The medical profession and the Physician's role in society
- The MBBS programme
- Alternate health systems i.e. AYUSH in India and history of Medicine
- Medical ethics, attitudes and professionalism
- Health care system and its delivery
- National health programmes and policies
- Universal precautions and vaccinations
- Patient safety and biohazard safety
- Principles of primary care(general and community based care)
- The academic ambience

(b) Enable the learner to acquire enhanced skills in:

- Language
- Interpersonal relationships
- Communication
- Learning including self-directed learning
- Time management
- Stress management
- Use of information technology, and artificial intelligence

(c) Train the learner to provide:

- First-aid
- Basic life support

- In addition to the above, learners maybe enrolled in one of the following programmes which will be run concurrently:
- Local language programme
- English language programme
- Computer skills

These may be done in the last two hours of the day. These sessions must be as interactive as possible.

Sports (to be used through the Foundation Course as protected 04 hours /week).

Leisure and extracurricular activity (to be used through the Foundation Course as projected 02 hours per week).

Institutions shall develop learning modules and identify the appropriate resource persons for their delivery.

The time committed for the Foundation Course may not be used for any other curricular activity.

The Foundation Course shall have a minimum of 75% attendance of all students mandatorily. This will be certified by the Dean of the college.

The Foundation Course shall be organized by the Coordinator appointed by the Dean of the college and shall be under supervision of the Heads of MBBS phase 1 departments.

Every college shall arrange for a meeting with parents/ wards of all students and records of the same shall be made available to UGMEB of NMC.

2) Early Clinical Exposure

Objectives: The objectives of early clinical exposure of the first-year medical learners are to enable the learner to:

- Recognize the relevance of basic sciences in diagnosis, patient care and management,
- Provide a context that will enhance basic science learning,
- Relate to experience of patients as a motivation to learn,
- Recognize attitude, ethics and professionalism as integral to doctor-
- Patient relationship,
- Understand the socio-cultural context of disease through the study of humanities.

- Elements
- Basic science correlation: i.e. apply and correlate principles of basic sciences as they relate to patient care (this shall be part of integrated modules).
- Clinical skills: to include basic skills in interviewing patients, doctor-patient communication, ethics and professionalism, critical thinking and analysis and self-learning (this training shall be imparted in the time allotted for early clinical exposure).
- Humanities: To introduce learners to a broader understanding of the socio-economic framework and cultural context within which health is delivered through the study of humanities and social sciences.

3) Electives

Objectives: To provide the learner with opportunities:

- For diverse learning experiences,
- It is mandatory for learners to do an elective. The elective time shall not be used to make up for missed clinical postings, shortage of attendance or other purposes.
- Institutions will pre-determine the number and nature of electives, names of the supervisors, and the number of learners in each elective based on the local conditions, available resources and faculty.
-
- Electives on topics in areas such as Research methodology, Use of Artificial intelligence and computers in Health and Medical Education, Health Management, Health economics, Indian system of medicine, Medical photography /clinical photography, Global health, Evidence based medicine, Art and music in medicine, Literary activities, etc. may be provided by the college/ institution.
- It shall be preferable that elective choices are made available to the learners in the beginning of the academic year.
- The learner must submit a learning log book based on both blocks of the electives.
- 75% attendance in the electives and submission of log book maintained during electives is required for eligibility to appear in the final MBBS examination/ NEXT.
- Institutions may use part of this time for strengthening basic skill certification.

4) Professional Development including Attitude, Ethics and Communication Module (AETCOM)

Objectives of the programme : At the end of the programme, the learner must demonstrate ability to:

- Understand and apply principles of bioethics and law as they apply to medical practice and research, understand and apply the principles of clinical reasoning as they apply to the care of the patients,
- Understand and apply the principles of system-based care as they relate to the care of the patient,
- Understand and apply empathy and other human values to the care of the patient,
- Communicate effectively with patients, families, colleagues and other health care professionals,
- Understand the strengths and limitations of alternative systems of medicine,
- Respond to events and issues in a professional, considerate and humane fashion,
- Translate learning from the humanities in order to further his professional and personal growth.

Learning experiences:

- This will be a longitudinal programme spread across the continuum of the MBBS programme including internship,
- Learning experiences shall include small group discussions, patient care scenarios, workshops, seminars, role plays, lectures etc.
- Attitude, Ethics & Communication Module (AETCOM module) developed by the erstwhile Medical Council of India should be used longitudinally for purposes of instruction.
- 75% attendance in Professional Development Programme (AETCOM Module) shall be mandatory for eligibility to appear for final examination in each professional year.

Internal Assessment shall include:

- Written tests comprising of short notes and creative writing experiences,
- OSCE based clinical scenarios /viva voce.
- At least one question in each paper of each clinical specialty in the University examination shall test knowledge competencies acquired during the professional development programme.
- Skill competencies acquired during the Professional Development Programme must be tested during the clinical, practical and viva voce.

5) Learner-doctor method of clinical training (Clinical Clerkship)

a. Goal: To provide learners with experience in:

- Longitudinal patient care,
- Being part of the health care team,
- Hands-on care of patients in outpatient and in-patient setting.

b. Structure:

- The first clinical posting in second professional shall orient learners to the patient, their roles and the specialty.
- The learner-doctor programme shall progress as outlined in Table 9.
- The learner shall function as a part of the health care team with the following responsibilities:
    - Be a part of the units' out-patient services on admission days,
    - Remain with the admission unit until at least 6 PM except during designated class hours,
    - Be assigned patients admitted during each admission day for whom he will undertake responsibility, under the supervision of a senior resident or faculty member,
    - Participate in the unit rounds on its admission day and will present the assigned patients to the supervising Physician,
- Follow the patient's progress throughout the hospital stay until discharge,
- Participate, under supervision, in procedures, surgeries, deliveries etc. of assigned patients,
- Participate in unit rounds on at least one other day of the week excluding the admission day,
- Discuss ethical and other humanitarian issues during unit rounds,
- Attend all scheduled classes and educational activities,
- Document his observations in a prescribed log book /case record.

No learner will be given independent charge of the patient in the capacity of primary Physician of the concerned patient.

The supervising Physician shall be responsible for all patient care decisions and guide the learner from time to time as required.

6) Assessment:

- A designated faculty member in each unit will coordinate and facilitate the

activities of the learner, monitor progress, provide feedback and review the log book/ case record.

- The log book/ case record must include the written case record prepared by the learner including relevant investigations, treatment and its rationale, hospital course, family and patient discussions, discharge summary etc.
- The log book shall also include records of outpatients assigned. Submission of the log book/ case record to the department is required for eligibility to appear for the final examination of the subject.

I. Eligibility to appear for Professional examinations

The performance in essential components of training are to be assessed, based on:

(a) Attendance

- There shall be a minimum of 75% attendance in theory and 80% in practical /clinical for eligibility to appear for the examinations in that subject. In subjects that are taught in more than one phase – the learner must have 75% attendance in theory and 80% in practical in each phase of instruction in that subject. There shall be minimum of 80% attendance in family visits under Family adoption programme.
- If an examination comprises more than one subject (for e.g., General Surgery and allied branches), the candidate must have a minimum of 75% attendance in each subject including its allied branches, and 80% attendance in each clinical posting.
- Learners who do not have at least 75% attendance in the electives will not be eligible for the Third Professional - Part II examination/ NEXT.

(b) Internal Assessment: Internal assessment shall be based on day-to-day assessment. It shall relate to different ways in which learners participate in learning process including assignments, preparation for seminar, clinical case presentation, preparation of clinical case for discussion, clinical case study/ problem solving exercise, participation in project for health care in the community. Internal assessment shall not be added to summative assessment. However, internal assessment should be displayed under a separate column in detailed marks card.

(c) Learners must have completed the required certifiable competencies for that phase of training and completed the log book appropriate for that phase of training to be eligible for appearing at the final University examination of that subject.

(d) Regular periodic examinations shall be conducted throughout the course. There shall be no less than three internal assessment examinations in each subject of first and second professional year, and no less than two examinations in each subject of final professional

year. An end of posting clinical assessment shall be conducted for each clinical posting in each professional year.

- When subjects are taught in more than one phase, the internal assessment must be done in each phase and must contribute proportionately to final assessment. For example, General Medicine must be assessed in second Professional, third Professional Part I and third Professional Part II, independently.
- Day to day records and log book (including required skill certifications) should be given importance in internal assessment. Internal assessment should be based on competencies and skills.
- The final internal assessment in a broad clinical specialty (e.g., Surgery and allied specialties etc.) shall comprise of marks from all the constituent specialties. The proportion of the marks for each constituent specialty shall be determined by the time of instruction allotted to each.
- Learners must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40% marks in theory and practical separately) for internal assessment in a particular subject in order to be eligible for appearing at the final University examination of that subject. Internal assessment marks will reflect as separate head of passing at the summative examination.
- The results of internal assessment should be displayed on the notice board within one week of the test.
- Universities shall guide the colleges regarding formulating policies for remedial measures for students who are either not able to score qualifying marks or have missed on some assessments due to any reason.

II. University Examinations:

University examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary knowledge, minimal level of skills, ethical and professional values with clear concepts of the fundamentals which are necessary for him to function effectively and appropriately as a Physician of the first contact. Assessment shall be carried out on an objective basis to the extent possible.

- Nature of questions shall include different types such as structured assays (Long-Answer Questions -LAQ), Short-Answer Questions (SAQ) and objective type questions (e.g. Multiple Choice Questions - MCQ). Marks for each part shall be indicated separately. MCQs shall be accorded a weightage of not more than 20% of the total theory marks. In subjects that have two papers, the learner must secure minimum 50% of marks in aggregate (both papers together) to pass.
- Practical /clinical examinations shall be conducted in the laboratories and /or hospital wards. The objective will be to assess proficiency and skills to conduct experiments, interpret data and form logical conclusion. Clinical cases kept in the examination must be common conditions that the learner may encounter as a

Physician of first contact in the community. Selection of rare syndromes and disorders as examination cases is to be discouraged. Emphasis should be on candidate's capability to elicit history, demonstrate physical signs, write a case record, analyze the case and develop a management plan.

- Viva/oral examination should assess approach to patient management, emergencies, and attitudinal, ethical and professional values. Candidate's skill in interpretation of common investigative data, X-rays, identification of specimens, ECG, etc. is to be also assessed.

University Examinations shall be held as under:

(a) First Professional

The first Professional examination shall be held at the end of first Professional training (in the 12th month of that training), in the subjects of Anatomy, Physiology and Biochemistry.

(b) Second Professional

The second Professional examination shall be held at the end of second professional training (12th month of that training), in the subjects of Pathology, Microbiology, and Pharmacology.

(c) Third Professional

- Third Professional Part I examination shall be held at end of third Professional part 1 of training (12th month of that training) in the subjects of Community Medicine, and Forensic Medicine including Toxicology
- Third Professional Part II / National Exit Test (NExT) as per NExT regulations- (Final Professional) examination shall be at the end of 17th / 18th month of that training, in the subjects of General Medicine, General Surgery, Ophthalmology, Otorhinolaryngology, Obstetrics & Gynecology, and Pediatrics, and allied subjects as per NExT REGULATIONS.

Note:

- At least one question in each paper of each PHASE shall test the knowledge, and competencies acquired during the professional development programme (AETCOM module).
- Skills competencies acquired during the Professional Development Programme (AETCOM module) shall be tested during clinical, practical and viva.

In subjects that have two papers, the learner must secure minimum 50% of marks in aggregate (both papers together) to pass in the said subject

Criteria for passing in a subject: A candidate shall obtain 50% marks in University conducted examination separately in Theory and in Practical (practical includes: practical/ clinical and viva voce) in order to be declared as passed in that subject.

Appointment of Examiners

- Person appointed as an examiner in the particular subject must have at least four years of total teaching experience as Assistant Professor after obtaining postgraduate degree in the subject in a college affiliated to a recognized medical college (by UGMEB of NMC).
- For Practical /Clinical examinations, there shall be at least four examiners for every learner, out of whom not less than 50% must be external examiners. Of the four examiners, the senior-most internal examiner shall act as the Chairman and coordinator of the whole examination programme so that uniformity in the matter of assessment of candidates is maintained.
- A University having more than one college shall have separate sets of examiners for each college, with internal examiners from the concerned college. External examiner may be from outside the college/ University/ state/ union territory.
- There shall be a Chairman of the Board of paper-setters who shall be an internal examiner and shall moderate the questions.
- All eligible examiners with requisite qualifications and experience can be appointed internal examiners by rotation in their subjects.
- All theory paper assessment should be done as central assessment program (CAP) of the concerned University.
- Internal examiners shall be appointed from the same institution for unitary examination in the same institution. For pooled examinations at one centre, the approved internal examiners from same University may be appointed.
- There shall be no grace marks to be considered for passing in an examination.

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AETCOM Competencies for First MBBS

Subject	Competency Number	Competency
Anatomy	Module 1.5	The cadaver as our first teacher Demonstrate respect and follow the correct procedure when handling cadavers and other biologic tissue
	Module 1.1	Identify, discuss Physician's role and responsibility to society and the community that he serves
Physiology	Module 1.2, Module 1.3	Demonstrate empathy in patient encounters
	Module 1.4	Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non- judgmental and empathetic manner
Biochemistry	Module 1.1,	Enumerate and Describe the role of a Physician in health care system
	Module 1.1	Describe and discuss the commitment to lifelong learning as an important part of Physician growth

AETCOM Competencies for Second MBBS

Subject	Competency Number	Competency
Pathology	2.6	Identify, discuss and define medico-legal, socio-cultural and ethical issues as they pertain to refusal of care including do not resuscitate and withdrawal of life support.
	2.4 A	Demonstrate ability to work in a team of peers and superiors.
	2.4 B	Demonstrate respect in relationship with patients, fellow team members, superiors and other health care workers.
	2.7	Identify, discuss and defend, medico-legal, socio-cultural and ethical issues as they pertain to consent for surgical procedures.
Microbiology	Module 2.2 A	Describe and discuss the role of non-malfeasance as a guiding principle in patient care
	Module 2.2 B	Describe and discuss the role of autonomy and shared responsibility as a guiding principle in patient care
	Module 2.2 C	Describe and discuss the role of beneficence of a guiding principle inpatient care
	Module 2.2 D	Describe and discuss the role of a Physician in health care system
	Module 2.2 E	Describe and discuss the role of justice as a guiding principle in patient Care
	Module 2.3	Describe and discuss the role of justice as a guiding principle in patient care
	Module 2.5	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to patient autonomy, patient rights and shared responsibility in health care
Pharmacology	Module 2.1	Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non-judgmental and empathetic manner.
	Module 2.8	Demonstrate empathy in patient encounters.

AETCOM Competencies for Third Year (Part I)

Subject	Competency Number	Competency
Ophthalmology	3.1	Demonstrate ability to communicate to patients in a patient, respectful, nonthreatening, non-judgmental and empathetic manner
	3.2	Demonstrate an understanding of the implications and the appropriate procedure and response to be followed in the event of medical error
(Oto-Rhino-Laryngology(ENT)	3.3 A	Demonstrate ability to communicate to patients in a patient, respectful, nonthreatening, non-judgmental and empathetic manner
	3.3 B	Identify, discuss and defend, medico-legal, socio-cultural and ethical issues as they pertain to consent for surgical procedures
Forensic Medicine & Toxicology	3.3 C	Administer informed consent and appropriately address patient queries to a patient undergoing a surgical procedure in a simulated environment
	3.4	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to confidentiality in patient care
Community Medicine	3.5 A	Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues as it pertains to the physician - patient relationship (including fiduciary duty)
	3.5 B	Identify and discuss physician's role and responsibility to society and the community that she/ he serves

AETCOM Competencies for Third Year (Part II)

Subject	Competency Number	Competency
Medicine and Allied Subjects	4.1 A	The student should be able to: Demonstrate ability to communicate to patients in a patient, respectful, nonthreatening, non-judgmental and empathetic manner
	4.1 B	The student should be able to: Communicate diagnostic and therapeutic options to patient and family in a simulated environment
	4.3	The student should be able to: Identify and discuss medico-legal, socio-economic and ethical issues as it pertains to organ donation
Surgery and Allied Subjects	4.4 A	The student should be able to: Demonstrate empathy in patient encounters
	4.4 B	The student should be able to: Communicate care options to patient and family with a terminal illness in a simulated environment
	4.5	The student should be able to: Identify and discuss and defend medico-legal, socio-cultural, professional and ethical issues in physician - industry relationships
	4.6	The student should be able to: Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts
Obstetrics and Gynecology	4.2	The student should be able to: Identify, discuss and defend medico-legal, socioeconomic and ethical issues as it pertains to abortion / Medical Termination of Pregnancy and reproductive rights
	4.7	The student should be able to: Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts
	4.8 A	The student should be able to: Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts.
	4.8 B	The student should be able to: Demonstrate empathy to patient and family with a terminal illness in a simulated environment.
Pediatrics	4.9 A	The student should be able to: Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues pertaining to medical negligence
	4.9 B	The student should be able to: Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues pertaining to malpractice

Table1: Time distribution of MBBS Programme & Examination Schedule

Academic Calendar for CBME 2023-24 Batch

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023								1	2	3	4	5
2024	6	7	8	9	10	11	12-1st Prof exam, result	13-2nd MBBS	14	15	16	17
2025	18	19	20	21	22	23	24-2nd Prof exam, result	25-Final 1st	26	27	28	29
2026	30	31	32	33	34	35	36-Final 1st exam, result	37-Final 2nd	38	39	40	41
2027	42	43	44	45	46	47	48	49	50	51	52	53 Final Exam/NExT
2028	54 NExT	1-CRMI	2	3	4	5-2nd NExT	6	7	8	9	10	11
2029	12 NExT											

Legends:

AETCOM: Attitude, Ethics and Communication skills

FAP: Family Adoption Programme (village outreach)

SDL: Self Directed Learning

SGL: Small Group Learning (tutorials/ Seminars/ Integrated Learning)

Note : NExT shall be as per NExT Regulations

Table2: Distribution of subjects in each Professional Phase

Phase & year of MBBS training	Subjects & Teaching Elements	Duration (months)	University Examination
First Professional MBBS	(i) Foundation course -1 week, remaining spread over 6 months at the discretion of college. (ii) Anatomy, Physiology & Biochemistry, Introduction to Community Medicine, Family adoption programme (FAP) through village outreach (iii) Medicine, Humanities. (iv) Early Clinical Exposure. (v) Attitude, Ethics, and communication Module (AETCOM)	12 months	1st professional
Second Professional MBBS	(i) Pathology, Microbiology, Pharmacology (ii) Introduction to clinical subjects (iii) Clinical postings, Family visits for FAP (iv) AETCOM	12 months	2nd professional
Third Professional part 1, MBBS, including Electives 1 month	(i) Community Medicine, Forensic Medicine and Toxicology, Medicine & allied, Surgery & allied, Pediatrics and Obstetrics & Gynecology. (ii) Family visits for FAP (iii) Clinical postings (iv) AETCOM (v) Electives- 1 month, 2 blocks, 15 days each	12 months	Final professional-Part 1
Third Professional part 2, MBBS	(i) General Medicine, Dermatology, Psychiatry, Respiratory medicine, Pediatrics, General Surgery, Orthopedics, Oto-rhinolaryngology, Ophthalmology, Radiodiagnosis, Anesthesiology, Obstetrics & Gynecology (ii) Clinical postings (iii) AETCOM	18 months	Final Professiona-Part II

Table 3: Foundation Course

(one week + spread over 6 months at the discretion of college)

Subjects/Contents	**Teaching hours**
Orientation	30
Skills Module	34
Field visit to Community Health Center	08
Introduction to Professional Development & AETCOM module	40
Sports, Yoga and extra-curricular activities	16
Enhancement of language/computer skills	32
Total	**160**

Table No. 4 - Distribution of Subject Wise Teaching Hours for 1st MBBS

Subject	Lectures	SGL	SDL	Total
Foundation Course	-	-	-	39
Anatomy	210	400	10	620
Physiology*	130	300	10	440
Biochemistry	78	144	10	232
Early Clinical Exposure**	27	-	-	27
Community Medicine	20	20	-	40
FAP	-	-	27	27
(AETCOM)***	-	26	-	26
Sports and extra-curricular activities	-	-	-	10
Formative Assessment and Term examinations	-	-	-	60
Total	**464**	**918**	**30**	**1521 #**

- Including Molecular Biology

** Early Clinical exposure hours to be divided equally in all three subjects.

***AETCOM module shall be a longitudinal programme.

Includes hours for Foundation course also

Table No. 5 - Distribution of Subject Wise Teaching Hours for II MBBS

Subjects	Lectures	SGL	Clinical Postings*	SDL	Total
Pathology	80	165	-	10	255
Pharmacology	80	165	-	10	255
Microbiology	70	135	-	10	215
Community Medicine	15	0	0	10	25
FAP	0	0	30	-	30
Forensic Medicine and Toxicology	12	22	-	08	42
Clinical Subjects	59	-	540	-	599
AETCOM	-	29	-	8	37
Sports and extra-curricular activities	-	-	-	20	35
Pandemic module				28	28
Final total	**316**	**516**	**585**	**104**	**1521**

Note : ***Clinical postings shall be for 3 hours per day, Monday to Friday.***

There will be 15 hours per week for all clinical postings.

Table No. 6 - Distribution of Subject Wise Teaching Hours for Final MBBS part 1

Subject	Lectures	SGL	SDL	Total
Electives	0	156	0	156
Gen. Med.	30	50	10	90
Gen Surgery	30	50	10	90
Obs. & Gyn	30	50	10	90
Pediatrics	25	30	10	65
Ortho+ PMR	15	20	10	45
For. Med.& Tox.	40	70	20	130
Community Med	55	70	20	145
FAP (Visits +log book submission)	-	21	10	31
Otorhinolaryngology (ENT)	15	20	10	45
Ophthalmology	15	20	10	45
Clinical posting	-	-	540	540
AETCOM	0	19	12	31
Pandemic module	18	0	0	18
Total	**273**	**546**	**672**	**1521**

Table 7: Distribution of Subject wise Teaching Hours for

Third professional part-2/ Final MBBS

Subjects	Lectures	SGL	SDL	Total
General Medicine	80	140	40	**260**
General Surgery	80	140	40	**260**
Obstetrics and Gynecology	80	140	40	**260**
Pediatrics	30	60	30	**120**
Orthopedics + Phys. Med. Rehab	25	35	25	**85**
AETCOM	30	0	22	**52**
Dermatology	15	10	15	**40**
Psychiatry	15	15	15	**45**
Respiratory Medicine	15	15	15	**45**
Otorhinolaryngology (ENT)	15	25	15	**55**
Ophthalmology	15	25	15	**55**
Radiodiagnosis +RT	8	15	15	**38**
Anesthesiology	8	15	15	**38**
Pandemic module	28	-	-	**28**
TOTAL	**444**	**610**	**302**	**1356**

Extra time for SDL/preparation for NExT

Table No. 8: Clinical Posting Schedules in weeks

Subjects	Period of training in weeks			Total Weeks
	II MBBS	III MBBS Part I	III MBBS Part II	
Electives	0	4	0	4
General Medicine	7	4	10	21
General Surgery	7	4	10	21
Obstetrics & Gynaecology	7	4	10	21
Pediatrics	4	4	5	13
Community Medicine	4	4	0	8
Orthopaedics, PMR, Trauma	2	2	4	8
Otorhinolaryngology	0	3	4	7
Ophthalmology	0	3	4	7
Respiratory Medicine	0	0	3	3
Psychiatry	0	2	4	6
Radio-diagnosis	0	0	2	2
Dermatology	2	2	2	6
Dentistry	1	0	0	1
Anaesthesiology	0	0	3	3
Emergency Medicine	2	0	1	3
Total	**36**	**36**	**62**	**134**

Table 9: Learner- Doctor programme (Clinical Clerkship)

Year of Curriculum	Focus of Learner-Doctor programme
Year 1	Introduction to hospital environment, early clinical exposure, understanding perspectives of illness, Family Adoption Program(FAP)
Year 2	History taking, physical examination, assessment of change in clinical status, communication and patient education, FAP
Year 3	All of the above and choice of investigations, basic procedures and continuity of care
Year 4	All of the above (except FAP) and decision making, management and outcomes

Table 10 : Marks distribution for various subjects for University Annual Examinations

Phase of Course	Theory	Practicals	Passing criteria
1st MBBS			
Anatomy- 2 papers	Paper 1- 100	100	Mandatory to get 50% marks separately in theory and in practicals. For theory, papers 1 and 2 for the same subject, aggregate of 50% in both papers.
	Paper 2 -100		
Physiology- 2 papers	Paper 1- 100	100	
	Paper 2 -100		
Biochemistry- 1 paper	Paper 1- 100	50	
2nd MBBS			
Pathology - 2 papers	Paper 1- 100	100	
	Paper 2 -100		
Microbiology- 1 paper	Paper 1- 100	50	
Pharmacology- 2 papers	Paper 1 -100	100	
	Paper 2- 100		
Final MBBS part 1			
Forensic Med. Tox.- 1 paper	Paper 1 - 100	50	
Community Med- 2 papers	Paper 1 -100	100	
	Paper 2- 100		

For NEXT, as per NEXT regulations.

GUIDELINES FOR MANPOWER REQUIREMENT FOR RESEARCH FACILITIES IN A MEDICAL COLLEGE

Research labs can be under following categories:

1. **Molecular lab**
2. **Stem cell research lab**
3. **Cytogenetics**
4. **HLA and tissue typing research lab**

Applied Clinical research for organ perfusion, cancer research, in vitro fertilization, etc. can be under any of the above research facilities.

MAN POWER:

(1) Lab Director : **1(One) Post**

Minimum Qualifications required :

(i) MD Path/MD Microbiology/MD Transfusion Medicine/MD Biochemistry.

(ii) Faculty with PhD (Medical subject will be preferred)

Lab work : 10 years experience

Lab research related publications : Minimum 10 in last 10 years

(2) Lab Supervisor : **1(One) Post (per research facility)**

Minimum Qualifications required:

(i) MD Path/ MD Microbiology/MD Transfusion Medicine/MD Biochemistry

(ii) Faculty with Ph.D. (Medical subject) will be preferred, or M.Sc. in life sciences with PhD from Medical college.

Lab work : 7 years experience

Lab research related publications : Minimum 5 in last 5 years

(3) Senior Scientific Research Officer : 1(One) Post or more (per research facility)

Minimum Qualifications required	:	
	(i)	PhD with MD Path/MD Microbiology/MD Transfusion Medicine/MD Biochemistry/PhD in medical college or MSc in life sciences with PhD from medical college
Lab work	:	4 years experience
Lab research related publications	:	Minimum 3 in last 3 years
(4) **Junior Research Officer**	:	1(One)or more (per research facility)
Minimum Qualifications required	:	
	(i)	MD Path/ MD Microbiology/ MD Transfusion Medicine/MD Biochemistry or Diploma in Clinical Pathology/ M.Sc. in Life Sciences, Ph.D. scholar/ Postdoc fellow
	(ii)	Diploma holder in any branch may pursue PhD if experience / research inclinations proved for minimum of 1 year. They can be enrolled for integrated Master's PhD course.
Lab work	:	1 year experience
Lab research related publications	:	preferably 1 in last 2 years
(5) Laboratory Technicians	:	**Minimum 2(two)** Posts
Minimum Qualifications required	:	
	(i)	B.Sc./M.Sc. in Life Sciences including Biotechnology,
	(ii)	DMLT
(6) Data entry operator/ Clerk	:	Minimum 1(One)

Minimum Qualifications required :

Experience :

(7) **Store keeper** : **M**inimum 1(One)

Minimum Qualifications required :

Experience :

(8) **Biostatistician** : **M**inimum 1(One)

Minimum Qualifications required :

Experience :

(9) Lab attendant :

(10) Peon/ Multi-task worker :

(11) **Clinical Monitors** :

Any MBBS or above with research inclination

(12) Social worker/ MSW with applied research inclinations

CURRICULUM FOR FAMILY ADOPTION PROGRAMME

FAMILY ADOPTION PROGRAM:

This is being introduced with the aim of village outreach program for MBBS students. Every college may arrange one diagnostic medical camp in the village wherein identification of:

a) anaemia, malnutrition in children, hypertension, diabetes mellitus, ischemic heart diseases, kidney diseases, any other local problems may be addressed.
b) If required, patients shall be admitted in the hospital for acute illness under care of student, charges may be waived off or provide concession or govt. schemes.
c) For chronic illness, students shall be involved.
d) Subsidized treatment charges may be provided under govt. schemes or welfare schemes.
e) Medical student may be allocated about 5 families and introduced in the first visit.
f) Camps may be arranged by Dean and Community Medicine/ P.S.M. department with active involvement of Associate/ Asst. Professors, social worker and supporting staff. Local population may be involved with village leaders.
g) Visit by students be made to the visit as mentioned in table below. Annual follow up diagnostic camp can be continued by the PSM department.

TARGETS TO BE ACHIEVED BY STUDENTS:

First Professional Year:

a) Learning communication skills and inspire confidence amongst families
b) Understand the dynamics of rural set-up of that region
c) Screening programs and education about ongoing government sponsored health related programs
d) Learn to analyse the data collected from their families
e) Identify diseases/ ill-health/ malnutrition of allotted families and try to improve the standards

Second Professional Year

a) Inspire active participation of community through families allotted
b) Continue active involvement to become the first doctor /reference point of the family by continued active interaction
c) Start compiling the outcome targets achieved

Third Professional Year

Analysis of their involvement and impact on existing socio-politico-economic dynamics in addition to improvement in health conditions

-Final visit to have last round of active interaction with families
-prepare a report to be submitted to department addressing:

1) Improvement in general health
2) Immunization
3) Sanitation,
4) De-addiction
5) Whether healthy lifestyles like reading good books, sports/ yoga activities have been inculcated in the house-holds.
6) Improvement in anaemia, tuberculosis control
7) Sanitation awareness
8) Any other issues
9) Role of the student in supporting family during illness/ medical emergency
10) Social responsibility in the form of environment protection programme in form of plantation drive (medicinal plants/trees), cleanliness and sanitation drives with the initiative of the medical student

Curriculum for Family Adoption Programme

Professional Year	Competency The student should be able to	Objectives	Suggested Teaching Learning methods	Suggested Assessment methods	Teaching Hours
1st Professional	• Collect demographic profile of allotted families, take history and conduct clinical examination of all family members	By the end of this visit, students should be able to compile the basic demographic profile of allocated family members	Family survey, Community clinics	Community case presentation, OSPE, logbook, journal of visit	6 hrs
	• Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor	By the end of this visit, students should be able to report the basic health profile and treatment history of allocated family members	Community clinics, Multispecialty camps	Community case presentation, OSPE, logbook, journal of visit	9 hrs
	• Maintain communication & follow up of remedial measures	By the end of this visit, students should be able to provide details of communication maintained with family members for follow-up of treatment and	Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community	Community case presentation, OSPE, logbook based certification of competency, journal of visit	6 hrs

		suggested remedial measures	clinics,		
	• Take part in environment protection and sustenance activities.	By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenance like study of environment of families, tree plantation/ herbal plantation activities conducted in the village	Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences	logbook based certification of competency, journal of visit	6hrs (Total27 hrs, 9 visits)
2nd Professional	• Take history and conduct clinical examination of all family members	By the end of this visit, students should be able to compile the updated medical history of family members and report their vitals and anthropometry	Family survey, Community clinics	Community case presentation, OSPE, logbook, journal of visit	6 hrs
	• Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor	By the end of this visit, students should be able to report the details of clinical examination like Hb %, blood group, urine routine and blood sugar along with treatment history of allocated family members	Community clinics, Multispecialty camps	Community case presentation, OSPE, logbook, journal of visit	9 hrs

	• Maintain communication & follow up of remedial measures	By the end of this visit, students should be able to provide details of communication maintained with family members for follow-up of treatment, and suggested remedial measures along with details of vaccination drive	Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community clinics,	Community case presentation, OSPE, logbook based certification of competency, journal of visit	9 hrs
	• Take part in environment protection and sustenance activities.	By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenance like study of environment of families, tree plantation/ herbal plantation activities conducted in the village	Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences	logbook based certification of competency, journal of visit	6 hrs (Total 30 hrs, 10 visits)
3rd Professional	• Take history and conduct clinical examination of all family members	By the end of this visit, students should be able to update the medical history of family members and their vitals and anthropometry	Family survey, Community clinics	Community case presentation, OSPE, logbook, journal of visit	3hrs
	• Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor	By the end of this visit, students should be able to report the details of clinical examination like Hb %, blood group, urine	Community clinics, Multispecialty camps	Community case presentation, OSPE, logbook, journal of visit	3hrs

		routine and blood sugar along with treatment history of allocated family members			
	• Maintain communication & follow up of remedial measures	By the end of this visit, students should be able to provide details of communication maintained with family members for follow-up of treatment, and suggested remedial measures along with details of vaccination drive	Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community clinics,	Community case presentation, OSPE, logbook based certification of competency, journal of visit	3hrs
	• Take part in environment protection and sustenance activities. • Council the family members of allotted families and analyze the health trajectory of adopted family under overall guidance of mentor	By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenance like study of environment of families, tree plantation/ herbal plantation activities conducted in the village, By the end of this visit, students should be able to analyze and report the health trajectory of adopted family along with remedial measures adopted at individual, family and community level	Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences, Small group discussion (report of the health trajectory of adopted family)	logbook based certification of competency, journal of visit	3hrs (total 21 hrs, 7 visits)

LOG BOOK FOR FAMILY ADOPTION

COLLEGE NAME :

UNIVERSITY :

ADDRESS DETAILS :

NAME OF THE STUDENT :

ROLL NO. :

VILLAGE NAME :

TEHSIL/ DISTRICT :

STATE/ UNION TERITORY :

NAME OF THE MENTOR :

MENTOR STATUS :
Asst. Prof/ S.R. And Details
(If changed, details of subsequent mentors)

NAME OF ASHA WORKER :

ADDRESS OF ASHA WORKER :

EXPERIENCE :
(SINCE HOW MANY YEARS IS HE/ SHE EMPLOYED)
(SEPARATE PAGE FOR EACH FAMILY BE MAINTAINED)

- Family name and address
- Approximate size of living space of house-hold
- Malaria/ flu/ etc pertinent to the region

1) If there is any illness or medical emergency required by the house-hold, the student should take initiative in being the primary contact for the family.
2) The student in turn should consult his/her mentor for further management of the patient.
3) The hospital to which the college is attached must provide treatment facilities to the patient.
4) Government schemes may be utilized for optimal management.
5) Follow-up records must be maintained by the student. These must be periodically evaluated by mentors with the help of senior residents.
6) The entire data sheet may be prepared by every student and submitted by the end of 6th semester for evaluation.
7) Progress notes must include every demographic point and history recorded.

Appendix "H - 1"

Guidelines regarding admission of students with "Specified Disabilities" under the Rights of Persons with Disabilities Act, 2016 with respect to admission in MBBS Course.

Note : 1. The "Certificate of Disability" shall be issued in accordance with the Rights of Persons with Disabilities Rules, 2017 notified in the Gazette of India by the Ministry of Social Justice and Empowerment [Departmentof Empowerment of Persons with Disabilities (*Divyangjan*)] on 15th June 2017.

2. The extent of "specified disability" in a person shall be assessed in accordance with the "Guidelines forthe purpose of assessing the extent of specified disability in a person included under the Rights of Persons with Disabilities Act, 2016 (49 of 2016)" notified in the Gazette of India by the Ministry of Social Justice and Empowerment [Department of Empowerment of Persons with Disabilities (*Divyangjan*)] on 4th January 2018.

3. The minimum degree of disability should be 40% (Benchmark Disability) in order to be eligible for availing reservation for persons with specified disability.

4. **The term 'Persons with Disabilities' (PwD) is to be used instead of the term 'Physically Handicapped' (PH).**

S. No.	Disability Type	Type of Disabilities	Specified Disability	Disability Range		
				Eligible for Medical Course, Not Eligible for PwD Quota	Eligible for Medical Course, Eligible for PwD Quota	Not Eligible forMedical Course
1.	Physical Disability	A. LocomotorDisability, including Specified Disabilities(a to f).	a. Leprosy cured person*	Less than 40% disability	40-80% disability Persons with more than 80% disability may also be allowed on case to case basis and their functional competency will be determined with the aid of assistive devices, if it is being used, to see if it is brought below 80% and whether they possess sufficient motor ability as required to pursue and complete the course satisfactorily.	More than 80%
			b. Cerebral Palsy**			
			c. Dwarfism			
			d. Muscular Dystrophy			
			e. Acid attack victims			
			f. Others*** such as Amputation, Poliomyelitis, etc.			
			* Attention should be paid to loss of sensations in fingers and hands, amputation, as well as involvement of eyes and corresponding recommendations be looked at. ** Attention should be paid to impairment of vision, hearing, cognitive function etc. and corresponding recommendations be looked at. *** (i) Both hands intact, with intact sensations, sufficient strength and range of motion are essential tobe considered eligible for medical course. (ii) Movement of the upper limb with respect to all the joints (shoulder, elbow, forearm, wrist and all fingers) to be considered – full power, intact, in the dominant upper limb is necessary. (iii) For non-dominant upper limb, power of 4/5 or above is recommended.			
		B. Visual Impairment (*)	a. Blindness	Less than 40% disability	-	Equal to or More than 40% Disability
			b. Low vision			
		C. Hearing impairment@	a. Deaf	Less than 40% Disability	-	Equal to or more than 40% Disability
			b. Hard of hearing			
			(*) Persons with Visual impairment / visual disability of equal to or more than 40% may be made eligible to pursue MBBS Course and may be given reservation, subject to the condition that the visual disability is brought to a level of less than the benchmark of 40% with advanced low vision aids such as telescopes / magnifier etc. @Person with hearing disability of more than 40% may be made eligible to pursue MBBS Course and may be given reservation subject to condition that the hearing disability is brought to a level of less than the bench mark of 40% with the aid of assistive devices/cochlear implants (CI). In addition to this, the individual should have speech discrimination score of more than 60%			

		Type of Disabilities	Disability Range			
			Specified Disability	**Eligible for Medical Course, Not Eligible for PwD Quota**	**Eligible for Medical Course,Eligible for PwD Quota**	**Not Eligible for Medical Course**
		D. Speech & language disability$	Organic/ neurologi calcauses	Less than 40% Disability	-	Equal to or more than 40% Disability
		$ Persons with Speech Intelligibility Affected (SIA) shall be eligible to pursue MBBS Courses, provided Speech Intelligibility Affected (SIA) score shall not exceed 3 (three), which is 40% or below. Persons with Aphasia shall be eligible to pursue MBBS Courses, provided Aphasia Quotient (AQ) is 40% or below.				
2.	Intellectual disability	a. Specific learning disabilities (Perceptual disabilities, Dyslexia, Dyscalculia, Dyspraxia & Developmental aphasia)#	# currently there is no Quantification scale available to assess the severity of SpLD, therefore the cut-off of 40% is arbitrary and more evidence is needed.	Less than 40% Disability	Equal to or more than 40% disability and equal to or less than 80%. But selection will be based on the learning competency evaluated with the help of the remediation/assisted technology/aids/infrastructural changes by the Expert Panel.	More than 80% or severe nature or significant cognitive/ intellectual disability.
		b. Autism spectrum disorders		Absence or Mild Disability, Asperger syndrome (disability of upto 60% as per ISAA) where the individual is fit for MBBS course by an expert panel.	Currently not recommended due to lack of objective method to establish presence and extent of mental illness. However, the benefit of reservation/quota may be considered in future after developing better methods of disability assessment.	More than 60% disability or presence of cognitive/intellectual disability and/or if the person is unfit for pursuing MBBS course by an expert panel.
3.	Mental behavior	Mental illness		Absence or mild Disability: less than 40% (under IDEAS)	Currently not recommended due to lack of objective method to establish presence and extent of mental illness. However, the benefit of reservation/quota may be considered in future after developing better methods of disability assessment. According to the Notification dated 09.12.2020 by the Department of Empowerment of Persons with Disabilities (Divyangjan), Ministry of Social Justice, a diagnosis of SLD using NIMHANS SLD Battery should be equated to more than 40% disability. Any person with SLD and more than 40% disability should be allowed to complete on par with other PwDs under the reservation quota for PwDs.	Equal to or more than 40% disability or if the person is unfit to perform his/her duties. Standards may be drafted for the definition of "fitness to practice medicine" as are used by serval institutions of countries other than India.

4.	**Disability Type**	**Type of Disabilities**	**Specified Disability**	**Disability Range**		
				Eligible for Medical Course, Not Eligible for PwD Quota	**Eligible for Medical Course, Eligible for PwD Quota**	**Not Eligible for Medical Course**
	Disability caused due to	a. Chronic Neurological Conditions	i. Multiple Sclerosis ii. Parkinsonism	Less than 40% Disability	40-80% disability	More than 80%
		b. Blood Disorders	i. Haemophilia ii. Thalassemia iii. Sickle cell disease	Less than 40% Disability	40-80% disability	More than 80%
5.	Multiple disabilities including deaf		More than one of the abovespecified disabilities	Must consider all above while deciding in individual cases recommendations with respect to presence any of the above, namely, Visual, Hearing, Speech & Language disability, Intellectual Disability, and Mental Illness as a component of Multiple Disability Combining Formula as notified by the related Gazette Notification issued by the Govt. of India $a + \frac{b(90-a)}{90}$ (where a= higher value of disability % and b=lower value of disability % as calculated for different disabilities) is recommended for computing the disability arising when more than one disabling condition is present in a given individual. This formula may be used in cases with multiple disabilities, and recommendations regarding admission and/or reservation made as per the specific disabilities present in a given individual		

(NMC Format)

1st year MBBS Student admission in College for the Year...

Name of the Medical College:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
S.NO.	State	College name	Merit no.	Name of Students	Gender	Physically Handicapped	Date of Birth	Category	Sub-category	Marks obtained/ maximum marks in 10+2 (PCB)	PCB percentage	Marks obtained /maximum marks in 10+2 (English)	English Percentage	Marks obtained/Maximum marks in NEET Entrance Exam	NEET Entrance Exam Percentage	Date of Admission	NEET Roll No.	Fees Charged

Faculty : MBBS Year/Phase-

DEPARTMENT OF Anatomy/Physiology/Biochemistry

			Formative Assessment_Theory			Continuous Internal assessment_Theory						Cumulative percent of Theory & Practical		
S.No.	Roll No.	Name of Student	1st PCT Theory	2nd PCT Theory	Prelims Theory (Paper I & II)	Home Assignment	Seminar	Continuous Class Test (LMS)	Museum study	Library assignments	Attendance Theory	Total	Percentage Theory *(Minimum cut off 40%)*	Theory+ Practical = 500+500= 1000 *(Minimum cut off 50%)*
									Self Directed Learning					*Note: Minimum 40% separately for theory and practical and 50% cumulative in IA for eligibility in Summative examination*
			100	100	200	15	15	30	15	15	10	500	%	
1														
2														
3														

S/d
Professor & Head
Department of _____
*Medical College,
Univ.
State/ U.T.

Department of Anatomy/Physiology/Biochemistry

Faculty : MBBS **Year/Phase-**

Date : dd/mm/yyyy

			Formative Assessment			Continuous Internal Assessment (Practical)							
S.No.	Roll No.	Name of Student	1st PCT Practical/First Ward Leaving Examination	2nd PCT Practical /Second Ward Leaving Examination	Prelims Practical	Log book (150)				Journal *(Record book/Portf*	Attendance (Practical)	Total	Percentage Practical *(Minimum cut off 40%)*
						Certifiable skill based competencies (Through OSPE/OSCE/Spots/Exercise/Other	FAP competencies	AETCOM competencies	SVL Lab activity				
			100	100	100	70	10	30	40	40	10	500	%
1													
2													
3													

S/d
Professor & Head
Department of _____
**Medical College
University, State/ U.T.

Department OF Patho/Pharmac/Microbiology

Faculty : MBBS Year/Phase-

			Formative Assessment_Theory			Continuous Internal assessment_Theory						Cumulative percent of Theory & Practical		
S.No.	Roll No.	Name of Student	1st PCT Theory	2nd PCT Theory	Prelims Theory (Paper I & II)	Home Assignment	Seminar	Continuous Class Test (LMS)	Museum study	Library assignments	Attendance Theory	Total	Percentage Theory *(Minimum cut off 40%)*	Theory+ Practical = 500+500= 1000 *(Minimum cut off 50%)* *Note: Minimum 40% separately for theory and practical and 50% cumulative in IA for eligibility in Summative examination*
									Self Directed Learning					
			100	100	200	15	15	30	15	15	10	500	%	
1														
2														
3														

S/d
Professor & Head
Department of _____
College,
Univ.,
State/U.T.

Faculty : MBBS Year/Phase-

Department of Patho/Pharmac/Microbiology

Date : dd/mm/yyyy

			Formative Assessment			Continuous Internal Assessment (Practical)							
S.No.	Roll No.	Name of Student	1st PCT Practical/First Ward Leaving Examination	2nd PCT Practical /Second Ward Leaving Examination	Prelims Practical	Log book (150)			FAP	Journal *(Record book)*	Attendance (Practical)	Total	Percentage Practical *(Minimum cut off 40%)*
						Certifiable skill based competencies (Through OSPE/OSCE/Spots/Exercise/Other)	AETCOM competencies	SVL Lab activity					
			100	100	100	60	30	40	20	40	10	500	%
1													
2													
3													

S/d
Prof. , HOD,
College,
Univ,
State/ U.T.

DEPARTMENT OF FORENSIC MEDICINE AND TOXICOLOGY

S.No.	Roll No.	Name of Student	Formative Assessment_Theory			Continuous Internal assessment_Theory						Cumulative percent of Theory & Practical		
			1st PCT Theory	2nd PCT Theory	Prelims Theory (Paper I & II)	Home Assignment	Seminar	Continuous Class Test (LMS)	Museum study	Library assignments	Attendance Theory	Total	Percentage Theory (Minimum cut off 40%)	Theory+ Practical = 375+500= 875 *(Minimum cut off 50%)*
									Self Directed Learning					
			100	100	100	10	10	25	10	10	10	375	%	
1														
2														
3														

S/d
Professor & Head
Department of _____
* Medical College
University
State/
U.T.

Faculty : MBBS Year/Phase-

DEPARTMENT OF FORENSIC MEDICINE AND TOXICOLOGY

Date : dd/mm/yyyy

			Formative Assessment			Continuous Internal Assessment (Practical)						
S.No.	Roll No.	Name of Student	1st PCT Practical/First Ward Leaving Examination	2nd PCT Practical /Second Ward Leaving Examination	Prelims Practical	Log book (150)			Journal *(Record book/ Portfolio)*	Attendance (Practical)	Total	Percentage Practical *(Minimum cut off 40%)*
						Certifiable skill based competencies (Through OSPE/OSCE/Spots/Exercise/Other)	AETCOM competencies	SVL Lab activity				
			100	100	100	70	40	40	40	10	500	%
1												
2												
3												

S/d
Professor & Head
Department of _____
* Medical College
University
State/ U.T.

Faculty : MBBS Year/Phase-

DEPARTMENT OF COMMUNITY MEDICINE

S.No.	Roll No.	Name of Student	Formative Assessment_Theory			Continuous Internal assessment_Theory						Cumulative percent of Theory & Practical		
			1st PCT Theory	2nd PCT Theory	Prelims Theory (Paper I & II)	Home Assignment	Seminar	Continuous Class Test (LMS)	Museum study	Library assignments	Attendance Theory	Total	Percentage Theory *(Minimum cut off 40%)*	Theory+ Practical = 500+500= 1000 *(Minimum cut off 50%)*
									Self Directed Learning					*Note: Minimum 40% separately for theory and practical and 50% cumulative in IA for eligibility in Summative examination*
			100	100	200	15	15	30	15	15	10	500	%	
1														
2														
3														

S/d
Professor & Head
Department of _____
* Medical College
University
State/
U.T.

Faculty : MBBS Year/Phase-

Department of Community Medicine

Date : dd/mm/yyyy

			Formative Assessment			Continuous Internal Assessment (Practical)						
S.No.	Roll No.	Name of Student	1st PCT Practical/First Ward Leaving Examination	2nd PCT Practical /Second Ward Leaving Examination	Prelims Practical	Log book (150)			Journal *(Record book/ Portfolio)*	Attendance (Practical)	Total	Percentage Practical *(Minimum cut off 40%)*
						Certifiable skill based competencies (Through OSPE/OSCE/Spots/Exercise/Other)	Family Adoption Programme competencies in Comm. Med	AETCOM competencies				
			100	100	100	60	30	30	40	10	500	%
1												
2												
3												

S/d
Professor & Head
Department of _____
* Medical College
University
State/ U.T.

DEPARTMENT OF Medicine, Surgery, OBGY

S.No.	Roll No.	Name of Student	Formative Assessment_Theory			Continuous Internal assessment_Theory						Cumulative percent of Theory & Practical		
			1st PCT Theory	2nd PCT Theory	Prelims Theory (Paper I & II)	Home Assignment	Seminar	Continuous Class Test (LMS)	Museum study	Library assignments	Attendance Theory	Total	Percentage Theory *(Minimum cut off 40%)*	Theory+ Practical = 500+650= 1150 *(Minimum cut off 50%)*
									Self Directed Learning					*Note: Minimum 40% separately for theory and practical and 50% cumulative in IA for eligibility in Summative examination*
			100	100	200	15	15	30	15	15	10	500	%	
1														
2														
3														

S/d
Professor & Head
Department of _____
*** Medical College, University**
State/ U.T.

DEPARTMENT OF Medicine, Surgery, OBGY

			Formative Assessment			Continuous Internal Assessment (Practical)						
			1st PCT Practical/First Ward Leaving Examination	2nd PCT Practical /Second Ward Leaving Examination	Prelims Practical	Log book (200)			Journal *(Record book/Portfolio)*	Attendance (Practical)	Total	Percentage Practical *(Minimum cut off 40%)*
S.No.	Roll No.	Name of Student				Certifiable skill based competencies (Through OSPE/OSCE/Spots/Exercise/Other)	AETCOM competencies	SVL Lab activity				
			100	100	200	100	50	50	40	10	650	%
1												
2												
3												

S/d
Professor & Head
Department of _____
*Medical College
University
State/ U.T.

DEPARTMENT OF PAEDIATRICS, OPHTHALMOLOGY, OTORHINOLARYNGOLOGY (ENT)

Faculty : MBBS Year/Phase-

DEPARTMENT OF Paediatrics/ Ophthalm/ ENT

S.No.	Roll No.	Name of Student	Formative Assessment_Theory			Continuous Internal assessment_Theory						Cumulative percent of Theory & Practical		
			1st PCT Theory	2nd PCT Theory	Prelims Theory (Paper I &	Home Assignment	Seminar	Continuous Class Test (LMS)	Museum study	Library assignments	Attendance Theory	Total	Percentage Theory (Minimum cut off	Theory+ Practical = 375+500= 875 (Minimum cut off 50%)
									Self Directed Learning					
			100	100	100	10	10	25	10	10	10	375	%	
1														
2														
3														

NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/22 **Date: 02-11-2022**

National Medical Commission

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR M.D. IN PATHOLOGY

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PATHOLOGY

Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

This programme is meant to standardize Pathology teaching at postgraduate level throughout the country in order to achieve uniformity in teaching and create suitable manpower with appropriate expertise. The postgraduate student in pathology should be sufficiently trained, professionally competent and confident in handling, ~~and~~ processing, and diagnosis related to histopathology (surgical pathology), cytopathology, and hematology with reasonable working knowledge in blood banking, laboratory medicine, medical statistics, and ancillary techniques with understanding of general principles and methodology.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board cum Expert group of NMC has attempted to render uniformity without compromise to the purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies".

National Medical Commission

SUBJECT SPECIFIC LEARNING OBJECTIVES

At the end of the MD training programme in Pathology, the student should achieve the following goals:

1. Knowledge of Pathology

1.1. Make a diagnosis based on histopathology (surgical pathology) and cytopathology specimens, blood and bone marrow examination and various tests of Laboratory Medicine (clinical pathology, clinical biochemistry) as well as Blood Banking (Transfusion Medicine).

1.2. Interpret clinical and laboratory data with reasonable accuracy and prepare a succinct and lucid report

1.3. Compose reports following standard protocols including synoptic reporting

1.4. Interpret and correlate clinical and laboratory data so that clinical manifestations of diseases can be explained.

1.5. Advise on the selection of appropriate specimens and tests necessary to arrive at a diagnosis in a problematic case including molecular tests.

1.6. Correlate clinical and laboratory findings with pathology findings at autopsy, identify miscorrelations and the causes of death due to diseases (apart from purely metabolic causes).

1.7. Maintain quality control of all tests by being part of Internal Quality Control Monitoring program.

1.8. Make and record observations systematically and maintain accurate records of tests and their results for reasonable periods of time. Identify problems in the laboratory, offer solutions thereof and maintain a high order of quality control.

1.9. Should be aware of safe and effective disposal of laboratory waste and ensure minimization risk of exposure to infection and accidents to laboratory personnel.

2. Teaching and training

2.1. Should be able to teach Pathology to undergraduates, postgraduates, nurses and paramedical staff including laboratory personnel.

2.2. The postgraduate student should be able to teach effectively and assess undergraduate medical and allied health science students so that they become competent healthcare professionals.

3. Research

3.1. Plan, execute, analyze, and present research work independently or as part of a team.

3.2. The postgraduate student in Pathology should acquire knowledge and skills to be able to conduct a research project from the planning to the publication stage and become a life-long learner.

4. Professionalism, Ethics and Communication skills

4.1. The postgraduate student should learn and apply principles of professionalism, ethics, and effective communication in conduct of routine pathology services, research, and routine work.

National Medical Commission

SUBJECT SPECIFIC COMPETENCIES

A. COGNITIVE DOMAIN

A postgraduate student upon successfully qualifying the MD (Pathology) examination should have acquired the following BROAD theoretical competencies and should be:

- Capable of offering an accurate diagnostic opinion in a given clinical situation with an appropriate and relevant sample of tissue, blood, body fluid, etc. for the purpose of diagnosis.
- Conversant with the standard operating procedures of various laboratories including histopathology, cytopathology, hematology and laboratory medicine
- Able to teach and share his knowledge and competence with others. The student should be imparted training in teaching methods in the subject which may enable the student to take up teaching assignments in Medical Colleges/Institutes.
- Capable of pursuing clinical and laboratory-based research. He/she should be introduced to basic research methodology so that he/she can conduct fundamental and applied research.

National Medical Commission

At the end of the course, **the student should have acquired the following competencies as a diagnostician:**

Surgical pathology

- Be conversant in the histogenesis and pathophysiological processes associated with various diseases.
- Should be able to identify problems in the histopathology laboratory and offer viable solutions.
- Possess the background knowledge necessary for the evaluation and reporting of Surgical Pathology.
- Conversant with the various equipment used in the histopathology laboratory.
- Should have knowledge of automation and quality assurance in histopathology.

Cytopathology

- Possess the background knowledge necessary for the evaluation and reporting of Cytopathology.

- Demonstrate familiarity with, and guide clinical/radiology residents in keeping with the clinical information on the choice of site, collection, preservation, transport, type of preparation and method of obtaining various cytological specimens.
- Conversant with the various equipment used in the cytopathology laboratory.
- Should have knowledge of automation and quality assurance in cytopathology.

Hematology

- Demonstrate ability to utilize the principles of the practice of Hematology for the planning of tests, interpretation, and diagnosis of diseases of the blood and bone marrow.
- Conversant with the various equipment used in the hematology laboratory.
- Should have knowledge of automation and quality assurance in hematology.

Laboratory medicine

- Demonstrate familiarity with the normal range of values of the chemical content of body fluids, significance of altered values, and interpretation thereof.
- Possess knowledge of the following specialized organ function tests and relative utility and limitations of each and significance of altered values:
  (i) Renal function test
  (ii) Liver function test
  (iii) Endocrine function test
  (iv) Tests for malabsorption
- Principles, advantage and disadvantages, scope, and limitation of automation in laboratory.
- Learn the principle and methodology of quality control in the laboratory.

National Medical Commission

Transfusion medicine

- Possess knowledge of basic immunology, ABO and Rh groups, minor blood groups and their clinical significance, transfusion therapy, pre-transfusion testing, transfusion related infections, transfusion reactions and quality control in blood bank.

Autopsy pathology

- Conversant with the technique of autopsy.
- Possess sufficient understanding of the various disease processes so that meaningful clinico-pathological correlation can be made.

Immunopathology

- Demonstrate familiarity with current concepts of structure and function of the immune system, its aberrations, and mechanisms thereof.
- Demonstrate familiarity with the scope, principles, limitations, and interpretations of the results of ELISA techniques, HLA typing, immunofluorescence, and immunoelectrophoresis.

Immunohistochemistry and flow cytometry

- Demonstrate familiarity with the principles and procedures of performing immunohistochemistry including automation in procedure and interpretation.
- Demonstrate familiarity with the principles and procedures of performing flow cytometry.

Cytogenetics and Molecular biology

- Demonstrate familiarity with the principles of molecular biopsy especially related to the understanding of disease processes and its use in various diagnostic tests at least including but not limited to in-situ hybridization, polymerase chain reaction, Sanger Sequencing and Next generation sequencing.

Electron microscopy

- Demonstrate familiarity with the principles and techniques of electron microscopy and the working of the electron microscope.
- Demonstrate familiarity with the tissue processing and staining methods for electron microscopy, including immune-labelling techniques and use of semi-thin sections.

Enzyme histochemistry

- Demonstrate familiarity with the principles, use and interpretations of common enzyme histochemical procedures.

Quality Control

- Demonstrate familiarity with various quality control programmes running in the department, both internal and external quality.
- Demonstrate familiarity with inert and intra assay variations, batch variations, validation of chemicals and instruments.

Laboratory Safety and Good clinical lab practices

- Demonstrate familiarity with good lab practices and safety, record maintenance of capital equipment and consumables, purchase specifications, approximate costs of reagents and equipment, maintenance of store logbooks, etc.

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Biomedical Waste Management

- Demonstrate familiarity with disposal methods for each specimen, reagents, instruments, autoclaving techniques, recycling of products and e-waste.

At the end of the course, **the student should have acquired the following competencies as a <u>teacher:</u>**

- Demonstrate familiarity with different modes, methods, and principles of teaching including microteaching.

At the end of the course, **the student should have acquired the following competencies as a <u>researcher:</u>**

- Conversant with the principles of basic and applied research methodology, literature search, study design, sample size estimation, selection of controls, and appropriate application of medical statistics.
- Possess knowledge about the methods of writing thesis and/or a research paper with the prescribed instructions, as expected of international standards.
- Conversant with the use of digital slide imaging, algorithms to evaluate findings in imaging, morphometry, and application of artificial intelligence.

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B. AFFECTIVE DOMAIN

1. The student will show integrity, accountability, respect, compassion and dedicated patient care. The student will demonstrate a commitment to excellence and continuous professional development.
2. The student should demonstrate a commitment to ethical principles relating to providing patient care, confidentiality of patient information and informed consent.
3. The student should show sensitivity and responsiveness to patients' culture, age, gender and disabilities.
4. The student should demonstrate a commitment to ethical principles relating to research conduct and research publication.

C. PSYCHOMOTOR DOMAIN

1. Able to perform grossing of biopsy and surgical specimens including gross diagnosis and taking appropriate sections/ samples necessary for diagnosis, comprehensive staging, and ancillary testing.
2. Conversant in histopathology tissue processing techniques and troubleshooting, cutting of paraffin and frozen sections, making imprint smears, and staining, and immunohistochemistry.
3. Able to collect specimens by routinely performing non-invasive out-patient procedures such as venipuncture, finger-prick, fine needle aspiration of superficial lumps and bone-marrow aspirates, making smears and staining, and provide appropriate guidance to colleagues performing procedure such as a biopsy or an imaging guided biopsy including on-site microscopic assessment of specimen adequacy.
4. Perform an autopsy, dissect various organ complexes and display the gross findings.
5. Conversant with the function, handling, and routine care of equipment in the laboratory and quality assurance.
6. Able to teach and share his knowledge and competence with others. The student should be imparted training in teaching methods in the subject which may enable the student to take up teaching assignments in Medical Colleges/Institutes.
7. Able to pursue clinical and laboratory-based research. He/she should be introduced to basic research methodology so that he/she can independently conduct fundamental and applied research.

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Syllabus

Course contents:

It is difficult to give a precise outline of the Course Contents for post graduate training. A postgraduate is supposed to acquire not only the professional competence of a well-trained specialist but also academic maturity, a capacity to reason and critically analyze scientific data as well as to keep himself abreast of the latest developments in the field of Pathology and related sciences. The study of Anatomic Pathology includes all aspects of Pathology as encompassed in the branches of General and Systemic Pathology. Only the broad outlines are provided.

A. COGNITIVE DOMAIN

A) General Pathology:

Normal cell and tissue structure and function:

- The changes in cellular structure and function in diseases.
- Causes of disease, its pathogenesis, reaction of cells, tissues, organ systems, and the body to various sub lethal and lethal injuries.
- Cellular adaptation, cell injury, and cell death.
- Mechanism, morphology and examples of cell injury, necrosis, apoptosis, autophagy, and newer forms of cell death including necroptosis and pyroptosis.
- Sub cellular and cellular responses and adaptation to injury.
- Intracellular and intercellular accumulations, pathological calcification, and cell aging.

Acute and chronic inflammation:

- Vascular and cellular events in acute inflammation, chemical mediators, outcome, and morphological patterns of acute inflammation.
- Chronic inflammation with special reference to granulomatous inflammation.
- Systemic effects and effects of deranged inflammation.
- Tissue renewal and repair: Regeneration healing and fibrosis.
- Control of normal cell proliferation and tissue growth, mechanism of tissue regeneration, repair by healing and fibrosis.
- Extracellular matrix and cell matrix interactions.

Hemodynamic disorders, thromboembolic disease, and shock:

- Edema, hyperemia, congestion, and hemorrhage.
- Normal Hemostasis, thrombosis, DIC, embolism, infarction, and shock.

Genetic Disorders

- Principles of genetics, normal karyotyping.
- Mutations, Mendelian disorders, disorders with multifactorial inheritance cytogenetic disorders involving autosomes and sex chromosomes.
- Single gene disorders with nonclassic inheritance.
- Diagnosis of genetic disorders involving molecular and genetic techniques.

Neoplasia

- Definition, nomenclature, and biology of tumor growth
- Molecular basis of cancer with special reference to carcinogenic agents and molecular basis of multistep carcinogenesis.
- Epidemiology and clinical features of tumors.

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- Grading, staging and laboratory diagnosis of cancer.

Infectious Diseases

- Pathology and general principles of microbial pathogenesis, special techniques for diagnosing bacterial, fungal, parasitic, and viral infections.

Environmental and nutritional pathology

- Common environmental and occupational exposures leading on to diseases.
- Nutritional deficiencies and obesity related disorders.

Disease of Infancy and Childhood

- Congenital anomalies, birth injuries, diseases of neonates, inborn errors of metabolism, tumor, and tumor like lesions of infancy and childhood.

Immunopathology

- Innate immunity- Role of phagocytic cells, complement, mast cells & humoral mechanisms.
- Specific Acquired Immunity- Details about antibody production & action, Brief principles about memory, Ag specificity & vaccination.
- Cell involved in Immune response- T- Lymphocytes, B-lymphocytes, macrophages, dendritic cells, and natural-killer cells.
- Cytokines with details about their properties and functions.
- Structure and function of histocompatibility molecules and disease association.
- Disorders of the immune system.
- All hypersensitivity reactions.
- Autoimmune disorders with special reference to SLE, Rheumatoid arthritis, Sjogren's syndrome, systemic sclerosis, polyarteritis nodosa and other vasculitides, Mixed connective tissue disorders and inflammatory disorders.
- Immunodeficiency syndrome – Acquired with emphasis on AIDS.
- Amyloidosis including pathogenesis, special stains & clinical correlation.
- Transplant rejection in detail.
- Graft vs Host Disease.

B) Systemic Pathology:

The study of normal structure and function of various organ systems and the etiopathogenesis, gross and microscopic alterations of structure of these organ systems in disease and functional correlation with clinical features.

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Blood vessels, lymphatic and veins

- Normal morphology, congenital anomalies, atherosclerosis, hypertensive vascular disease.
- Inflammatory and neoplastic diseases of all the vessels.

Heart

- Normal morphology, its blood supply and effect of aging on heart.
- Ischemic, Hypertensive, valvular, congenital heart diseases.
- Cardiomyopathies
- Myocardial disorders
- Pericardial diseases.
- Tumors of the heart.

Lungs and Mediastinum

- Congenital anomalies
- Obstructive and restrictive pulmonary diseases
- Diseases of vascular origin
- Infections of Lung
- Infections of Mediastinum
- Tumors of lung
- Lung transplantation
- Diseases of pleura
- Thymus – Developmental, autoimmune, and inflammatory disorder and tumors.

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Head and Neck

- Oral cavity: - inflammatory disease, Preneoplastic lesions and tumors.
- Diseases of teeth and supporting structures.
- Upper airways and ear – congenital anomalies, infections, and tumors.
- Salivary glands – Infections autoimmune disorders and tumors.

Gastrointestinal Tract

- Congenital anomalies, infections, inflammatory and vascular disorders and tumors of esophagus, stomach, small and large intestines, appendix, and anal canal.
- Diseases of the peritoneum, Omentum and Mesentery Retroperitoneum.
- Inflammatory and neoplastic lesions.

Liver

- Normal morphology with general features of hepatic disease including LFTs.
- Infectious, autoimmune drug induced metabolic and circulatory disorders of liver.

- Hepatic diseases associated with pregnancy, neonates, organ and bone marrow transplantation.
- Liver transplantation pathology.
- Cysts, Nodules, and tumors of liver.

Biliary tract

- Congenital anomalies, injuries, Infection, inflammation, of Gallstones and tumors of gall bladder and extra hepatic bile ducts. Pancreas.
- Congenital anomalies, pancreatitis, and neoplasms of pancreas.

Kidney

- Clinical manifestations of renal diseases
- Congenital anomalies
- Diseases affecting glomeruli, tubules, interstitium and blood vessels.
- Cystic diseases of kidney
- Nephrolithiasis
- Tumors of kidney
- Kidney Transplant pathology

Lower urinary tract and male genital system

- Congenital anomalies, inflammation and tumors of bladder, ureter, urethra, penis, testis, epididymis, and Scrotum.
- Inflammation, enlargement, and tumors of prostate.

Female genital tract

- Physiology, cytology and histology of female genital tract, menstrual disorders, and hormonal abnormalities.
- Congenital anomalies, inflammation, preneoplastic and neoplastic lesions of vulva, vagina, cervix, uterus, fallopian tubes, ovaries and mesonephron.
- Gestational and placental disorders.

Breast

- Inflammations, benign epithelial lesions, and tumors of the breast.
- Diseases of male breast.

Endocrine System

- Normal hormonal levels and functions of all the endocrine glands.
- Hypo and hyperactivity of glands of endocrine system i.e., pituitary, thyroid, parathyroid, pancreas, adrenals, and pineal gland.

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- Autoimmune diseases, inflammations and tumors affecting these glands,
- Neuroendocrine tumors,

Skin and Subcutaneous tissue

- Disorders of pigmentation and melanocytes,
- Inflammatory, vesiculobullous, and infectious disease,
- Proliferative lesions and Tumors of the epidermis, dermis, and skin appendage.

Musculoskeletal system

- Bone Modelling, growth, and development, genetic and acquired abnormalities in bone cells, matrix and structure, factures, necrosis and infections of bones, tumors and tumor-like lesions,
- Joints: Arthritis, tumor, and tumor-like lesions.
- Soft tissue: Tumors and tumor=like lesions.

Peripheral nerves and skeletal muscles

- General reactions of motor units.
- Inflammatory, infectious, hereditary, metabolic, and traumatic neuropathies.
- Atrophy, dystrophy, myopathies of the skeletal muscles.
- Diseases of neuromuscular junction.
- Tumors of peripheral nerves and skeletal muscles.

Skull and Central Nervous System

- Degenerative, metabolic, toxic, demyelinating, infectious, cerebrovascular malformations, and traumatic injuries.
- Tumors.

Eye and Orbit

- Infections, inflammatory, congenital diseases and neoplasms of orbit, eyelid, conjunctiva sclera, uvea, cornea, retina, and optic nerves.

C) Hematology and Transfusion medicine

The study of Hematology includes all aspects of the diseases of the blood and bone marrow. This would involve the study of the normal, and the causes of diseases and the changes thereof.

Biology of stem cell and Hematopoiesis

- Overview of stem cell biology and cellular biology of hematopoiesis.
- Transcription factors and humoral regulation in normal and malignant hematopoiesis.
- Interaction between hematopoietic stem cells, progenitor cell and stromal compartment of bone marrow.

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- Stem cell homing & mobilization.

Erythroid maturation, differentiation, and abnormality

- Pathobiology of human erythrocyte & Hemoglobin Anemia.
- Approach to anemia in adults and children in: Clinical correlation & diagnostic modalities.
- Classification of anemias (Morphological, pathophysiological, and based on erythropoiesis i.e., proliferative vs non-proliferative).
- Iron deficiency anemia including iron metabolism and differential diagnosis from other microcytic hypochromic anemias.
- Disorder of iron metabolism including iron overload.
- Anemia of chronic disorders with special reference to infections, collagen vascular disorders, inflammation etc.
- Megaloblastic anemia and other causes of megaloblastosis.
- Definition, approach, and classification of hemolytic anemia.
- Lab diagnosis of Hemoglobin disorders and hereditary anemia like Thalassemia and related hemoglobinopathies, sickle cell anemia.
- Hemoglobin associated with altered Oxygen affinity.
- Red blood cell enzymopathy, membrane disorder, autoimmune hemolytic anemia, non-immune hemolytic anemia, paroxysmal nocturnal hemoglobinuria.
- Approach to Pancytopenia/ Cytopenia.
- Bone marrow failure syndrome.
- Porphyria.

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WBC disorders, complement and immunoglobin biology

- Normal granulopoiesis.
- Acquired and congenital disorders of phagocytosis (neutrophil, monocyte, eosinophil, and macrophages.
- Disorder of leukocyte number, function, and morphology.

Storage disorder

Hematological responses to Infections

- Viral disorders - Infectious mononucleosis, Hepatitis, and dengue.
- Parasitic infections - Malaria, Kala azar.

Hematological malignancies

- Conventional & molecular cytogenetic and immunohistochemical basis of hematological malignancies.

- Classification (WHO, ICC).
- Their basis and diagnostic approach to various hematological malignancies.
- Pathophysiology, prognostic factors, cytochemistry, cytogenetics of various leukemias.
- Pathophysiology and classification of MDS, MPN/MDS, myeloproliferative disorders.
- Pathophysiology of Non-Hodgkin's lymphoma, Clinical staging of Hodgkin's lymphoma.
- Role of molecular cytogenetics and immunohistochemistry in Hodgkin's and Non-Hodgkin's lymphoma and lymphoproliferative disorders.
- AIDS related and Transplant related lymphomas.
- Plasma cell dyscrasias and gammopathies.
- Mastocytosis.
- Role of chemotherapy and antineoplastic agents based on molecular mechanism of hematological malignancies, clinical use of hematopoietic growth factors.

Hematopoietic stem cell transplantation

- Role and indications of HST, immunodeficiency state, hematological Malignancies and Non-hematological disorders.
- Practical aspect of umbilical cord stem cells transplantation.
- Peripheral stem cell collection.
- Role of stem cell in tissue repair.
- Complications of Hematopoietic stem cell transplant.
- Gene therapy and genetic engineering.

Prenatal diagnosis of genetic hematological diseases

Hemostasis & Thrombosis

- Megakaryocyte and platelet structure.
- Molecular basis of platelet function, activation.
- Role of blood vessel, coagulation system and fibrinolytic system in hemostasis.
- Clinical and lab evaluation of bleeding and coagulation disorders.
- Clinical & diagnostic aspects of factor deficiencies including hemophilia, von Willebrand disease, DIC, Vitamin K deficiency.
- Thrombotic and non-thrombotic purpura.
- Hereditary and acquired platelet disorders and its management.
- Thrombophilia (Inherited & acquired).
- Lab evaluation and management of hypercoagulable states.

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Human blood group antigen and antibody and Immuno-hematology

- Selection of donor and screening..
- Principle, indication and storage of red blood cells, WBC, platelet, and plasma transfusion.
- Various methods of component separation and plasma derivatives with special reference to Fresh frozen plasma, cryo-precipitates, platelet concentrate, single donor plasma, albumin, and Immunoglobulin.
- Graft Rejection, GVH diseases, Transfusion Reactions, Blood grouping & cross matching.
- Blood bank audit.
- Apheresis

Hematological manifestations of systemic diseases

- Liver disorders, renal disorders, infections, cancers, parasitic diseases, AIDS, pregnancy, and surgical patients.

Spleen and its disorders

D) Laboratory Medicine (Clinical Pathology including Parasitology)

- Principles of testing, indications, values with ranges in normal and diseased states in relation to:
    - Liver function tests
    - Renal function tests
    - Endocrine function tests
    - Body fluid analysis including stool, urine, semen, CSF, etc.
- Principles of laboratory automation, trouble shooting, and quality assurance.

D) Special techniques

The student is expected to acquire a general acquaintance of techniques and principles and to interpret data in the following fields:

- Immunopathology,
- Electron microscopy,
- Histochemistry,
- Immunohistochemistry,
- Cytogenetics and in-situ hybridization,
- Molecular Biology,
- Digital Pathology and image analysis,

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- Maintenance of records,
- Information retrieval, use of Computer and Internet in medicine.

E) Instrumentation and automation

- Principles, indications, working, maintenance, and troubleshooting of equipment used in various laboratories:
    - Histopathology laboratory – Histopathology tissue processor, microtome, water batch, embedding station, Stainer, IHC Stainer, ultramicrotome, etc.
    - Microscopes – Immunofluorescence, FISH, Confocal, Electron, etc.
    - Cytopathology Laboratory – Centrifuge, Cytocentrifuge, Cytospin apparatus, liquid-based cytology, etc.
    - Hematology Laboratory – automated cell counter, flow cytometer, coagulometer, HPLC, Electrophoresis apparatus, immunoblot, etc.
    - Clinical Pathology –Photoelectric colorimeter, Spectrophotometer, pH meter, Centrifuge, Electrophoresis apparatus, ELISA Reader, chemiluminescence, etc.
    - Digital pathology – Whole slide scanners
    - Molecular pathology – PCR, Sanger sequencer, NGS sequencers, etc.
- Automation in Pathology.
- Good lab practices and safety, record maintenance of capital equipment and consumables, purchase specifications, approximate costs of reagents and equipment, maintenance of store logbooks, etc.

F) Quality assurance program

- Internal and external quality assurance methods.
- Intra assay variations, batch variations, validation of chemicals and instruments.

G) Establishment Act and Rules and regulations formed by Govt. or regulatory bodies

H) Biomedical Waste management

- Disposal methods for each specimen, reagents, instruments, autoclaving techniques, recycling of products and e-waste.

I) Biostatistics, Research Methodology and Clinical Epidemiology

J) Ethics and Medico legal aspects relevant to Pathology

K) Current topics and recent advances in pathology

B. PSYCHOMOTOR DOMAIN

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Demonstrate following predominant Psychomotor domain competencies		
Sr. No.	Competency	Perform under supervision/ perform independently/ Observation only
I.	HISTOPATHOLOGY (SURGICAL PATHOLOGY)	
1.	Given the clinical and operative data, identify and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens and be able to correctly diagnose common lesions received on an average day from the surgical service of an average teaching hospital	Independently
2.	Perform a systematic gross examination of the tissues including the taking of appropriate tissue sections and in special cases as in intestinal mucosal biopsies, muscle biopsies and nerve biopsies, demonstrate the orientation of tissues in paraffin blocks.	Independently
3.	Identify and systematically and accurately describe the chief histo-morphological alterations in the tissue received in the surgical pathology service. He/she should also correctly interpret and correlate with the clinical data to diagnose routine surgical material received on an average day.	Independently
4.	Identify common problems in histopathology processing techniques (poor fixation, delayed fixation, poor staining, etc.,) including automated tissue processing machine troubleshooting and rectify common problems	Independently
5.	Operate and maintain common equipment in the histopathology laboratory such as microtome, water bath, cryostat, tissue processor, auto Stainer, etc.	Perform under supervision
6.	Process a tissue, make a paraffin block and cut sections of good quality on a rotary microtome	Perform under supervision
7.	Stain paraffin sections with hematoxylin and eosin stain and common special stains needed for diagnosis	Independently
8.	Cut a frozen section, stain and interpret the slide in correlation with the clinical data provided	Independently

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9.	Standardize and validate new antibodies for immunohistochemistry with understanding of controls, clones, and dilutions	Independently
10.	Perform immunohistochemistry on paraffin sections using manual method	Independently
11.	Identify common problems in immunohistochemistry procedure (artifacts, inadequate retrieval, section floating, IHC failure, etc.,) and rectify such problems	Independently
12.	Decide on the appropriate immunohistochemical panels for diagnosis, prognosis and predictive purposes in common disease conditions based on standard recommendations and interpret their results	Independently
13.	Write histopathology reports, including synoptic reports, wherever needed, following protocols and international standards. The reports should be succinct and lucid, with clinical notes and advice, as necessary.	Independently
II	CYTOPATHOLOGY	
1.	Perform fine needle aspiration of superficial lumps and make good quality smears including collection of material for cell block preparation and decide on the type of fixative and stain in a given case	Independently
2.	Prepare and stain good quality smears for cytopathological examination	Independently
3.	Provide appropriate guidance to colleagues performing procedure such as a biopsy or an imaging guided biopsy including on-site microscopic assessment of specimen adequacy.	Independently
4.	Decide on the technique of collection, preservation, transport and concentration of various exfoliative cytology specimens (such as filters, centrifuge, liquid-based cytology, cytospin, etc.)	Independently
5.	Perform on-site adequacy assessment in image guided sampling procedures and decide on sample triage for routine diagnosis (type of preparation, stain, etc.) and ancillary tests including microbiological and molecular tests	Independently
6.	Diagnose common cases received in a routine cytopathology laboratory and categorize them into negative, inconclusive and positive, using the correct technique of screening and dotting the slides	Independently

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	for suspicious cells, correctly identify the type of tumor, if present, and the presence of organisms, fungi and parasites, if present	
7.	Perform preparations (cytospin smears, liquid-based cytology, cell blocks, etc.) of common cytological samples using equipment such as centrifuge, cytocentrifuge and liquid based cytology apparatus	Observation only
III	HEMATOLOGY	
1.	Perform venipuncture for peripheral blood collection and decide on appropriate collection tubes, storage, and anticoagulant based on indication	Independently
2.	Prepare good quality peripheral blood smears, stain and report peripheral blood counts and other findings including reticulocyte and platelet counts on cell counter and manually	Independently
3.	Perform bone marrow aspirates and biopsy, prepare good quality smears and imprints	Perform under supervision
4.	Perform bone marrow aspirate staining including stain for iron	Independently
5.	Perform cytochemical characterization of leukemia with special stains on bone marrow aspirates	Perform under supervision
6.	Perform and interpret coagulation profile including PT, APTT and FDP	Independently
7.	Perform and interpret sickling test and osmotic fragility test	Independently
8.	Describe accurately the morphologic findings in the peripheral and bone marrow smears, identifying and quantitating the morphologic abnormalities in disease states and arriving at a correct diagnosis in at least common cases referred to the Hematology clinic, given the relevant clinical data	Independently
9.	Given the clinical data, interpret the results of i. Red cell indices ii. Plasma hemoglobin iii. Hemosiderin in urine iv. Hemolytic anemia profile including HPLC, Hb electrophoresis etc. v. Hemoglobin and serum protein electrophoresis vi. Clotting time and other point of care tests for bleeding	Independently

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	vii. G6PD enzyme estimation viii. Platelet function tests including platelet aggregation and adhesion and PF3 release ix. Russell's viper venom time (RVVT) x. Coagulation Factor assays xi. Serum Fibrinogen xii. Screening for coagulation factor inhibitor, Bethesda Assay, xiii. Fibrin Degradation Products (FDP), D-Dimers xiv. Monitoring of anti-coagulant therapy xv. Thrombophilia profile (Lupus anticoagulant (LAC), Anticardiolipin Antibody (ACA), Activated Protein C Resistance (APCR), Protein C (Pr C), Protein S (Pr S) and Antithrombin III (AT III)) xvi. Serum ferritin, Serum iron and total iron binding capacity	
10.	Interpret flow cytometry findings in the immunophenotyping of leukemia, CD34 enumeration, CD 3/CD 19 enumeration, PNH work up, etc.	Independently
11.	Interpret results of cytogenetics and molecular diagnostics in the work up of hematological diseases	Independently
12.	Prepare samples as appropriate for the indication, and operate equipment such as automated cell counter, flow cytometry, coagulometers, HPLC and electrophoresis apparatus	Observation only
IV	LABORATORY MEDICINE	
1.	Plan a strategy of laboratory investigation of a given case, given the relevant clinical history and physical findings in a logical sequence, with a rational explanation of each step; be able to correctly interpret the laboratory data of such studies, and discuss their significance with a view to arrive at a diagnosis.	Independently
2.	Perform urine analysis including physical, chemical and microscopic, examination of the sediment as well as by Dipstick methods.	Independently
3.	Perform macroscopic and microscopic examination of feces and identify the ova and cysts of common parasites.	Independently

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4.	Perform a complete examination: physical, chemical and cell content of Cerebrospinal Fluid (C.S.F), pleural and peritoneal fluid	Independently
5.	Perform semen analysis and interpret results in the context of clinical and hormone findings	Independently
6.	Perform quantitative estimation of blood/serum by automated techniques for common biochemical tests	Independently
7.	Prepare standard solutions and reagents relevant to common biochemical tests including the preparation of normal solution, molar solution and buffers	Independently
8.	Interpret and report common laboratory biochemical tests (LFT, KFT, endocrine function tests) with understanding of clinical implications	Independently
9.	Operate, maintain and troubleshoot common equipment used such as photoelectric colorimeter, Spectrophotometer, pH meter, Centrifuge, Electrophoresis apparatus, ELISA Reader, PCR, chemiluminescence, etc.	Perform under supervision
V	TRANSFUSION MEDICINE	
1.	Perform selection and bleeding of donors, ABO and Rh grouping and cross match, antibody screening and titer, selection of blood for exchange transfusion	Independently
2.	Resolve ABO grouping problems and outline measures for investigation of transfusion medicine	Independently
3.	Perform and interpret anti-globulin test in antenatal and neonatal work up	Independently
4.	Prepare blood components such as cryoprecipitates, platelet concentrates, fresh frozen plasma, single donor plasma, red blood cell concentrates, etc. and test blood for presence of pathogens including HBV, HCV, HIV, VDRL, Malaria, etc.	Observation only
VI	AUTOPSY	
1.	Perform an autopsy, dissect various organ complexes, and display the gross findings (Note: An improvised autopsy may also be arranged in places where full autopsy is not possible. Relevant organs from wet specimens in the museum with appropriate clinical history may be arranged for a detailed description and diagnosis. At least ten such	Independently (see Note)

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	improvised autopsies may be discussed by each candidate during the entire duration of the course)	
2.	Provide Provisional and Final Anatomic Diagnosis report, major findings correctly and systematically at autopsy, and the Autopsy Protocol as per prescribed instructions.	Independently
VII	MOLECULAR BIOLOGY	
1.	Interpret results of Polymerase Chain Reaction (PCR), real time PCR, Sanger Sequencing in a given clinical context.	Independently
2.	Interpret results of in-situ hybridization (fluorescent and chromogenic) in a given clinical context	Independently
3.	Prepare sample by appropriate methods and perform Polymerase Chain Reaction (PCR), real time PCR, Sanger Sequencing, and in-situ hybridization including troubleshooting	Observation only
VIII	IMMUNOPATHOLOGY	
1.	Interpret direct/ indirect immunofluorescence results in the context of common diseases of the skin, medical renal diseases and autoimmune diseases	Independently
2.	Prepare sample by appropriate methods and perform indirect immunofluorescence on a frozen section from skin/ renal biopsy	Perform under supervision
IX	ELECTRON MICROSCOPY	
1.	Interpret transmission electron microscopy results in common non-neoplastic and neoplastic diseases	Independently
2.	Prepare specimen by appropriate methods and process tissue for electron microscopy, interpret semi-thin sections and view ultra-thin sections under electron microscope	Observation only
X.	DIGITAL PATHOLOGY	
1.	Navigate and annotate whole slide scanned images	Independently
2.	Select and scan slides for digitalization and perform basic image analysis functions such as length measurements, enumeration, etc.	Observation only
XI.	TEACHING	
1.	Demonstrate different methods of teaching-learning and assessments	Independently
2.	Engage and teach undergraduates and paramedical staff in the form of small group teaching and demonstrations	Independently

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3.	Engage in peer teaching in the form of presenting seminars and journal clubs and be able to use different modes of teaching including PowerPoint projections and charts	Independently
XII.	RESEARCH	
1.	Write the thesis (and/or a scientific paper) in accordance with the prescribed instructions, as expected of international standards	Independently

TEACHING AND LEARNING METHODS

General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skills oriented. Learning in the program, essentially autonomous and self-directed, and emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the postgraduate (PG) courses shall work as full-time (junior) residents/demonstrators during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a logbook for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real time. Maintenance of e-records of such procedures is encouraged.

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The three-year training programme for the MD degree may be arranged in the form of postings to different assignments/laboratories for specified periods as outlined below. The period of such assignments/postings is recommended for 36 months with breaks only for examinations and mandatory postings. Posting schedules may be modified depending on needs, feasibility and exigencies. For facilities not available in the parent institution as well as for additional knowledge and skill, extramural postings may be undertaken. Departments may vary the postings slightly based on the clinical profile of the hospital, within the time period bands given below, however at least the lower limit for each of the four main components of the course must be covered during postings.

Posting schedule is given below:

S. No	Section/ Subject	Duration in months
(i)	Surgical Pathology, Autopsy, Immunohistochemistry	11-16
(ii)	Hematology, Laboratory Medicine, and Blood bank	8-10
(iii)	Cytopathology	6-9
(iv)	Basic Sciences, Immunopathology, Cytogenetics, Electron microscopy, Molecular Biology etc. and Research Techniques including Thesis	2-6
	Total	**36 (including exam)**

Teaching-Learning methods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinical meetings, seminars, small group discussion, case-based learning, simulation-based teaching, self-directed learning, integrated learning, interdepartmental meetings, and any other collaborative activity with the allied departments. Methods with exposure to the applied aspects of the subject relevant to basic/clinical sciences should also be used. **The suggested examples of teaching-learning methods are given below but are not limited to these. The frequency of various below mentioned teaching-learning methods can vary based on the subject's requirements, competencies, workload and overall working schedule in the concerned subject. The Pathology resident is expected to sit in reporting every day, having seen the slides the previous day with written descriptions, which should be evaluated daily by the reporting faculty. This is the mainstay of training in all disciplines of Pathology.**

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A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures per year in the concerned PG department is suggested. Topics to be selected as per subject requirements All postgraduate trainees will be required to attend these lectures. Lectures can cover topics such as:

1. Subject related important topics as per specialty requirement
2. Recent advances
3. Research methodology and biostatistics
4. Salient features of Undergraduate/Postgraduate medical curriculum
5. Teaching and assessment methodology.

Topic numbers 3, 4, 5 can be done during research methodology/biostatistics and medical education workshops in the institute.

B. Journal club: Minimum of once in 1-2 weeks is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once every 1-2 weeks is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive evidence-based review of the topic. The student should be graded by the faculty and peers.

D. Student Symposium: Minimum of once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by the faculty and peers.

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E. Laboratory work/ Interactive slide and gross sessions: Minimum - once every 1-2 weeks.

Laboratory work, slide and gross specimen teaching sessions should be coordinated and guided by faculty from the department. Various methods like case-based discussions, oral or written quiz, etc. are to be used. Faculty from the department should participate in moderating the teaching-learning sessions.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main Department and other department/s on topics of current/common interest or clinical cases. This includes institutional activities such as clinical combined rounds (CCR), clinic-pathological correlation conferences (CPC), and departmental activities like autopsy conferences.

G. a. Rotational clinical / community / institutional postings

Depending on local institutional policy and the subject specialty needs, postgraduate trainees may be posted in relevant departments/ units/ institutions. The aim would be to acquire more in-depth knowledge as applicable to the concerned specialty. Postings would be rotated

between various units/departments and details to be included in the specialty-based Guidelines. Few examples are listed below:

- Laboratory-based specialty units/departments e.g. Biochemistry / Microbiology/ Infection control unit/Laboratory Medicine, Hematology, Blood bank, Transplantation Immunology, Forensic Medicine, Proteomics, etc.
- Medical Education Unit (MEU) or Department of Medical Education (DOME): optional

G. b. Posting under "District Residency Programme" (DRP):

All postgraduate students pursuing MS/MS in broad specialties in all Medical Colleges/Institutions shall undergo a compulsory rotation of three months in District Hospitals/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th, or 5th semester of the Postgraduate programme and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident".

Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists / clinicians in different hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

H. Teaching research skills

Writing a thesis should be used for inculcating research knowledge and skills. All postgraduate students shall conduct a research project of sufficient depth to be presented to the University as a postgraduate thesis under the supervision of an eligible faculty member

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of the department as guide and one or more co-guides who may be from the same or other departments.

In addition to the thesis project, every postgraduate trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be reinforced.

I. Training in teaching skills

MEU/DOME should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on the teaching skills of the student.

J. Logbook

During the training period, the postgraduate student should maintain a Logbook indicating the duration of the postings/work done in Wards, OPDs, Casualty and other areas of posting. This should indicate the procedures assisted and performed and the teaching sessions attended. The logbook entries must be done in real time. The logbook is thus a record of various activities by the student like: (1) Overall participation & performance, (2) attendance, (3) participation in sessions, (4) record of completion of pre-determined activities, and (5) acquisition of selected competencies.

The purpose of the Logbook is to:

a) help maintain a record of the work done during training,
b) enable Faculty/Consultants to have direct information about the work done and intervene, if necessary,
c) provide feedback and assess the progress of learning with experience gained periodically.

The Logbook should be used in the internal assessment of the student, should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce completed logbook in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate from the Head

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of Department regarding the clinical competence and skillful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in logbook particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and at least two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty are referred to the MCI Logbook Guidelines uploaded on the Website.

K. Course in Research Methodology

All postgraduate students shall complete an online course in Research Methodology within six months of the commencement of the batch and generate the online certificate on successful completion of the course.

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Other aspects

- The Postgraduate trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The Postgraduate trainees should undergo training in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS).
- The Postgraduate trainees must undergo training in information technology and use of computers.

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learnt initially on the models, later to be performed under supervision followed by independent performance. For this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, i.e., assessment to improve learning

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination, should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

Quarterly assessment during the MD training should be based on:

- Case presentation, case work up, case handling/management : once a week
- Laboratory performance : twice a week
- Journal club : once a week
- Seminar : once a fortnight
- Case discussions : once a fortnight/month
- Interdepartmental case or seminar : once a month

Note: These sessions may be organized and recorded as an institutional activity for all postgraduates.

- Attendance at Scientific meetings, CME programmes (at least 02 each)

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The student to be assessed periodically as per categories listed in appropriate (non-clinical/clinical) postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, i.e., assessment at the end of training

Essential pre-requisites for appearing for examination include:

1. **Logbook** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.

2. At least **two presentations** at state/national level conference. One paper (thesis or non-thesis related work) should be published /accepted/publication draft in an indexed journal.

The summative examination would be carried out as per the Rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination**.**

The postgraduate examination shall be in three parts**:**

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners**.**

2. **Theory examination**

   The examinations shall be organized based on 'Grading 'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill, and competence at the end of the training, as given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination. The examination for M.D./ M.S shall be held at the end of 3rd academic year.

   There shall be four theory papers (as per PG Regulations).

   Paper I: Basic sciences as applied to the subject (general pathology, pathophysiology, immunopathology, and molecular biology).

   Paper II: (Systemic pathology – surgical and cytopathology).

   Paper III: (Hematology, transfusion medicine and laboratory medicine including instrumentation and quality control).

   Paper IV: Recent advances in the subject.

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The papers should have ideally one (01) structured long answer question which will evaluate comprehensive in-depth knowledge and 6-8 short answer questions.

3. Practical/clinical and Oral/viva voce examination

Practical examination

Practical examination should be spread at least over **two** days for each student and include various major components of the syllabus focusing mainly on the psychomotor domain.

Oral/Viva voce examination on defined areas should be conducted by each examiner separately. Oral examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject focusing on psychomotor and affective domain.

The final clinical examination in broad specialty clinical subjects should include:

- Cases pertaining to major systems (e.g., one long case and three short cases),
- Stations for laboratory, procedural and communication skills,
- Logbook Records and reports of day-to-day observation during the training,
- It is emphasized that Oral/viva voce examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject.

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The practical examination in Pathology should follow general guidelines outlined below which may be modified according to local university guidelines and should be spread over at least two days. The following marks distribution is suggested:

Practical 500 marks (including 100 marks for internal assessment)

Section I: Histopathology: 150 marks

- Slides (12-15)
- Grossing/autopsy
- Long case (write a full description with clinical information provided) and/or 2 biopsy cases with ancillary tests reporting (written work only, no viva)

Section II: Cytopathology and histo/cyto techniques: 80 marks

- Slides (5-8)
- Histo/Cyto techniques
- Special stain exercise

- Immunopathology, OSPE, EM

Section III: Hematology, transfusion medicine and clinical pathology: 120 marks

- Slides
- Exercises
- Case study
- Blood bank
- Clinical pathology exercises and OSPE

Section IV: Viva, basic sciences, and communication skills: 50 marks

- Pedagogy/thesis presentation
- Oral viva
- Basic Sciences

Details of exercises in individual sections are given below:

I. Clinical Pathology:

- Discussion of a clinical case history.
- Plan relevant investigations of the above case and interpret the biochemistry findings.
- Two investigations should be performed including at least one clinical pathology exercise like CSF, pleural tap etc. analysis and complete urinalysis.

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II. Haematology:

- Discuss hematology cases given the relevant history. Plan relevant investigations.
- Perform complete hemogram and at least two tests preferably including one coagulation exercise.
- Identify electrophoresis strips, osmotic fragility charts etc., interpretation of data from auto analyzers, HPLC and flow cytometry.
- Examine, report, and discuss around ten cases given the history and relevant blood smears and/or bone marrow aspirate smears and bone marrow biopsy interpretation.

III. Transfusion Medicine:

- Perform blood grouping
- Perform the necessary exercise like cross matching.
- Coomb's test, gel cards interpretation.

IV. Histopathology and cytopathology:

- Examine, report, and discuss 12-15 cases histopathology and 5-8 cytopathology cases, given the relevant history and slides.
- Perform a Hematoxylin and Eosin stain and any special stain on a paraffin section. Should be conversant with histopathology techniques including cryostat.
- Long case (write a full description with clinical information provided) and/or 2 biopsy cases with ancillary tests reporting

V. Autopsy:

- Given a case history and relevant organs (with or without slides), give a list of anatomical diagnosis in an autopsy case.

VI. Gross Pathology

- Describe findings of gross specimens, give diagnosis, and identify the sections to be processed. The post graduate student should perform grossing in front of the examiners for evaluation.

VII. Basic Sciences:

- 10-15 spots based on basic sciences be included
- Identify electron micrographs
- Identify gels, results of PCR, immunological tests including interpretation of Immunofluorescence pictures, etc.
- Identify histochemical and immuno-histochemistry stains

VIII. Teaching exercise

- Teach on a small topic for about 10 min or present dissertation and research
- General Viva-Voce (Grand Viva) – structured viva may be done separately or combined with above exercises

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Recommended Reading:

Books (latest edition)

1. Histology for Pathologists. Stephen S. Sternberg (Ed), Raven Press, New York.
2. Robbin's Pathologic Basis of Disease Ramzi S.Cotran, Vinay Kumar, Stanley L Robbins WB Saunders Co., Philadelphia.
3. Ackerman's Surgical Pathology. Juan Rosai Mosby. St. Louis.
4. Diagnostic Surgical Pathology. Stephen S Sternberg. Lippincott, William Wilkins. Philadelphia.

5. Diagnostic Histopathology of Tumours. Christopher DM Fletcher (Ed). Churchill Livingstone. Edinburgh.
6. Manual & Atlas of Fine Needle Aspiration Cytology. Svante R Orell, et al London.
7. Theory and Practice of Histological Techniques, Bancroft JD, Stevens A, Turner DR, Churchill Livingstone, Edinburgh.
8. Diagnostic Cytology and its Histopathologic Basis, Koss LG, J.B. Lippincott, Philadelphia.
9. Comprehensive Cytopathology, Bibbo M, W.B. Saunders Co., Philadelphia.
10. Wintrobe's Clinical Hematology, Lee GR, Foerster J, Lupeus J, Paraskevas F, Gveer JP, Rodgers GN, Williams & Wilkins, Baltimore.
11. Atlas and Text of Hematology 4th edition. Singh T. Avichal Publishing Company.
12. Dacie and Lewis Practical Hematology, Bain BJ, Bates I, Laffan MA. Elsevier.
13. Bone Marrow Pathology, Bain BJ, Clark DM, Lampert IA, Blackwell Science, Oxford.
14. Henry's clinical diagnosis and management by laboratory methods.
15. WHO classification of tumors. IARC Lyon.

Journals

03-05 international Journals and 02 national (all indexed) journals.

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Annexure I

Student appraisal form for broad specialty non-clinical disciplines

	Elements	Less than Satisfactory			Satisfactory			More than satisfactory			Comments
		1	2	3	4	5	6	7	8	9	
1	**Scholastic aptitude and learning**										
1.1	Has knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g Posters, publications etc)										
1.4	Documentation of acquisition of competence (eg Log book)										
1.5	Performance in work based assessments										
1.6	Self-directed Learning										
2	**Work related to training**										
2.1	Practical skills that are appropriate for the level of training										
2.2	Respect for processes and procedures in the work space										
2.3	Ability to work with other members of the team										
2.4	Participation and compliance with the quality improvement process at the work environment										

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2.5	Ability to record and document work accurately and appropriate for level of training										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethically appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment pattern been discussed with the trainee?	Yes	No								
	If not explain.										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

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Subject Expert Group members for preparation of REVISED Guidelines for competency based postgraduate training programme for MD in Pathology

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NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/14 **Date: 05-08-2022**

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PAEDIATRICS

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PAEDIATRICS

PREAMBLE

The purpose of any postgraduate (PG) education is to train an individual, in this case a qualified MBBS doctor, to achieve competencies across all domains that enables the student to perform the professional role as an expert and specialist practicing a specialty in the community (Newborn to adolescent care; ambulatory and in-patient care; Well child/Healthy and Ill child; health promotion, disease prevention and curative care; individual and family centered care; emergency care, Intensive and routine Care). The shift towards competency-based medical education by Medical Council of India and continued by the National Medical Commission (NMC) focuses education to be outcome based, emphasizing abilities, balancing domains of learning and promoting a learner centered ownership of the curriculum.

The practice of medicine has and will continue to change. Existing changes in the environment and practice have included an explosion of information, stress on knowledge at the expense of skills/attitudes/critical thinking, increased access of information and health delivery systems by lay public, development and access to sub-specialties, technological and IT advances, costs of management (diagnostic and therapeutic), changes in disease trends (non-communicable diseases, behavioral/developmental disorders, malignancies, immunology, etc.), medico-legal litigations, emphasis on quality standards, improved patient safety, violence/anger against health personnel and the emergence of professional-ethical dilemmas to name a few.

The NMC's competency based education is organized using a framework of competencies (predefined abilities) that forms the backbone of the curriculum as defined outcomes. These competencies are defined as observable abilities of a health professional, integrating multiple components across all domains, cognitive, psychomotor skills, and affective. Identified competencies are to be measured and assessed to ensure their acquisition which in turn determines competence. Defined competencies in each domain facilitates education progressing from being a novice towards mastery with formative assessments (feedback) vital for success. Every domain will have weightage and the phenomenon of allowing the ability in one should not be allowed to compensate the lack of ability in another.

These changes are reflected in the review of Core Competencies keeping them mostly aligned with CBME Undergraduate efforts. Each competency will require Sub-competencies/milestones enabling both student and teacher monitor progress that is transparent making both accountable. Specific Learning Objectives that will be necessary to achieve (and assess) outcomes are certainly also required to complete the process. This document has been prepared by subject-content specialists of NMC. The Expert Group of the NMC had attempted to render uniformity without compromise to the purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies

SUBJECT SPECIFIC OBJECTIVES

Goal

The goal of the MD Paediatrics post-graduate course on successful completion, is to mould the individual into a qualified Pediatrician who is a specialist doctor with the ability (competence) to assess the state of health; promote health; and diagnose as well as manage disease (acute or chronic, emergency or routine) in children of all ages from newborn to the adolescent.

Their expertise includes dealing with medical and surgical conditions of varied degrees of complexities providing a spectrum of care from prevention, promotion, resuscitation, emergency care, acute care, chronic care and procedures (diagnostic and therapeutic) including providing palliative care. Unlike in most adults, children go through changes in growth and development leading to anatomical, behavioral, and developmental changes that emphasizes that the Specialist incorporates this dynamic requirement into screening, assessments, diagnostic and therapeutic decisions. They will continue to play an important part in the health of the family and community especially through education and support of prevention of disease and health promotion since Paediatrics is child-centered and family-focused given the relationships and social structures of families. Pediatricians will also continue to provide consultative services to many other physicians across the specialties including Emergency, Burns, Plastic Surgery, Anesthesiologist, Surgeons, Infectious Disease, Community and Family Medicine.

SUBJECT SPECIFIC OBJECTIVES

The objectives of the postgraduate course (MD) in Paediatrics are to produce a competent pediatrician who:

- Acquires competencies relevant to all aspects of Paediatrics (newborn to adolescent) that are essential to function as a clinical expert in providing newborn and pediatric health services for the community at all levels.
- Recognizes the holistic health needs of healthy neonates, infants, children, and adolescents
- Performs responsibilities of the provision of clinical care in keeping with principles of the National Health Policy.
- Performs responsibilities in a professional and ethical manner.
- Acquires skills in effectively communicating not only with the health team but with the child, family, and the community
- Is actively involved in keeping oneself up to date with scientific advances in Paediatrics and Medicolegal aspects of practice.
- Is oriented to principles of research methodology enabling critical appreciation of published scientific evidence and contributing through scholarship
- Acquires skills to enable education of all stakeholders including health team members
- Acquires skills and understanding of dealing with health team members enabling optimizing system-based practice.

SUBJECT SPECIFIC COMPETENCIES

Towards achieving suitable outcomes certain Competencies are essential to be achieved, assessed that will enable the qualified professional to perform the role of a Paediatric Specialist.

Aligned with the NMC's existing Undergraduate CBME, the following are refined and identified as themes or roles mandatory to perform the responsibility as a Pediatric Specialist in the community after acquiring an MD Paediatric post-graduation:

1. Clinical Expert
2. Communicator

3. Professional
4. Scholar
5. Team Member

Core Competencies

(The term 'children' is hereby used to include all age groups from birth to 18 years - newborn, neonates, infants, toddlers, children and adolescents)

To perform each of these above roles as a Paediatrician, every role determines competencies which in turn requires Specific Learning Objectives covering all the domains of learning.

By the end of the MD Paediatric course, the postgraduate student should be able to:

1. Clinical Expert

1.1. Appreciate and recognize maternal and child health needs in the context of the health priority of the country at all levels ie. Individual, Community, Local, Regional, and National.

1.2. Apply an understanding of the determinants of child health at individual, community, and population levels in practice of disease prevention, health promotion and clinical care of all children.

1.3. Understand the existing inequities in accessibility to child friendly health, economics of child health and existing status of child health across gender, communities, region, and nation (eg. NHFS survey).

1.4. Participate in population/community efforts towards prevention, promotion, and disease control relevant and with implications for child health (ie. National Health Programs).

1.5. Appreciate and recognize the importance of nurturing care for the early growth and development as the very foundation of Paediatrics and help each child realize her/his optimal growth and development potential.

1.6. Actively support the optimization of quality of growth, development, and holistic health of children in care through education enhancing the promotive, preventive, and curative measures.

1.7. Provide continuum of care and rehabilitation for children afflicted by chronic disease.

1.8. Scientific Knowledge and Evidence

1.8.1. Apply an understanding of scientific basis, concepts, principles, and advances as the basis of health and disease in the screening, diagnosis, and management of all children including growth and development.

1.9. Clinical History/Examination

1.9.1. Demonstrate appropriate proficiency in basic clinical skills appropriate for children, ie. History, Physical Examination and Assessments of Growth/ Development/ Behavior, in arriving at the most likely clinical differential; in identifying precipitating or predisposing factors; prioritizing high risk versus low-risk conditions; and, those in need of emergency versus routine care.

1.9.2. Organize and analyze an authentic history and relevant examination towards a valid clinical assessment of health of all children including growth, development, and behavioral assessments.

1.10. Investigations

1.10.1. Order rational Investigations and interpret results keeping in mind cost effectiveness and purpose in child health (ie., confirming diagnosis that impacts management decisions).

1.11. Procedures/Interventions

1.11.1. Order, perform with safety and interpret results of procedures/ interventions that are cost-effective for diagnostic and therapeutic purposes in child health.

1.12. Critical Thinking

1.12.1. Demonstrate a logical clinical approach to diagnose children in health and disease in all settings.

1.12.2. Manage using appropriate resources all children in health and disease in settings not less than secondary level facilities

1.12.3. Demonstrate clinical reasoning at every step from gathering, organization, prioritization, analysis and creating logical diagnostic hypothesis from clinical data relevant to childhood (history to examination to investigations)

1.12.4. Formulate rational, judicious, and cost-effective plans (Investigation, Therapeutic and Counseling/Education plans) for all children in health and disease (acute and chronic) taking into consideration individual/ family circumstances, interpersonal dynamics, socioeconomic status, vulnerabilities, epidemiology, and population health factors.

1.12.5. Choose investigations and prescribes medications/interventions that are rational and cost-effective balancing benefits and costs in child health in the context of family status.

1.12.6. Critically appreciate scientific literature especially relevant to children under their care.

1.13. Responsiveness

1.13.1. Rapidly assess/screen, recognize and manage critically ill sick children prioritized for immediate attention.

1.13.2. Demonstrate sensitivity and appreciate the emotional and behavioral characteristics and needs of children while dealing with them

1.14. Quality of Care

1.14.1. Demonstrate practices that maximize child safety

1.14.2. Optimize safe working practices in child health delivery settings

1.14.3. Participate in incident reporting of adverse events and errors enabling quality improvement of child health

1.14.4. Participate in continuous Child Health Care related Quality Improvement measures especially patient related audits, recognition of gaps and implementation of interventions to improve quality

1.15. Advocacy

1.15.1. Responding to a Child's health needs by advocating for them

1.16. Documentation

1.16.1. Maintain Child health records of relevant demographic details clinical details, progress, interpretations, educational, monitoring and management decisions accurately and neatly organized

1.16.2. Provide relevant concise summaries and certification in completeness to authorized legal guardians of children

1.16.3. Maintain childhood morbidity and mortality data for audit purposes.

2. Communicator

2.1. Effective Communication

2.1.1. Demonstrate all aspects of effective and empathetic communication during most encounters with children and parents/guardians (listening skills, culturally appropriate verbal and non-verbal cues, simple understandable

language, allow questions, clarify answers and concise written communications for prescriptions and patient education)

2.1.2. Demonstrate mutually respectful communications with children/parents/guardians (verbal, telephonic, electronic and written) that is collaborative and effective between health system colleagues of all levels.

2.2. Effective Counselling

2.2.1. Provide professional assistance and guidance in assisting children/parents/ authorized legal guardians determine their autonomous decisions regarding their own health (especially related Diagnostic Interventions and Therapeutic options).

3. Professional

3.1. Responsibility

3.1.1. Demonstrate responsibility for all aspects of the conduct of child care, academic tasks and research in children undertaken.

3.1.2. Demonstrate social accountability consistent with community and professional expectations through active participation in child health relevant Community Outreach programs

3.1.3. Demonstrate an understanding of one's own limits and seeks assistance appropriately in dealing with children in health and disease.

3.2. Integrity

3.2.1. Demonstrate commitment with honesty for consistent and uncompromising adherence to moral and ethical principles and values in protecting child rights and wellbeing during care, academics, and research.

3.3. Compassion and empathy

3.3.1. Demonstrate the ability to understand and share the feelings of children and families while dealing with them as care providers.

3.3.2. Demonstrate the ability to understand and share the feelings of health team members while working with them for the good of children.

3.4. Stigma and Discrimination

3.4.1. Demonstrate ability to comprehend the differences in values and beliefs while respectfully continuing child health care without discrimination

3.5. Ethical principles

3.5.1. Recognize ethical conflicts specific for child health between principles of ethics and justifies options/decisions while discussing within health care team discussions.

3.5.2. Demonstrate respect for confidentiality in issues related to child health.

3.5.3. Demonstrate ability to honor the doctor-child/parent/legal guardian relationship in all dealings with respect ensuring due care especially avoiding all inappropriate behavior and activities that lead to conflicts of interest.

3.5.4. Demonstrate mutual respect for all members on the child health team and behaves equitably and collaboratively while dealing with them.

3.5.5. Demonstrate prioritization of child's welfare and community benefits over self when appropriate.

3.6. Medicolegal Law and Code of Ethics

3.6.1. Practice within the NMC's standards as prescribed by the Code of Ethics especially in dealings with children.

3.6.2. Practice within the Law of the land fulfilling legal requirements during the provision of care especially relevant to children.

4. Scholar

4.1. Research

4.1.1. Refer to evidence-based guidelines in the decision-making process for child care justifying limitations.

4.1.2. Understand research methodology and the creation of a research studies for child health.

4.1.3. Demonstrate the ability to critically appreciate the quality and implications of scientific literature justifying its application in the delivery of child health care.

4.1.4. Demonstrate an ability to identify pertinent research questions relevant to child health through active participation and involvement in research.

4.2. Academics

4.2.1. Demonstrate features of active adult learning through enthusiasm and displaying a positive attitude in the educational process while participating in educational activities to build child health care capacities (Intra- and inter-institutional).

4.2.2. Use appropriate educational techniques to promote health education amongst children/parents/legal guardians/community

4.2.3. Use appropriate educational techniques to facilitate learning of other child health care team members including undergraduates, nurses, paraclinical staff and peers

4.2.4. Maintain competency by keeping up to date with child health guidelines through continued medical education with scientific knowledge and skills to enable quality practice

4.3. Application

4.3.1. Apply child health expertise in an area of study that is published in academic journals

4.3.2. Apply child health expertise while participating in health education and community efforts

5. Team Member

5.1. Teams

5.1.1. Demonstrate an understanding of the roles and competencies of other health care providers dealing with child health.

5.1.2. Demonstrate the ability to engage and collaborate with all child health care team members keeping the patient at the center of all such collaboration.

5.1.3. Recognize and discuss in a non-judgmental way the roles of informal stakeholders as extended teams especially in child care planning (especially mature adolescent, extended family, alternative medicine practitioners, support networks, etc.)

5.1.4. Demonstrate knowledge of health care financing, implications for management and its application in assisting patient to access the best possible care through extended team networking while dealing with child health.

5.1.5. Maintain personal health and wellbeing not only of self but of team members.

5.2. Leaders

5.2.1. Demonstrate leadership and management skills enabling effective working as a child health team

5.2.2. Lead, manage, and participate as a member of an effective and efficient child health care team while collaborating respectfully either as leader or member.

5.2.3. Facilitate child health team capacity building of competencies by leading through conduct of effective education sessions for members of the health team learning.

5.2.4. Manage time and human resources efficiently and effectively to deliver optimal child health care.

SYLLABUS

Syllabus gives an outline and summary of topics to be covered in the MD Paediatric Course.

In Competency Based Education, outcomes are required to be defined, taught, learnt, and assessed that determines competence at the end of the course. Defined Outcomes should focus on what is expected practically in the "real world" by the professional performing roles of the expert physician. This syllabus is focused on all age group of children from neonates to toddlers to children to adolescents as per existing practice. The syllabus thus stresses on "real world presentation of symptoms and signs" and is categorized under the following:

A. Cognitive Domain
    a. Basic Sciences
    b. Approaches/Management of common symptoms/signs inclusive of analysis, interpretation, and application of investigations
    c. Specific Topics classified as per traditional systems
B. Psychomotor Domain
C. Affective Domain
D. Pedagogic and Research Skills

A) Predominant in Cognitive (Knowledge) Domain

a. Basic Sciences

- *Should be able to justify and apply in the practice of Paediatrics, an understanding of the fundamentals of basic sciences as listed below:*

1. Applied Anatomy

1.1. Embryogenesis of all organ systems
1.2. Central Nervous System

1.2.1. Structures, Functions, Clinical considerations

1.2.1.1. Cerebral Cortex
1.2.1.2. Corticospinal tracts
1.2.1.3. Extrapyramidal tracts
1.2.1.4. Cerebellar connections
1.2.1.5. Sensory tracts
1.2.1.6. Ventricles

1.3. Spinal Cord, Peripheral Nerves

1.3.1. Structures, Functions, Clinical considerations

1.3.1.1. Lower Motor Neuron

1.4. Bladder and Bowel control
1.5. Vascular supply – Principal arteries and veins
1.6. Extremities, Abdomen, Thorax, Head and Neck
1.7. Fetal circulation

2. Physiological basis and Pathophysiology in Health and Disease

2.1. Physical Growth
2.2. Temperature regulation
2.3. Acid Base Balance
2.4. Fluid Balance
2.5. Hematopoiesis
2.6. Hemostasis
2.7. Electrolyte balance
2.8. Bone mineralization: Calcium-Phosphate balance
2.9. Puberty
2.10. Renal function
2.11. Hepatic function
    2.11.1. Bilirubin
    2.11.2. Drug metabolism
2.12. Respiratory function
2.13. Cardiac function
2.14. Gastrointestinal
2.15. Endocrine functions
2.16. Developmental Milestones
2.17. Adolescence
2.18. Placenta functions
2.19. Fetal to Infant Transitions (Cardio-respiratory)
2.20. Nutrition
2.21. Allergy

3. Biochemical basis of health and disease

3.1. Cell biology
    3.1.1. Cell cycle
    3.1.2. Cell signaling
3.2. CHO metabolism
3.3. Lipid metabolism
3.4. Protein metabolism
3.5. TCA Cycle
3.6. Hemoglobin
3.7. Clinical Chemistry
    3.7.1. Vitamins
    3.7.2. Minerals
3.8. Plasma Proteins
3.9. Coagulation Pathway

4. Genetics and Molecular Medicine

4.1. Human Genome
4.2. Nucleic acids

4.2.1. Protein synthesis

4.3. Recombinant DNA Technology

4.3.1. Basic techniques
4.3.2. Applications

4.4. Chromosomal abnormalities

4.4.1. Pedigree charting

4.5. Prenatal/Postnatal diagnosis
4.6. Immunogenetics

4.6.1. HLA

5. Clinical Microbiology

5.1. Virology

5.1.1. Classifications
5.1.2. Diagnostics
5.1.3. Therapeutics
5.1.4. Resistance

5.2. Bacteriology

5.2.1. Classification
5.2.2. Endo/Exotoxins
5.2.3. Diagnostics
5.2.4. Therapeutics
5.2.5. Resistance
5.2.6. Antibiotic Stewardship

5.3. Mycology

5.3.1. Classification
5.3.2. Diagnostics
5.3.3. Therapeutics
5.3.4. Resistance

5.4. Parasitology (Protozoology and Helminthology)

5.4.1. Classification
5.4.2. Diagnostics
5.4.3. Therapeutics
5.4.4. Resistance

5.5. Waste disposal, sterilization, disinfection

5.5.1. Infection Control

6. Immunology

6.1. Immune response system

6.1.1. Innate, Adaptive
6.1.2. Cellular
6.1.3. Antibodies
6.1.4. Cytokines
6.1.5. Clinical considerations

6.2. Immunoglobulins

6.2.1. Types
6.2.2. Clinical considerations

6.3. Complement

6.3.1. Components
6.3.2. Pathways
6.3.3. Deficiencies
6.3.4. Clinical considerations

6.4. Hypersensitivity reactions

6.5. Blood group Immunology

6.5.1. ABO
6.5.2. Rh
6.5.3. Minor groups

6.6. Immunological assays

6.7. Science of Vaccinology

6.7.1. Vaccines
6.7.2. Classification
6.7.3. Schedule
6.7.4. Indications, contraindications
6.7.5. Adverse effects
6.7.6. Catch up doses

6.8. Immunodeficiency

6.8.1. Primary
6.8.2. Secondary

6.9. Autoimmune disease

6.9.1. Basis
6.9.2. Autoantibodies
6.9.3. Clinical considerations

6.10. Transplant Immunology

6.10.1. Stem cell
6.10.2. GVH disease
6.10.3. Solid organ transplant

6.11. Cancer Immunology

7. Pharmacology

7.1. Pharmacokinetics – common medications
7.2. Antimicrobials
7.3. Analgesia, sedation
7.4. Drug interactions
7.5. Adverse effects
7.6. Antidotes for poisons
7.7. Drug induced disease

8. Epidemiology

8.1. Rates
8.2. Principles of study design
8.3. Measures of effects
8.4. Association and causation
8.5. Diagnostic tests

9. Statistics

9.1. Distribution of data
9.2. Measures of Central tendency
9.3. Measures of dispersion
9.4. Probability distributions
9.5. Sampling
9.6. Statistical significance

10. Professionalism and Ethics

10.1. Professionalism

10.1.1. Clinical competencies
10.1.2. Effective communication
10.1.3. Understanding of Ethics
10.1.4. Accountability
10.1.5. Altruism
10.1.6. Excellence
10.1.7. Humanism

10.2. Ethics

10.2.1. Code of ethics
10.2.2. Principles of Ethics
10.2.3. Ethical workup
10.2.4. Doctor-Patient relationship
10.2.5. Confidentiality and privacy
10.2.6. Doctor-Doctor relationship

10.3. Medico-legal essentials

10.3.1. POSCO
10.3.2. Certifications
10.3.3. Documentation
10.3.4. Informed consent
10.3.5. MLC formalities

11. Pedagogy

11.1. How adults learn
11.2. Competencies and Specific Learning Objectives
11.3. Teaching Learning Methodologies
11.4. T-L Media including Power Point Presentations
11.5. Assessments- Formative and Summative

12. Management

12.1. Time Management
12.2. Conflict Management
12.3. Communication especially Listening

12.4. How to study – Lectures? Wards? Journal club?
12.5. Fundamentals of Counselling
12.6. Stress Management
12.7. Teamwork
12.8. Leadership

b. Approaches/Management of common symptoms/signsinclusive of analysis, interpretation, and application of investigations *(In every age group from newborn to adolescent)*

- ***Approaches*** *(Clinical and Investigation) of the following clinical symptoms/ signs*

Management *plans (Investigation, Treatment, Care, Counselling, Education, Follow Up, Rehabilitation Plans) of healthy children (section 1.1) and children with the following clinical symptoms/signs.*

1.1. Healthy Children

1.1.1. Healthy neonate
1.1.2. Healthy infant
1.1.3. Healthy child
1.1.4. Healthy adolescent

1.2. Cardiovascular Symptoms/Signs

1.2.1. Murmurs
1.2.2. Cyanosis
1.2.3. Syncope
1.2.4. Dizziness
1.2.5. Breathlessness
1.2.6. Palpitations
1.2.7. Chest Pain

1.3. Development (and Behavioral) Symptoms/ Signs

1.3.1. Normal development
1.3.2. Delayed milestones
1.3.3. Regression of milestones
1.3.4. Unusual behaviors
1.3.5. Poor scholastic performance
1.3.6. Deviations in sexuality
1.3.7. Dysmorphic features
1.3.8. Suicide attempt
1.3.9. Behavioral issues -disinterest, isolation, poor social interaction
1.3.10. Substance abuse
1.3.11. Abnormal eating behavior
1.3.12. Sleep disturbance
1.3.13. Breath holding spells
1.3.14. Multiple unexplained unrelated complaints
1.3.15. Technology dependence
1.3.16. Speech abnormalities

1.4. Dermatology

1.4.1. Neonatal skin lesions
1.4.2. Infantile skin lesions
1.4.3. Acquired skin rashes in childhood
1.4.4. Urticaria
1.4.5. Neurocutaneous presentations

1.5. Emergencies

1.5.1. Dehydration
1.5.2. Respiratory distress
1.5.3. Hypoxia
1.5.4. Shock
1.5.5. Incessant crying
1.5.6. Sick looking
1.5.7. Status epilepticus
1.5.8. Acute Severe Asthma
1.5.9. Trauma
1.5.10. Animal/human bite
1.5.11. Abuse
1.5.12. Cardio-pulmonary failure
1.5.13. Oliguria/Anuria
1.5.14. Raised intracranial pressure
1.5.15. Coma
1.5.16. Traumatic Brain Injury
1.5.17. Acute poisoning
1.5.18. Envenomation
1.5.19. Medico-legal conditions

1.6. Endocrine Symptoms

1.6.1. Abnormal stature
1.6.2. Hypoglycemia
1.6.3. Delayed puberty
1.6.4. Precocious puberty
1.6.5. Goiter

1.7. **Gastrointestinal (and Hepatic) Symptoms**

1.7.1. Tongue tie
1.7.2. Vomiting and regurgitation
1.7.3. Diarrhea – Acute
1.7.4. Diarrhea – Chronic, persistent, recurrent
1.7.5. Abdominal pain – Acute
1.7.6. Abdominal Pain - Recurrent
1.7.7. Constipation
1.7.8. Jaundice
1.7.9. Gastrointestinal bleed
1.7.10. Hepatomegaly
1.7.11. Splenomegaly
1.7.12. Hepatosplenomegaly
1.7.13. Encopresis
1.7.14. Abdominal distention

1.7.15. Abnormal Liver Function tests

1.8. Genital Symptoms

1.8.1. Atypical or ambiguous genitalia
1.8.2. Menstrual abnormalities
1.8.3. Injuries to genitalia
1.8.4. Foreskin, penile problems
1.8.5. Labial adhesions

1.9. Growth (and Nutrition related) Symptoms

1.9.1. Normal growth
1.9.2. Normal diet
1.9.3. Poor feeding in Infancy
1.9.4. Undernutrition
1.9.5. Failure to thrive
1.9.6. Overweight and obesity

1.10. Hematological Symptoms

1.10.1. Pallor
1.10.2. Bleeding manifestations
1.10.3. Lymphadenopathy
1.10.4. Thrombotic manifestations
1.10.5. Abnormal Hematological parameters including Pancytopenia

1.11. **Infectious (and Immunological) Symptoms**

1.11.1. Fever with focus
1.11.2. Fever without focus
1.11.3. Fever - persistent or recurrent
1.11.4. Exanthematous Fever
1.11.5. Recurrent infections
1.11.6. Hospital acquired infection
1.11.7. Vaccination Issues– complete, incomplete

1.12. Metabolic Symptoms

1.12.1. Acidosis – metabolic, respiratory
1.12.2. Alkalosis – metabolic, respiratory
1.12.3. Mixed Acid-Base disturbance
1.12.4. Dyselectrolytemia – Hypo/Hypernatremia, Hypo/Hyperkalemia, Hypo/hypercalcemia
1.12.5. Hyperammoniaemia
1.12.6. Hypoglycemia

1.13. **Musculoskeletal Symptoms**

1.13.1. Joint pains with or without swelling
1.13.2. Low back pain
1.13.3. Deformities of bone growth
1.13.4. Scoliosis

1.13.5. Growing Pains involving lower limbs

1.14. Neonatology

1.14.1. Term gestation
1.14.2. Prematurity
1.14.3. Low birth weight
1.14.4. Neonatal Jaundice
1.14.5. Ill/Sick
1.14.6. Neonatal seizures
1.14.7. Neonatal respiratory distress
1.14.8. Neonatal Apnea
1.14.9. Neonatal Shock
1.14.10. Metabolic/electrolyte disturbances – Glucose, Sodium, Potassium, Calcium, Bicarbonate, Lactate, Ammonia
1.14.11. Feed Intolerance
1.14.12. Spinal/Cranial abnormalities
1.14.13. Post NICU follow up
1.14.14. HIV-HepB-Syphilis exposure/infection
1.14.15. Inadequate breast milk
1.14.16. Antenatal detected renal abnormalities

1.15. **Neurological Symptoms**

1.15.1. Seizures
1.15.2. Altered sensorium/Coma
1.15.3. Motor weakness
1.15.4. Incessant Irritability
1.15.5. Headache
1.15.6. Abnormal Head circumference
1.15.7. Sensory abnormalities
1.15.8. Abnormal gait
1.15.9. Ataxia
1.15.10. Facial weakness
1.15.11. Involuntary movements

1.16. **Ophthalmological Symptoms**

1.16.1. Red eye
1.16.2. Watering of eye
1.16.3. Discharge from eye
1.16.4. Poor vision
1.16.5. White reflex
1.16.6. Deviation of eyes

1.17. **Otorhino-laryngology Symptoms**

1.17.1. Nasal discharge, Nasal congestion, Sneezing
1.17.2. Sore Throat
1.17.3. Ear Pain/discharge
1.17.4. Tonsillar hypertrophy
1.17.5. Epistaxis
1.17.6. Impaired hearing

1.18. **Renal and Urological Symptoms**

1.18.1. Enuresis
1.18.2. Dysuria
1.18.3. Proteinuria
1.18.4. Hematuria
1.18.5. Edema
1.18.6. Hypertension
1.18.7. Dyselectrolytemia
1.18.8. Polyuria
1.18.9. Scrotal and Inguinal swelling
1.18.10. Oliguria/Anuria

1.19. **Respiratory Symptoms**

1.19.1. Cough
1.19.2. Breathlessness
1.19.3. Noisy breathing - snoring, stridor, wheeze
1.19.4. Hemoptysis

1.20. Community Situations

1.20.1. Vaccination camps
1.20.2. School Health Checkups
1.20.3. Outbreaks of childhood diseases

1.21 Analysis, interpretation, and application of Investigations

1.21.1. Radiology X-rays (Chest AP/PA/Lateral, abdomen, spine, extremities)
1.21.2. Contrast X-rays (Micturating cystourethrogram)
1.21.3. Ultrasound (Lung: Consolidation, Left Heart failure, effusion; Circulation: Intravascular Volume; Neonatal Brain: Hydrocephalus, Intracranial Collections; Central veins: Patency for US guided central lines; Lymphadenopathy: For US guided FNAC aspirations)
1.21.4. CT scan with/without contrast (Brain: Cerebral edema, Midline shift, Meningitis, Encephalitis, ADEM, Hemorrhage, Infarction, SOLS, Hydrocephalus)
1.21.5. MRI scan (Brain: Gross White vs Grey matter degeneration)
1.21.6. HIDA Scan

1.22. Microbiology

1.22.1. Grams stain of CSF, Pus, Peritoneal fluid
1.22.2. Ziehl Neilson Stain of Sputum, Pus
1.22.3. Hanging drop for motile cholera
1.22.4. PCR reports for infectious disease diagnosis
1.22.5. Culture and sensitivity reports of body fluids

1.23. Pathology

1.23.1. Pathology reports of human tissue

1.24. Routine labs

1.24.1. Hematology reports of Blood counts, peripheral smear, Bleeding and Coagulation parameters, basic immunology
1.24.2. Urine routine analysis

1.25. Biochemical

1.25.1. Biochemical routine (Electrolytes, Calcium-Phosphate, Renal, Liver profiles, Arterial/venous Blood Gases)
1.25.2. Inborn error of metabolism newborn screening reports
1.25.3. Endocrine (Glucose related, Thyroid related, Hormonal assays, Lipid profiles)

1.26. Electrophysiological Studies

1.26.1. Electrocardiogram

1.27. Lung Function Tests
1.27.1. Spirometry

C. Specific Topics

Understanding the definition, epidemiology, etiopathogenesis, clinical presentation, investigations, complications, differential diagnosis, treatment, prognosis, prevention, follow up and rehabilitation, if required, of the following, but not limited to:

1. Overview

1.1. History of Paediatrics
1.2. State of Health of Children – Global, Regional and India
1.3. Evidence-based Care in Pediatrics
1.4. WHO's Sustainable Development Goals
1.5. National Programs relevant to Child Health
1.6. Ethics in the Care of Children
1.7. Medico-legal aspects relevant to Paediatrics including: Documentation (Initial History/Examination/Differential Sheet, Progress (SOAP, Problem Oriented), Death and other Certification, Informed Consent, Wound Certificates, POSCO, Financial Receipts, Outpatient/In Patient Registers)

2. Genetics

2.1. Inheritance Patterns
2.2. Genetic Counseling
2.3. Prevention of Genetic Disorders
Management of Genetic Disorders

3. Metabolic Disorders

3.1. Approach to Inborn Errors of Metabolism
3.2. Approach to Hypoglycemia
3.3. Defects of Amino Acid Metabolism

3.3.1. Phenylalanine
3.3.2. Urea Cycle Disorders

3.4. Defects of Lipid Metabolism

3.4.1. Organic Acidemias
3.4.2. Fatty Acid Oxidation
3.4.3. Mitochondrial Disorders
3.4.4. Peroxisomal Disorders
3.4.5. Lysosomal Storage Disorders
3.4.6. Gaucher Disease
3.4.7. Niemann-Pick Disease

3.5. Defects of Carbohydrate Metabolism

3.5.1. Glycogen Storage Disease

3.6. GM1 and GM2 Gangliosidosis
3.7. Mucopolysaccharidoses
3.8. Porphyrias
3.9. Newborn Screening

4. Immunology

4.1. Laboratory Diagnosis of Immune-mediated Diseases
4.2. Primary Immunodeficiency Disorders

4.2.1. Antibodies
4.2.2. Cellular
4.2.3. Multiple types

4.2.3.1. SCID (Severe combined immunodeficiency)

4.3. Phagocytic system

4.3.1. Neutrophils
4.3.2. Leukopenia
4.3.3. Leuocyctosis

4.4. Complement pathway

4.4.1. Complement deficiencies

4.5. Intravenous Immunoglobulin
4.6. Multisystem Inflammatory Syndrome of Childhood

5. Allergy

5.1. Basis of Allergy
5.2. Allergic rhinitis
5.3. Atopic dermatitis
5.4. Urticaria, Angioedema
5.5. Anaphylaxis
5.6. Asthma
5.7. Serum sickness
5.8. Drug allergies
5.9. Food allergies

6. Fluid and Electrolytes

6.1. Body Fluids – Composition, Osmolality

6.2. Fluid Therapy - Maintenance, Replacement
6.3. Sodium
6.4. Potassium
6.5. Calcium
6.6. Magnesium
6.7. Phosphorus
6.8. Acid-base Abnormalities

7. Therapeutics

7.1. Principles of Drug Therapy
7.2. Administration of Medications
7.3. Pre-anesthesia Checkup
7.4. Procedural sedation
7.5. Analgesia

8. Acutely Ill

8.1. Assessment and Triage
8.2. Cardiopulmonary Resuscitation

8.2.1. Basic Life Support
8.2.2. Pediatric Advanced Life Support

8.3. Minor Injuries – Abrasions, Lacerations

9. Pediatric Intensive Care

9.1. Shock
9.2. Respiratory Failure
9.3. Pediatric Acute Respiratory Distress Syndrome
9.4. Ventilation – Non-Invasive and Invasive
9.5. Sedation, Analgesia and Paralysis
9.6. Nutrition in Intensive Care
9.7. ECMO
9.8. Concepts of Futility, Do not Resuscitate, Withdrawal of Care
9.9. Palliative Care
9.10. Death

10. Toxins

10.1. Clinical Approach to a Poisoned Child
10.2. Poisonings by Common Drugs
10.3. Hydrocarbon Poisoning
10.4. Poisoning in the Household
10.5. Corrosive Poisoning
10.6. Snakebite
10.7. Insect Stings including Bee, Wasp, Scorpion Sting

11. Injuries

11.1. Poly Trauma: Stabilization, Triage, and Transport
11.2. Drowning/Submersion Injuries
11.3. Animal-related Injuries

11.4. Burn Injuries
11.5. Cold Injuries

12. Neonatology

12.1. Neonatal Mortality and Morbidities
12.2. Fetal Physiology and Growth
12.3. Maternal Influences on Fetus
12.4. Transition of the Fetus to Newborn
12.5. Intrauterine diagnosis and management of Fetal disease
12.6. Organization of Neonatal Care

13. Normal Newborn

13.1. Delivery Room Care of the Newborn
13.2. Newborn Resuscitation
13.3. Assessment of the Newborn
13.4. Care of the Normal Newborn
13.5. Maintenance of Temperature
13.6. Breastfeeding and Lactation Management

14. Disorders of Weight and Gestation in Neonates

14.1. Low Birthweight

14.1.1. Feeding of Low-birth weight
14.1.2. Intrauterine Growth Restriction

14.2. Prematurity
14.3. Post term
14.4. Large for Gestational Age

15. High-risk Newborn

15.1. Recognition of High-risk neonate
15.2. Multiple-gestational pregnancies
15.3. Birth Injuries
15.4. Perinatal Asphyxia
15.5. Jaundice in the newborn
15.6. Infant of Diabetic Mother
15.7. Neonatal Hypoglycemia
15.8. Anemia and Polycythemia
15.9. The Bleeding Neonate
15.10. Hemorrhagic Disease of the
15.11. Thrombocytopenia in the Newborn
15.12. Cyanosis in the Newborn
15.13. Necrotizing Enterocolitis
15.14. Retinopathy of Prematurity
15.15. Dyselectrolytemia, Hypocalcemia, Hypermagnesemia
15.16. Neonatal Transport
15.17. Follow-up of the High-risk Neonate

16. Neonatal Infections

16.1. Neonatal Sepsis – Early and Late
16.2. Superficial Infections in Neonates
16.3. Neonatal Meningitis
16.4. Deep-seated Infections in Neonates
16.5. Neonatal Tetanus
16.6. Intrauterine Infections

17. Neonatal Neurological Problems

17.1. Seizures in the Neonates
17.2. Hypoxic Ischemic Encephalopathy
17.3. Intra-cranial/ventricular Hemorrhage
17.4. Peripheral nerve injuries

18. Neonatal Respiratory Problems

18.1. Approach to a Neonate with Respiratory Distress
18.2. Neonatal Apnea Neonatal Ventilation
18.3. Hyaline Membrane Disease
18.4. Transient Tachypnea of the Newborn
18.5. Meconium Aspiration Syndrome
18.6. Pulmonary Air Leaks in the Newborn
18.7. Persistent Pulmonary Hypertension (PPHN)
18.8. Pulmonary Hemorrhage
18.9. Bronchopulmonary Dysplasia
18.10. Extra pulmonary air leaks

19. Neonatal Cardiac Problems

19.1. Neonate with a murmur
19.2. Patent ductusarteriosus
19.3. Ductus dependent shunts

20. Hematological disorders in Neonates

20.1. Anemia in Neonate
20.2. Hemolytic Disease
20.3. Polycythemia
20.4. Hemorrhagic Disease

21. Congenital Malformations

21.1. Esophageal Atresia and Tracheoesophageal Fistula
21.2. Diaphragmatic Hernia and Eventration
21.3. Gastrointestinal and Abdominal Malformation
21.4. Genitourinary Malformations
21.5. CNS Malformations
21.6. Single Umbilical Artery, Polydactyly, Skin Tags

22. Growth: Normal and Abnormal

22.1. Normal Growth
22.2. Factors Affecting Growth

22.3. Assessment of Physical Growth
22.4. Disorders of Growth (Failure to Thrive, Overweight and Obesity)
22.5. Abnormalities of Stature

23. Development and Developmental Delay

23.1. Theories of Development and Behaviour
23.2. Laws of Development
23.3. Factors Affecting Development
23.4. Normal Development
23.5. Screening of Development and Behaviour
23.6. Approach to Diagnosis of Developmental Delay: Developmental Screening and Surveillance
23.7. Global Developmental Delay
23.8. Specific Developmental Delays
23.9. Cerebral Palsy
23.10. Intellectual Disability
23.11. Learning disabilities
23.12. Hearing Impairment
23.13. Mental Retardation

24. Behavior and Learning

24.1. Evaluation of Mental Well-Being
24.2. Psychosocial assessments
24.3. Technology Dependence
24.4. Bulling
24.5. Common Behavioral Problems
24.6. Tantrums and Breath-Holding
24.7. Enuresis and Encopresis
24.8. Sleep Medicine
24.9. Common Speech, Language, and Communication Disorders
24.10. Learning Disorders
24.11. Dyslexia
24.12. Attention-Deficit Hyperactivity Disorder
24.13. Oppositional Defiant and Conduct Disorders
24.14. Autism Spectrum Disorder
24.15. Rett Syndrome
24.16. Anorexia Nervosa and Bulimia
24.17. Anxiety Disorders
24.18. Suicide
24.19. Management of Psychological Illness

25. Nutrition and Nutritional Disorders

25.1. Nutritional Requirements
25.2. Nutritive Values of Indian Foods
25.3. Infant and Young Child Feeding
25.4. Adolescent Feeding
25.5. Feeding during Childhood and Food Allergy
25.6. Undernutrition: Prevalence and Etiology

25.7. Pathophysiology of Undernutrition
25.8. Malnutrition – Moderate and Severe Acute
25.9. Vitamin A
25.10. Vitamin B Complex
25.11. Vitamin C and Scurvy
25.12. Vitamin D, Nutritional Rickets, and Hypervitaminosis D
25.13. Iodine Deficiency Disorders
25.14. Zinc in Child Health
25.15. Trace Elements in Nutrition and Health
25.16. Fluorosis
25.17. Nutritional Rehabilitation including Diet Prescription
25.18. Enteral and Parenteral Nutrition
25.19. National Nutrition Programs

26. Immunization

26.1. Basic Concepts of Vaccination
26.2. Vaccine Administration Practices
26.3. Scheduling of Vaccines
26.4. Vaccine Storage and Cold Chain
26.5. Adverse Events following Immunization
26.6. BCG Vaccine
26.7. Poliovirus Vaccines
26.8. Diphtheria, Tetanus, and Pertussis Vaccines
26.9. Hepatitis B Vaccine
26.10. HaemophilusInfluenzae Type B (HIB) Vaccines
26.11. Measles Vaccine
26.12. Rubella Vaccines
26.13. Mumps Vaccine
26.14. Typhoid Fever Vaccines
26.15. Japanese Encephalitis Vaccine
26.16. Rabies Vaccines
26.17. Pneumococcal Vaccines
26.18. Rotavirus Vaccines
26.19. Cholera Vaccines
26.20. Varicella Vaccine
26.21. Hepatitis A Vaccine
26.22. Meningococcal Vaccine
26.23. Seasonal and Pandemic Influenza Vaccines
26.24. Human Papillomavirus Vaccines
26.25. Dengue Vaccines
26.26. Yellow Fever Vaccine
26.27. Combination Vaccines
26.28. Covid-19 Vaccines
26.29. Immunization in Special Situations

27. Adolescence

27.1. Gender, Sexual Identity and Sexuality
27.2. Psychosocial Development

28. Health Issues in Adolescence

- 28.1. Factors Influencing Adolescent Health
- 28.2. Adolescent Nutrition
- 28.3. Mental Health
- 28.4. Injuries, Violence, and Suicide
- 28.5. Menstrual Disorders
- 28.6. Polycystic Ovary Syndrome
- 28.7. Teenage Pregnancy
- 28.8. Sexually Transmitted Infections
- 28.9. Substance Abuse
  - 28.9.1. Alcohol
  - 28.9.2. Tobacco
  - 28.9.3. Other substances

29. Care of the Adolescents

- 29.1. Adolescent Counseling
- 29.2. Promoting Health of Adolescents
- 29.3. Adolescent Friendly Health Services

30. Infectious Diseases

- 30.1. Epidemiology of Infectious Diseases
- 30.2. Laboratory Diagnosis of Infection
- 30.3. Microbiome and Child Health
- 30.4. Antimicrobial Resistance
- 30.5. Infection Control and Prevention

31. Fever

- 31.1. Fever: General Principles of Management
- 31.2. Fever with/without focus
- 31.3. Fever of Unknown Origin
- 31.4. Infections in Immunocompromised conditions

32. Bacterial Infections

- 32.1. Natural History of Bacterial Infection
- 32.2. Principles of Antibiotic Therapy
- 32.3. Gram Positive Infections
  - 32.3.1. Streptococcal Infections
    - 32.3.1.1. Pneumococcal Infections
    - 32.3.1.2. Streptococcal Group A
    - 32.3.1.3. Streptococcal Group B
    - 32.3.1.4. Streptococcal Non A, Non B
  - 32.3.2. Staphylococcal Infections
  - 32.3.3. Enterococcus
  - 32.3.4. Diphtheria
  - 32.3.5. Nocardiosis
  - 32.3.6. Listeria monocytogenes
  - 32.3.7. Actinomycosis

32.4. Gram Negative Infections

32.4.1. Haemophilusinfluenzae
32.4.2. Neisseria
32.4.3. Pseudomonas
32.4.4. Pertussis
32.4.5. Salmonella

32.4.5.1. Nontyphoidal Salmonellosis
32.4.5.2. Enteric Fever

32.4.6. Shigella
32.4.7. Escherichia coli
32.4.8. Cholera
32.4.9. Campylobacter
32.4.10. Yersina
32.4.11. Aeromonas
32.4.12. Brucella
32.4.13. Moraxella catarrhalis
32.4.14. Helicobacter pylori

32.5. Anaerobic Bacterial

32.5.1. Clostridium tetani
32.5.2. Clostridium botulinum
32.5.3. Clostridium difficile

32.6. Spirochetal Infections

32.6.1. Treponemapallidum
32.6.2. Leptospirosis
32.6.3. Borrelia

32.6.3.1. Lyme
32.6.3.2. Relapsing Fever

32.7. Mycoplasma

32.7.1. Mycoplasma pneumoniae

32.8. Chlamydia

32.8.1. Chlamydia pneumonia
32.8.2. Chlamydia trachomatis
32.8.3. Psittacosis

32.9. Rickettsia

32.9.1. Spotted Fever
32.9.2. Scrub Typhus
32.9.3. Typhus
32.9.4. Ehrlichiosis
32.9.5. Q fever

33. Mycobacterial Infections

33.1. Childhood Tuberculosis: Epidemiology, Pathogenesis, Clinical Features, and Prevention

33.2. Diagnostic Tools for Tuberculosis in Children
33.3. Antitubercular Drugs and RNTCP
33.4. Guidelines for Childhood Tuberculosis
33.5. Drug Resistant Tuberculosis
33.6. Atypical Mycobacterial Infections
33.7. Leprosy

34. Viral Diseases

34.1. Epidemiology of Viral Infections
34.2. Principles of Antiviral Drugs
34.3. Measles
34.4. Mumps
34.5. Rubella
34.6. Roseola
34.7. Epstein-Barr
34.8. Cytomegalovirus
34.9. Influenza
34.10. Parainfluenza
34.11. Respiratory syncytial virus
34.12. Human metapneumovirus
34.13. Rhinovirus
34.14. Adenovirus
34.15. Coronavirus
34.16. Rotavirus
34.17. Human Papillomavirus
34.18. Arbovirus

34.18.1. Japanese Encephalitis
34.18.2. Other Encephalitis
34.18.3. Tick-borne Encephalitis
34.18.4. Chikungunya
34.18.5. Zika

34.19. Varicella-zoster
34.20. Herpes Simplex
34.21. Rabies
34.22. Parvovirus Infections
34.23. NonpolioEnteroviral Infections
34.24. Poliomyelitis
34.25. Viral Hepatitis
34.26. HIV
34.27. Human Lymphotrophic 1 and 2
34.28. Dengue
34.29. Yellow Fever
34.30. Ebola, Hanta
34.31. Rabies
34.32. Viral Hemorrhagic Fevers
34.33. Covid-19

35. Protozoal Disease

35.1. Epidemiology of Parasitic Infections
35.2. Principles of Antiparasitic therapy
35.3. Malaria
35.4. Leishmaniasis
35.5. Giardiasis
35.6. Amebiasis
35.7. Filariasis
35.8. Cryptosporidiosis
35.9. Toxoplasmosis
35.10. Helminthiasis

35.10.1. Hookworm Infestation
35.10.2. Ascariasis
35.10.3. Trichuriasis
35.10.4. Enterobiasis
35.10.5. Strongyloidiasis
35.10.6. Tapeworm Diseases
35.10.7. Cysticercosis
35.10.8. Trichinosis
35.10.9. Toxocara
35.10.10. Intestinal, Liver, and Lung Flukes
35.10.11. Hydatid Disease: Echinococcosis
35.10.12. Schistosomiasis

36. Fungal Infections

36.1. Fungi
36.2. Principles of Antifungal Therapy
36.3. Candidiasis
36.4. Aspergillosis
36.5. Malassezia
36.6. Cryptococcosis
36.7. Coccidioidomycosis
36.8. Blastomycosis
36.9. Histoplasmosis
36.10. Mucormycosis
36.11. Pneumocystis Jirovecii

37. Diarrheal Illnesses

37.1. Acute Watery Diarrhea
37.2. Dysentery
37.3. Cholera
37.4. Persistent Diarrhea
37.5. Chronic Diar*rhea*
37.6. Antibiotic Associated Diarrhea

38. Gastrointestinal Disorders

38.1. Anatomy and Physiology
38.2. Common Symptoms of Gastrointestinal Diseases
38.3. Oral Cavity disorders

38.3.1. Malocclusion
38.3.2. Dental Caries
38.3.3. Periodontal disease
38.3.4. Common lesions of soft palate
38.3.5. Cleft Lip and Cleft Palate
38.3.6. Diseases of Salivary Glands

38.4. Esophageal atresia, Tracheoesophageal Fistula
38.5. Disorders of Esophageal Motility
38.6. Gastroesophageal Reflux
38.7. Esophagitis
38.8. Hiatal Hernia
38.9. Ingestions

38.9.1. Foreign Body
38.9.2. Caustic

38.10. Infantile Hypertrophic Pyloric Stenosis, Volvulus, Duplication
38.11. Duodenal Obstruction
38.12. Malrotation
38.13. Intestinal duplication
38.14. Meckel Diverticulum
38.15. Chronic obstructive pseudoobstruction
38.16. Chronic Abdominal Pain—Functional Abdominal Pain
38.17. Acid Peptic Disease
38.18. Pancreas – Function, Tests

38.18.1. Pancreatitis
38.18.2. Treatment of Pancreatic insufficiency

38.19. Constipation
38.20. Hirschsprung Disease
38.21. Malabsorption Disorders

38.21.1. Assessment
38.21.2. Celiac
38.21.3. Enzyme Deficiencies

38.22. Inflammatory Bowel Disease
38.23. Intestinal Obstruction
38.24. Intussusception
38.25. Appendicitis
38.26. Abdominal Tuberculosis
38.27. Ascites
38.28. Umbilical Hernia
38.29. Inguinal Hernia
38.30. Testicular Torsion
38.31. Anorectal Disorders

38.31.1. Anal Fissure
38.31.2. Hemorrhoids
38.31.3. Prolapse

38.31.4. Pilonidal sinus
38.31.5. Anorectal malformations

38.32. Cyclic vomiting

39. Hepatobiliary Diseases

39.1. Liver Function Tests
39.2. Neonatal Cholestasis
39.3. Portal Hypertension
39.4. Gastrointestinal Bleeding
39.5. Metabolic Liver disease

39.5.1. Wilson
39.5.2. Others

39.6. Liver Abscess
39.7. Viral Hepatitis
39.8. Chronic Liver Disease
39.9. Acute Liver Failure
39.10. Autoimmune Hepatitis
39.11. Drug induced Hepatitis
39.12. Cystic disease of Liver
39.13. Liver transplantation
39.14. Liver Tumors
39.15. Peritoneum

39.15.1. Ascites
39.15.2. Peritonitis

39.16. Epigastric hernia

40. Disorders of Hematopoietic System

40.1. The Hematopoietic System
40.2. Anemia: Etiology and Classification
40.3. Inadequate Production

40.3.1. Physiological anemia of infancy
40.3.2. Congenital Bone Marrow Failure
40.3.3. Aplastic Anemia
40.3.4. Iron Deficiency Anemia
40.3.5. Megaloblastic Anemia
40.3.6. Anemia of Chronic disease
40.3.7. Congenital dyserthropoietic anemia

40.4. Hemolytic Anemia

40.4.1. Hemoglobinopathies

40.4.1.1. Sickle Cell Disease
40.4.1.2. Thalassemia

40.4.2. RBC Membrane Defects
40.4.3. Red Blood Cell Enzyme Defects
40.4.4. Immune Hemolytic Anemia

40.5. Polycythemia

40.6. Hemorrhagic and Thrombotic disorders

40.6.1. Coagulation Disorders
40.6.2. Hemophilia
40.6.3. Other Clotting Factor Deficiencies
40.6.4. Von Willebrand Disease
40.6.5. Thrombotic disorders
40.6.6. Disseminated Intravascular Coagulation

40.7. Platelet

40.7.1. Immune Thrombocytopenia
40.7.2. Hemolytic Uremic Syndrome
40.7.3. Thrombotic Thrombocytopenic Purpura
40.7.4. Kasabach- Merritt Syndrome
40.7.5. Platelet Function Defects

40.8. Blood Component Therapy

40.9. Spleen

40.9.1. Splenomegaly
40.9.2. Splenectomy

40.10. Lymphatics

40.10.1. Lymphadenopathy

41. Respiratory Diseases

41.1. Congenital Malformations of the Upper Respiratory Tract
41.2. Epistaxis
41.3. Nasal Polyps
41.4. Allergic Rhinitis
41.5. Otitis Media
41.6. Common Cold
41.7. Acute Pharyngitis
41.8. Retropharyngeal abscess
41.9. Sinusitis
41.10. Tonsils and Adenoids
41.11. Community Acquired Pneumonia
41.12. Pleural effusion, Empyema
41.13. Bronchiectasis
41.14. Pneumothorax, Pneumomediastinum, Pyopneumothorax
41.15. Skeletal deformities of Chest
41.16. Obstructive Sleep Apnea
41.17. Congenital Malformations of the Respiratory Tract
41.18. Congenital disorders of Lung
41.19. Croup, Epiglottitis, Laryngitis, Tracheitis
41.20. Bronchiolitis
41.21. Alpha-1 Antitrypsin Deficiency

41.22. Aspiration Syndromes
41.23. Preschool Wheeze and Bronchial Asthma
41.24. Aerosol Therapy
41.25. Pneumonia
41.26. Parapneumonic Effusion and Empyema
41.27. Pneumothorax and Air Leaks
41.28. Persistent and Recurrent Pneumonia
41.29. Interstitial Lung Disease
41.30. Hemoptysis and Alveolar Bleeds
41.31. Primary Ciliary Dyskinesia
41.32. Cystic Fibrosis
41.33. Bronchiectasis
41.34. Lung Abscess
41.35. Foreign Body Aspiration
41.36. Central Hypoventilation
41.37. Acute Respiratory Distress Syndrome
41.38. SIDS

42. Cardiovascular Disorders

42.1. Genetic Basis of Heart Diseases
42.2. Chest Skiagram in Heart Disease
42.3. Electrocardiogram
42.4. Echocardiography
42.5. Congestive Heart Failure
42.6. Cardiac Malposition
42.7. Acyanotic Congenital Heart Disease, Left to Right shunt

42.7.1. Ventricular Septal Defects
42.7.2. Patent DuctusArteriosus
42.7.3. Atrial Septal Defects
42.7.4. PAPVC
42.7.5. Atrioventricular Septal Defects

42.8. Acyanotic Congenital Heart Disease, Obstructive

42.8.1. Pulmonary Valve Stenosis
42.8.2. Coarctation of Aorta
42.8.3. Pulmonary Venous Hypertension

42.9. Acyanotic Congenital Heart Disease, Regurgitation

42.9.1. Mitral Valve Prolapse

42.10. Cyanotic Congenital Heart Disease, reduced Pulmonary flow

42.10.1. Tetralogy of Fallot and Variants
42.10.2. Tricuspid Atresia
42.10.3. Double outlet Right Ventricle
42.10.4. Ebstein Anomaly

42.11. Cyanotic Congenital Heart Disease, Increased Pulmonary flow

42.11.1. Transposition of Great Arteries and variants
42.11.2. TruncusArteriosus
42.11.3. TAPVC
42.11.4. Hypoplastic Left Heart Syndrome

42.12. Others

42.12.1. Anomalies of the Aortic Arch
42.12.2. Pulmonary Arterial Hypertension

42.13. Acquired Heart Disease

42.13.1. Acute Rheumatic Fever
42.13.2. Rheumatic Heart Disease
42.13.3. Infective Endocarditis
42.13.4. Myocardial Diseases: Myocarditis and Cardiomyopathies
42.13.5. Diseases of the Pericardium
42.13.6. Kawasaki disease

42.14. Cardiac Arrhythmias
42.15. Cardiac Emergencies
42.16. Heart Failure
42.17. Systemic Hypertension

43. Disorders of the Kidney and Urinary Tract

43.1. Investigations for Kidneys and Urinary Tract
43.2. Congenital Anomalies of Kidneys and Urinary Tract

43.2.1. Cystic Kidney Diseases

43.3. Glomerular Disease

43.3.1. Glomerulonephritis

43.3.1.1. Acute Poststreptococcal Glomerulonephritis
43.3.1.2. Membranous Nephropathy
43.3.1.3. Membranoproliferative Glomerulonephritis
43.3.1.4. RapidlyProgressive Glomerulonephritis

43.3.2. IgA nephropathy
43.3.3. Alport syndrome

43.4. Systemic Vasculitis and Lupus Nephritis
43.5. Goodpasture Disease
43.6. Henoch-SchonleinPurpura Nephritis
43.7. Hemolytic Uremic Syndrome
43.8. Toxic Nephropathy
43.9. Tubulointerstitial Disease

43.9.1. Pyelonephritis
43.9.2. Tubulointerstitial nephritis
43.9.3. Papillary necrosis
43.9.4. Acute Tubular Necrosis

43.10. Vascular Disease

43.10.1. Renal vein Thrombosis
43.10.2. Hypercalciuria
43.10.3. Nephrocalcinosis

43.11. Infections

43.11.1. Urinary Tract Infection
43.11.2. Cystitis
43.11.3. Urethritis
43.11.4. Hemorrhagic cystitis
43.11.5. Pyelonephritis

43.12. Proteinuria

43.12.1. Transient, Orthostatic
43.12.2. Nephrotic Syndrome

43.13. Tubular Disorders

43.13.1. Renal Tubular Disorders
43.13.2. Nephrogenic Diabetes Insipidus
43.13.3. Bartter Syndrome
43.13.4. Gitelman Syndrome

43.14. Renal Failure

43.14.1. Acute Kidney Injury
43.14.2. Chronic Kidney disease
43.14.3. End-stage renal disease
43.14.4. Renal Replacement Therapy
43.14.5. Renal Transplantation

43.15. Renal Calculi
43.16. Refractory Rickets
43.17. Hypertension
43.18. Vesicoureteral Reflux
43.19. Voiding Disorders
43.20. Penile anomalies

44. Gynecological Issues

44.1. Vaginal bleeding in prepubertal children
44.2. Breast concerns
44.3. Female genital mutilation

45. Neurological Disorders

45.1. Approach to Neurological Disorders including localization
45.2. Cerebrospinal Fluid and Neurophysiology
45.3. Neuroimaging
45.4. Congenital Anomalies

45.4.1. Neural Tube Defects and Spinal Cord Malformations

45.4.2. Microcephaly
45.4.3. Brain Malformations
45.4.4. Hydrocephalus
45.4.5. Craniosynostosis

45.5. Seizures

45.5.1. Febrile Seizures
45.5.2. Unprovoked Seizures and Epilepsy

45.5.2.1. Generalized
45.5.2.2. Focal
45.5.2.3. Reflex Seizures

45.5.3. Treatment of Seizures
45.5.4. Status Epilepticus
45.5.5. Nonepileptic Paroxysmal Disorders

45.6. Headaches

45.6.1. Migraine
45.6.2. Tension Headache
45.6.3. Secondary Headaches

45.7. Neurocutaneous Syndromes
45.8. Movement Disorders
45.9. Encephalopathies

45.9.1. Cerebral Palsy
45.9.2. Autoimmune
45.9.3. Mitochondrial

45.10. Neurodegenerative Disorders

45.10.1. Grey versus White Matter
45.10.2. Sphingolipidosis
45.10.3. Neuronal CeroidLipofuscinoses
45.10.4. Adrenoleucodystrophy

45.11. Demyelinating Disorders

45.11.1. Acute Disseminated Encephalomyelitis
45.11.2. Optic Neuritis
45.11.3. Transverse Myelitis
45.11.4. Multiple Sclerosis
45.11.5. Autoimmune and Paraneoplastic

45.12. Stroke

45.12.1. Arterial versus Venous

45.13. CNS Vasculitis
45.14. CNS Infections

45.14.1. Acute Pyogenic Meningitis
45.14.2. Tuberculosis of the Central Nervous System

45.14.3. Viral Meningoencephalitis
45.14.4. Neurocysticercosis
45.14.5. Brain Abscess

45.15. PseudotumorCerebri
45.16. Coma and Raised Intracranial Pressure
45.17. Brain Death
45.18. Infantile Tremor Syndrome
45.19. Neurometabolic Disorders
45.20. Spinal Cord Disorders
45.21. Traumatic Brain Injury
45.22. Neuro-Rehabilitation

45.22.1. Traumatic Brain Injury
45.22.2. Spinal cord Injury
45.22.3. Spasticity
45.22.4. Brachial plexus injury
45.22.5. Meningomyelocele
45.22.6. Disabled Child

46. Neuromuscular Disorders

46.1. Approach to Diagnosis of Neuromuscular Disorders
46.2. Floppy Infant
46.3. Congenital Muscle Disorders

46.3.1. Congenital Myopathies
46.3.2. Arthrogryposis

46.4. Muscular Dystrophies

46.4.1. Duchenne and Becker Muscular Dystrophy
46.4.2. Myotonic Muscular Dystrophy
46.4.3. Limb Girdle Muscular Dystrophy
46.4.4. Fascio-scapulo-humeral Muscular Dystrophy

46.5. Endocrine/Toxic Myopathies
46.6. Metabolic Myopathies

46.6.1. Periodic Paralysis
46.6.2. Glucogenoses
46.6.3. Mitochondrial
46.6.4. Lipid

46.7. Neuromuscular Transmission Disorders

46.7.1. Myasthenia Gravis
46.7.2. Spinal Muscular Atrophy
46.7.3. Motor Neuron Disease

46.8. Hereditary Motor Sensory Neuropathies

46.8.1. Peroneal Muscular Atrophy
46.8.2. Refsum Disease
46.8.3. Fabry Disease
46.8.4. Leukodystrophy

46.8.5. Acute Flaccid Paralysis

46.9. Toxic Neuropathies
46.10. Autonomic Neuropathy
46.11. Guillain-Barré Syndrome
46.12. Bell Palsy

47. Disorders of the Endocrine System

47.1. Physiology of Neuroendocrinology
47.2. Hypopituitarism

47.2.1. Growth Hormone Deficiency and Resistance
47.2.2. Polyuria, Diabetes Insipidus and Syndrome of Inappropriate Secretion of ADH

47.3. Thyroid Disorders

47.3.1. Thyroid Hormone Physiology
47.3.2. Hypothyroidism
47.3.3. Thyroiditis
47.3.4. Hyperthyroidism
47.3.5. Goiter and Thyroid Nodules
47.3.6. Newborn Screening for Congenital Hypothyroidism

47.4. Parathyroid Disorders

47.4.1. Bone Mineral and Hormone Physiology
47.4.2. Calcium Disorders
47.4.3. Metabolic Rickets
47.4.4. Disorders with Bone Fragility
47.4.5. Hypoparathyroidism
47.4.6. Pseudo hypothyroidism
47.4.7. Hyperparathyroidism

47.5. Pubertal Development

47.5.1. Normal Puberty
47.5.2. Delayed Puberty
47.5.3. Precocious Puberty

47.6. Adrenal Gland Disorders

47.6.1. Normal Development and Physiology of the Adrenal Gland
47.6.2. Congenital Adrenal Hyperplasia
47.6.3. Adrenal Insufficiency
47.6.4. Cushing Syndrome
47.6.5. Primary Aldosteronism
47.6.6. Pheochromocytoma

47.7. Gonad Disorders

47.7.1. Testicular Hypofunction
47.7.2. Ovarian Hypofunction
47.7.3. Gynecomastia
47.7.4. Disorders of Sex Development

47.7.5. Cryptorchidism and Micropenis

47.8. Glucocorticoid Use and Withdrawal

47.9. Diabetes Mellitus

47.9.1. Classification of Diabetes Mellitus
47.9.2. Type 1 Diabetes Mellitus
47.9.3. Type 2 Diabetes Mellitus
47.9.4. Acute and Chronic Complications of Diabetes Mellitus

47.10. Monogenic Obesity
47.11. Hyperlipidemia
47.12. Endocrine Consequences of Thalassemia Major
47.13. Endocrine Effects of Radiation and Cancer Chemotherapy
47.14. Adult Consequences of IUGR and Preterm Birth

48. Malignancies in Children

48.1. Epidemiology and Biology of Cancers
48.2. Principles of Diagnosis and Therapy of Cancer
48.3. Leukemias

48.3.1. Acute Lymphoblastic Leukemia
48.3.2. Acute Myelogenous Leukemia
48.3.3. Chronic Myelogenous Leukemia
48.3.4. Infantile Leukemia

48.4. Lymphoma

48.4.1. Hodgkin Lymphoma
48.4.2. Non-Hodgkin Lymphoma

48.5. Brain Tumors
48.6. Neuroblastoma
48.7. Wilms Tumor
48.8. Soft Tissue Tumors
48.9. Bone Tumors
48.10. Retinoblastoma
48.11. Gonadal, Germ cell neoplasms
48.12. Hemangioma
48.13. Lymphangiomas, Cystic Hygromas
48.14. Thyroid Tumours
48.15. Nasopharyngeal Carcinoma
48.16. Adrenal Tumours
48.17. Histiocytosis

48.17.1. LCH
48.17.2. HemophagocyticLymphohistiocytosis

48.18. Oncological Emergencies and Supportive Care
48.19. Hematopoietic Stem Cell Transplant

49. Rheumatological Disorders

49.1. Approach to a Child with Rheumatological Disorder
49.2. Laboratory Investigations for Rheumatological Disorders
49.3. Drugs and Principles of Management for Rheumatic Disorders
49.4. Juvenile Idiopathic Arthritis
49.5. Reactive, Post-Infectious Arthritis
49.6. Systemic Lupus Erythematosus: Clinical Features and Diagnostic Criteria
49.7. Management of Systemic Lupus Erythematosus
49.8. Juvenile Dermatomyositis
49.9. Large Vessel Vasculitis: Takayasu Arteritis
49.10. Medium Vessel Vasculitis: Kawasaki Disease and PolyarteritisNodosa
49.11. Small Vessel Vasculitis:Henoch-SchönleinPurpuraand ANCA Associated Vasculitis
49.12. Juvenile Scleroderma
49.13. Antiphospholipid Syndrome
49.14. Growing Pains

50. Common Eye Abnormalities

50.1. Common Visual Problems
50.2. Congenital Anomalies
50.3. Refractive Errors
50.4. Cornea and Conjunctiva
50.5. Uveitis
50.6. Cataract and Lens
50.7. Glaucoma
50.8. Optic Nerve and Pupil
50.9. Strabismus and Motility Disorders
50.10. Eyelid, Orbit, and Lacrimal Sac
50.11. Ocular Injuries
50.12. Orbital Infections
50.13. Ocular Manifestations of Systemic Disorders

51. Common ENT Problems

51.1. Hearing Loss
51.2. Congenital malformations of Ear
51.3. External Otitis
51.4. Otitis Media
51.5. Mastoiditis
51.6. Inner Ear

52. Common Skin Problems

52.1. Skin of the Newborn: Physiological and Pathological Changes
52.2. Care of Skin in the Newborn
52.3. Infections and Infestations
52.4. Congenital Cutaneous Malformations
52.5. Vitiligo and Other Hypopigmentary Diseases
52.6. Atopic Dermatitis
52.7. Contact Dermatitis

52.8. Urticaria and Mastocytosis
52.9. Psoriasis, GianottiCrosti Syndrome
52.10. AcanthosisNigrans
52.11. Cutaneous Drug Reactions
52.12. Cutaneous Manifestations of Nutritional Deficiency
52.13. Cutaneous Manifestations of Collagen Vascular Diseases
52.14. Neurocutaneous Syndromes
52.15. Vesiculobullous Disorders
52.16. Papulosquamous Disorders
52.17. Ichthyosis
52.18. Genetic Cutaneous Disorders
52.19. Hair Disorders
52.20. Nail Disorders
52.21. Infections of Skin

52.21.1. Impetigo
52.21.2. Subcutaneous Infections
52.21.3. Staphylococcal Scalded Skin Syndrome
52.21.4. Ecthyma
52.21.5. Fungal Infections
52.21.6. Viral Infections
52.21.7. Arthropod bites
52.21.8. Scabies
52.21.9. Pediculosis
52.21.10. Acne

53. Disorders of Bones and Joints

53.1. Assessment of the Locomotor System
53.2. Deformities of Foot and Toes

53.2.1. Congenital TalipesEquinovarus

53.3. Torsional deformities of Limb
53.4. Leg Length discrepancies
53.5. Transient Monoarticularsynovitis
53.6. Legg-Calvé-Perthes Disease
53.7. Neck Problems

53.7.1. Torticollis
53.7.2. Cervical anomalies

53.8. Scoliosis and Kyphosis
53.9. Developmental Dysplasia of the Hip (DDH)
53.10. Osteomyelitis
53.11. Septic Arthritis
53.12. Osgood-Schlatter Disease
53.13. Arthrogryposis
53.14. Injuries to Bones/Joints
53.15. Skeletal Dysplasia
53.16. Osteogenesisimperfecta
53.17. Marfan Syndrome
53.18. Metabolic Bone Disease

53.18.1. Hypo/Hyperphosphatemia
53.18.2. Osteoporosis

54. Vulnerable Children

54.1. Street Children
54.2. Child Labor
54.3. Child Abuse and Neglect
54.4. Adoption: Medical and Legal Issues
54.5. Rights of the Child

55. Environmental Health

55.1. Climate Change and its impact on Health
55.2. Air Pollution and its impact on Health
55.3. Biomedical Waste Management

56. Community Pediatrics

56.1. Indicators of Child Health
56.2. Environment and Child Health
56.3. Lead Poisoning
56.4. Adoption
56.5. Travel Medicine
56.6. Protection of Children from Sexual Offences ACT 2012
56.7. Rights of People With Disability Act 2016
56.8. National Programs for Child Health as relevantto Natonal Health Mission including RBSK.
56.9. Integrated Management of Neonatal and ChildhoodIllness-Facility (IMNCI-F)
56.10. Investigation of an Outbreak

57. Quality Assessment and Improvement

57.1.1. Point of Care Quality Improvement

B. Psychomotor Domain

- *Should be able to perform independently in the practice of Paediatrics, the following diagnostic and therapeutic interventions as listed below:*

1. Physical Examination

1.1. Measurement of Vitals
1.2. Measurement of Anthropometry
1.3. General physical examination
1.4. Physical Examination of Systems
1.5. Development (Screening) Assessment
1.6. Behavioral (Screening) Assessment
1.7. Sexual Maturity Assessment
1.8. Newborn Assessment including gestational assessments
1.9. Breastfeeding Assessment of Position and Attachment
1.10. Motor Disability Assessment

1.11. Autism Spectrum Disorder Screening
1.12. Fundus examination
1.13. Middle ear examination
1.14. Throat examination
1.15. Triage - Rapid assessment of Airway, Breathing and Circulation
1.16. Hand hygiene
1.17. Biomedical Waste disposal guidelines

2. Non-Invasive Monitoring

2.1. Pulse oximetry
2.2. Electrocardiogram
2.3. Vital Data Monitor

3. Procedures – Diagnostic

3.1. Informed Consent
3.2. Aseptic measures for all invasive procedures
3.3. Sampling

3.3.1. Venous blood
3.3.2. Arterial blood
3.3.3. Capillary blood

3.4. Vascular Access and cannulation

3.4.1. Intravenous – Peripheral
3.4.2. Intravenous - Central
3.4.3. Intraosseous
3.4.4. Intraarterial
3.4.5. Umbilical Vein

3.5. Diagnostic Taps

3.5.1. Pleural
3.5.2. Peritoneal
3.5.3. CSF
3.5.4. Pericardial
3.5.5. Joint fluid

3.5.6. Subdural
3.5.7. Ventricular

3.6. Urinary Catheterization
3.7. Urine collection

3.7.1. Mid-stream sampling
3.7.2. Catheter sampling
3.7.3. Suprapubic puncture

3.8. Tuberculin Skin Test
3.9. Antibiotic Test Dose
3.10. Feeding/Ryles Tube

3.10.1. Insertion

3.10.2. Gastric Aspiration
3.10.3. Feeds
3.10.4. Stomach wash

3.11. Respiratory

3.11.1. Naso, Pharyngeal and Nasopharyngeal swab collection

3.12. Suppository insertion
3.13. Per rectal exam
3.14. Inspection of Vulva/Vagina
3.15. Aspiration/Biopsy

3.15.1. Bone marrow
3.15.2. Liver
3.15.3. Kidney
3.15.4. FNAC Lymph node

3.16. Ultrasound – Lung (B line, Effusion), Circulation (IVC Volume), Vascular access (Central venous), Soft Tissue (Pus)
3.17. Blood Group/Type
3.18. Smears

3.18.1. Malaria Parasite Smear/Rapid Antigen Test
3.18.2. Peripheral Blood Smear
3.18.3. CSF/Pus Grams Stain
3.18.4. Sputum Ziehl Neilson Smear

3.19. Urine dipstick
3.20. Stool Hanging drop
3.21. Glucometer Blood Sugar
3.22. Shake test (Newborn gastric aspirate)
3.23. Electrocardiogram
3.24. Specific Screening/Assessment Tools

3.24.1. Gestation Assessments
3.24.2. Anthropometric measurements and Growth charting
3.24.3. Peak Flow Meter Measurement
3.24.4. HEADSS screening (Adolescence)
3.24.5. DDST screening (Development Assessment)
3.24.6. Assessment of Sexual Maturity using Tanner's
3.24.7. M-CHAT-R screening (Autism Assessment)
3.24.8. GMSCF Assessment of Motor Disability (Cerebral Palsy)
3.24.9. Pain assessment

4. Procedures – Therapeutic

4.1.Informed Consent
4.2.Prescriptions/Medication Orders
4.3.Neonatal Resuscitation Programincluding intubation
4.4.Basic Life Support
4.5.Advanced Paediatric Life Support including intubation

4.6.Heimlich, Foreign Body Removal
4.7.Exchange Transfusion
4.8.Stomach wash
4.9.Injections

- 4.9.1. Intravenous
- 4.9.2. Intramuscular
- 4.9.3. Subcutaneous
- 4.9.4. Intradermal

4.10. Infusions

- 4.10.1. IV bolus
- 4.10.2. Intravenous
- 4.10.3. Intraosseous
- 4.10.4. Blood Component Transfusion

4.11. Respiratory

- 4.11.1. Meter dose inhalation with or without Spacer/Mask
- 4.11.2. Nebulization
- 4.11.3. Airway Insertion – Nasopharyngeal, Oropharyngeal
- 4.11.4. Needle Cricothyroidotomy
- 4.11.5. Oxygen delivery methods
- 4.11.6. HFNC/CPAP/Non-Invasive Ventilation
- 4.11.7. Ventilation – Conventional
- 4.11.8. Intercostal drainage
- 4.11.9. Surfactant Administration (INSURE)

4.12. Spinal infusion/injection
4.13. Therapeutic Ascitic Tap
4.14. Peritoneal dialysis
4.15. Phototherapy
4.16. Incision and Drainage
4.17. Dressings
4.18. Sling
4.19. Transport onto and off stretcher
4.20. Neonatal Temperature Warm Chain Measures

- 4.20.1. Wrapping up Newborn
- 4.20.2. Kangaroo Mother Care

4.21. Immunization Cold Chain Measures

- 4.21.1. Refrigerator
- 4.21.2. Vaccine carrier

4.22. Restraining a child
4.23. Transporting a child
4.24. Early Interventional Therapy
4.25. Chest Physiotherapy

Milestones to be achieved on Psychomotor Skills through Year 1 to 3.
O-Observe PS-Perform under supervision PI-Perform ndependently

Milestones	1st Year	2nd Year	3rd Year
1. Physical Examination			
1.1. Measurement of Vitals	PI		
1.2. Measurement of Anthropometry	PI		
1.3. General physical examination	PI		
1.4. Physical Examination of Systems	PI		
1.5. Development (Screening) Assessment	O, PS	PI	
1.6. Behavioral (Screening) Assessment	O	PS	PI
1.7. Sexual Maturity Assessment	O, PS	PI	
1.8. Newborn Assessment including gestational assessments	PI		
1.9. Breastfeeding Assessment	PI		
1.10. Motor Disability Assessment	O	PS	PI
1.11. Autism Spectrum Disorder Screening	O	PS	PI
1.12. Fundus examination	PI		
1.13. Middle ear examination	PI		
1.14. Throat examination	PI		
1.15. Triage - Rapid assessment of ABC	PI		
1.16. Hand hygiene	PI		
1.17. Biomedical Waste disposal guidelines	PI		
2. Non-Invasive Monitoring			
2.1. Pulse oximetry	PI		
2.2. Electrocardiogram	PI		
2.3. Vital Data Monitor	PI		
3. Procedures – Diagnostic			
3.1. Informed Consent	PI		
3.2. Aseptic measures for all procedures	PI		
3.3. Sampling			
3.3.1. Venous blood	PI		
3.3.2. Arterial blood	PI		

3.3.3. Capillary blood	PI		
3.4. Vascular Access and cannulation			
3.4.1. Intravenous – Peripheral	PI		
3.4.2. Intravenous - Central	O	PS	PI
3.4.3. Intraosseous	PI		
3.4.4. Intraarterial	O	PS	PI
3.4.5. Umbilical Vein	PI		
3.5. Diagnostic Taps			
3.5.1. Pleural	PS	PI	
3.5.2. Peritoneal	PI		
3.5.3. CSF	PI		
3.5.4. Pericardial	O	PS	PI
3.5.5. Joint fluid	O	PS	PI
3.5.6. Subdural	O, PS	PI	
3.5.7. Ventricular	O	PS	PI
3.6. Urinary Catheterization	PI		
3.7. Urine collection			
3.7.1. Mid-stream sampling	PI		
3.7.2. Catheter sampling	PI		
3.7.3. Suprapubic puncture	PI		
3.8. Tuberculin Skin Test	PI		
3.9. Antibiotic Test Dose	PI		
3.10. Feeding/Ryles Tube			
3.10.1. Insertion	PI		
3.10.2. Gastric Aspiration	PI		
3.10.3. Feeds	PI		
3.10.4. Stomach wash	PI		
3.11. Respiratory			
3.11.1. Naso, Pharyngeal, NP swab collection	PI		
3.12. Suppository insertion	PI		
3.13. Per rectal exam	O	PS	PI

3.14. Inspection of Vulva/Vagina	PI		
3.15. Aspiration/Biopsy			
3.15.1. Bone marrow	O, PS	PI	
3.15.2. Liver	O	PS	PI
3.15.3. Kidney	O	PS	PI
3.15.4. FNAC Lymph node	O	PS	PI
3.16. Ultrasound – Lung (B line, Effusion), Circulation (IVC Volume), Vascular access (Central venous), Soft Tissue (Pus)	O	O, PS	PS
3.17. Blood Group/Type	O, PS	PI	
3.18. Smears			
3.18.1. Malaria Parasite Smear/Rapid Antigen Test	O, PS	PI	
3.18.2. Peripheral Blood Smear	O, PS	PI	
3.18.3. CSF/Pus Grams Stain	O, PS	PI	
3.18.4. Sputum Ziehl Neilson Smear	O, PS	PI	
3.19. Urine dipstick	PI		
3.20. Stool Hanging drop	O, PS	PI	
3.21. Glucometer Blood Sugar	PI		
3.22. Shake test (Neon gastric aspirate)	PI		
3.23. Electrocardiogram	PI		
3.24. Specific Screening/Assessment Tools			
3.24.1. Gestation Assessments	PI		
3.24.2. Anthropometric measurements and Growth charting	PI		
3.24.3. Peak Flow Meter Measurement	PI		
3.24.4. HEADSS screening (Adolescence)	O, PS	PI	
3.24.5. DDST screening (Development Assessment)	O, PS	PI	
3.24.6. Assessment of Sexual Maturity using Tanner's	O, PS	PI	
3.24.7. M-CHAT-R screening (Autism Assessment)	O	PS	PI
3.24.8. GMSCF Assessment of Motor Disability (Cerebral Palsy)	O	PS	PI

3.24.9. Pain assessment	PI		
4. Procedures – Therapeutic			
4.1. Informed Consent	PI		
4.2. Prescriptions/Medication Orders	PI		
4.3. Neonatal Resuscitation Program including ET	PI (BVM)	PI (ET)	
4.4. Basic Life Support	PI		
4.5. Advanced Paediatric Life Support including ET	PI (BVM)	PI (ET)	
4.6. Heimlich, Foreign Body Removal	PI		
4.7. Exchange Transfusion	O	PS	PI
4.8. Stomach wash	PI		
4.9. Injections			
4.9.1. Intravenous	PI		
4.9.2. Intramuscular	PI		
4.9.3. Subcutaneous	PI		
4.9.4. Intradermal	PI		
4.10. Infusions			
4.10.1. IV bolus	PI		
4.10.2. Intravenous	PI		
4.10.3. Intraosseous	PI		
4.10.4. Blood Component Transfusion	PI		
4.11. Respiratory			
4.11.1. Meter dose inhalation with or without Spacer/Mask	PI		
4.11.2. Nebulization	PI		
4.11.3. Airway Insertion – Nasophy, Orophy	PI		
4.11.4. Needle Cricothyroidotomy	O	PS	PI
4.11.5. Oxygen delivery methods	PI		
4.11.6. HFNC/CPAP/Non-Invasive Ventilation	O, PS	PI	
4.11.7. Ventilation – Conventional, High Freq (HFV)	O	PS	PI (Not HFV)
4.11.8. Intercostal drainage	O, PS	PI	
4.11.9. Surfactant Administration	O, PS	PI	

	(INSURE)			
4.12.	Spinal infusion/injection	O	PS	PI
4.13.	Therapeutic Ascitic Tap	O, PS	PI	
4.14.	Peritoneal dialysis	O	PS	PI
4.15.	Phototherapy	PI		
4.16.	Incision and Drainage	O	PS	PI
4.17.	Dressings	PI		
4.18.	Sling	PI		
4.19.	Transport onto and off stretcher	PI		
4.20.	Neonatal Temperature Warm Chain	PI		
4.20.1.	Wrapping up Newborn	PI		
4.20.2.	Kangaroo Mother Care	PI		
4.21.	Immunization Cold Chain Measures			
4.21.1.	Refrigerator	PI		
4.21.2.	Vaccine carrier	PI		
4.22.	Restraining a child	O, PS	PI	
4.23.	Transporting a child	O, PS	PI	
4.24.	Early Interventional Therapy	O	PS	PI
4.25.	Chest Physiotherapy	O, PS	PI	

C. Predominant in Affective Domain

Should be able to effectively and empathetically……..

1. Communication – Child/Attender/Guardian

1.1. Elicit a relevant and appropriate historyfrom an attender/child including family and support systems

1.2. Engage and explainsin appropriate language the plan (diagnostic and management including economics of plans)to an attender/child

1.3. Explain the prognosis of the child's condition

1.4. Educatea Parent, an attendant/guardian/child with regards disease/, cultural, and spiritual understanding associated with health care delivery complication prevention, health promotion, and management keeping illustrating ethical ---?

1.5. Counsel towards an Informed Consent/Assent

1.6. Communicate disturbing/bad news including death

1.7. Demonstrates communication skills to appropriately word reports, professional opinions, patient education and counseling with regards

1.7.1. Health and Disease condition with management plan

1.7.2. Nutrition - Breastfeeding, complimentary feeding and nutrition using a Growth chart

1.7.3. Immunization – On schedule, catch up including costs and advantages/disadvantages

1.7.4. Lifestyle

1.7.4.1. Dietary

1.7.4.2. Habits

1.7.5. Genetic risks of relevant inherited conditions

1.7.6. Options for management and future approach in care with advantages and disadvantages

1.7.7. Rights and responsibilities

1.8. Demonstrates knowledge or applies an understanding of psychological, social, and economic factors which are pertinent to the delivery of health care.

1.9. Demonstrates and effectively engages the patient and / or family in all communication.

1.10. Demonstrates ability to provide patient, family and community education through written material especially simple patient information leaflets

Should be able to effectively and respectfully……..

2. Communication – Health Team members

2.1. Communicate with all members of the health care team

2.2. Communicate with other members of the profession

2.3. Communicate with allied professionals associated with Health care

Should be able to ……..

3. Professionalism and Ethical Behaviour

3.1. Demonstrates Professional Conduct in patient care and research

3.1.1. Demonstrate respect for the Doctor-Patient relationship

3.1.2. Demonstrate respect for the Doctor-Health Care Team Member relationship

3.1.3. Demonstrateadherence to confidentiality and patient privacy in all communications in and outside the place of work.

3.1.4. Demonstrate respect of a patient's rights and decisions including the right to information and second opinion.

3.1.5. Demonstrate behaviour aligned with MCI/NMC code of ethics in all related dealings

3.1.6. Demonstrates personal and social responsibility/accountability in the provision ofhealth care at an individual, community and population level

3.1.7. Demonstrate an awareness of economic costs of health care in all dealings with patients.

3.1.8. Demonstrate adherence to research ethics guidelines in the conduct of patient related research.

3.1.9. Demonstrates work ethics while working in a health care team.

3.1.10. Demonstrates truthfulness, honesty and integrity in all interactions.

3.1.11. Provides care that surpasses personal beliefs and prejudices

3.1.12. Demonstrates appropriate etiquette in dealings with patients, relatives and other health personnel

3.2. Demonstrates behavior that is Ethical and bound by the Law of the land

3.2.1. RecognizesEthical conflicts and dilemmas seeking solutions to reduce conflicts and do the right thing.

3.2.2. Complies with legal requirements while dealing with child health and includes issues dealing with the Industry Conflict, MTP Act,PCPNDT act, Child Abuse, Child labour, Legal adoption, Consent and Assent.

D. Pedagogic and Research Skills

Should be able to effectively ……..

1. **Pedagogic Skills**

1.1. Conduct a small group learning session (Theory and Practical) using appropriate tools

1.2. Create and use an effective Powerpoint Presentation

1.3. Present to a large group

Should be able to effectively ……..

2. **Research Skills**

2.1. Search scientific literature and critically appraise the evidence using standard study design checklists enabling application to clinical care.

2.2. Justify the application of the findings of a research study in clinical practice (Diagnostic and Therapeutic Studies)

2.3. Develop a research hypothesis supported by scientific literature review, design an appropriate study, implement the methodology, generate results by analyzing data, and draw appropriate conclusions.

2.4. Should be able to present or/and publish a paper based on the conducted research.

TEACHING AND LEARNING METHODS

General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skills oriented. Learning in the program, essentially autonomous and self-directed, and emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the postgraduate (PG) courses shall work as full-time (junior) residents during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a logbook for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real time.

Teaching-Learning methods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinical meetings, seminars, small group discussion, bed-side teaching, case-based learning, simulation-based teaching, self-directed learning, integrated learning, interdepartmental meetings and any other collaborative activity with the allied departments. Methods with exposure to the applied aspects of the subject relevant to basic/clinical sciences should also be used. **The suggested examples of teaching-learning methods are given below but are not limited to these.**

A. Lectures: Didactic lectures should be used sparingly. A maximum of 10 lectures per year in the concerned PG department is suggested. All postgraduate trainees are encouraged to attend such lectures. Lectures can cover topics such as:

1. Subject-related important topics as per Paediatric requirements

2. Recent advances
3. Research methodology and biostatistics
4. Undergraduate/Postgraduate medical curriculum
5. Teaching and assessment methodology.

Topic numbers 3, 4, 5 can be done during research methodology/biostatistics and medical education workshops in the institute.

B. Journal club: Minimum of once in 1- 2 weeks is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once in 1-2 weeks is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive complete evidence-based review of the topic. The student should be graded by the faculty and peers. Symposium, Colloquium and Seminars may overlap to enhance involvement and active participation of postgraduates.

D. Student Symposium: Minimum of once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by the faculty and peers. Symposium, Colloquium and Seminars may overlap to enhance involvement and active participation of postgraduates.

E. Bedside clinics: Minimum - once a week.

Clinics/bedside teaching should be coordinated and guided by faculty from the department. Various methods like DOAP (Demonstrate, Observe, Assist, Perform), simulations in skill lab, and case-based discussions etc. are to be used. Faculty from the department should participate in moderating the teaching-learning sessions during clinical rounds.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main Department and other department/s on topics of current/common interest or clinical cases. Symposium, Colloquium and Seminars may overlap to enhance involvement and active participation of postgraduates.

G. a. Rotational clinical / community / institutional postings

Final decision that determines "external" postings outside the primary department will differ according to department needs, feasibility, sub-speciality availability and accessibility. Apart for mandatory postings, 'external' postings listed below are highly recommended (desirable) to expose postgraduates to allied Pediatric sub-specialities given existing trends in practice. Specific Learning Outcomes need to be defined for each of these postings even assessed keeping in mind the Competency based curriculum and their future professional roles as Pediatricians.

Rotations are listed below:

Mandatory Postings

- Paediatric emergency (minimum 1 month a year)
- Neonatology (NICU) (minimum 3 months a year)
- Intensive Care (PICU) (minimum 2 months a year)
- District Residency Programme with participation in Community Outreach Child Health Programs (at least 3 months over the entire course; 3rd or 4th or 5th semester; See Section G-b below).

Desirable postings based on need, availability, accessibility, and feasibility and may be innovatively integrated into schedule of posting to optimize learning experiences.

- Subspecialities Outpatient Clinics / observing- assisting in emergency
    - Clinical
        - Child Psychiatry
        - Pediatric Surgery
        - Developmental Pediatrics
        - Pediatric Nephrology
        - Pediatric Hemato-oncology
        - Pediatric Cardiology
        - Pediatric Gastroenterology
        - Pediatric Rheumatology/Immunology/Allergy
        - Genetic
        - Pediatric Pulmonology
        - Pediatric Dermatology
        - Pediatric Endocrinology
        - Adolescent Health

- DOTS, PPTCT, ART center with pediatric exposure
- Microbiology diagnostic Lab
- Radiology including CT/MRI
- Forensic Medicine especially Child related
- Neuro-rehabilitation (PMR, Physiotherapy, Occupational Therapy)

G b.Posting under "District Residency Programme" (DRP):

All postgraduate students pursuing MD/MS in broad specialities in all Medical Colleges/Institutions shall undergo a compulsory rotation of three months in District Hospitals/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th or 5th semester of the Postgraduate programme and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident".

Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

H. Teaching research skills

Writing a thesis should be used for inculcating research knowledge and skills. All postgraduate students shall conduct a research project of sufficient depth to be presented to the University as a postgraduate thesis under the supervision of an eligible faculty member of the department as guide and one or more co-guides who may be from the same or other departments.

In addition to the thesis project, every postgraduate trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be

reinforced. There should be periodic department review of the thesis work, as per following schedule:

- End of 6 months — Submission of protocol
- During 2ndyear — Mid-term presentation
- 6 months prior to examination — Final presentation; submission

I. Training in teaching skills

MEU/DOME should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on the teaching skills of the student.

J. Log book

During the training period, the postgraduate student should maintain a Log Book indicating the duration of the postings/work done in Wards, OPDs, Casualty and other areas of posting. This should indicate the procedures assisted and performed and the teaching sessions attended. The logbook entries must be done in real time. The logbook is thus a record of various activities by the student like: (1) Overall participation & performance, (2) attendance, (3) participation in sessions, (4) record of completion of pre-determined activities, and (5) acquisition of selected competencies.

- The purpose of the Log book is to:
  a) help maintain a record of the work done during training,
  b) enable Faculty/Consultants to have direct information about the work done and intervene, if necessary,
  c) provide feedback and assess the progress of learning with experience gained periodically.

The Logbook should be used in the internal assessment of the student, should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce completed logbook in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate from the Head of Department regarding the clinical competence and skillful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in logbook particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and at least two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty are referred to the MCI Logbook Guidelines uploaded on the Website.

K. **Course in Research Methodology**: All postgraduate students shall complete an NMC recognized course in Research Methodology within six months of the commencement of the batch and generate the online certificate on successful completion of the course.

Other aspects

- The Postgraduate trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The Postgraduate trainees should undergo training in Basic Cardiac Life Support (BCLS), Neonatal Resuscitation, Advanced Pediatric Life Support and Adult Advanced Cardiac Life Support (ACLS).
- The Postgraduate trainees must undergo training in information technology and use of computers.

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learnt initially on the models, later to be performed under supervision followed by independent performance. For this purpose, provision of skills laboratories in medical colleges is mandatory.

5. ASSESSMENT

FORMATIVE ASSESSMENT ie., assessment to improve learning

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

The Internal Assessment should be conducted in theory and practical/clinical examination, should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

Quarterly assessment during the MD training should be based on:

- Case presentation, case work up, case handling/management : once a week
- Laboratory performance : twice a week
- Journal club : once a week
- Seminar : once a fortnight
- Case discussions : once a fortnight/month
- Interdepartmental case or seminar : once a month

Note: These sessions may be organized and recorded as an institutional activity for all postgraduates.

- Attendance at Scientific meetings, CME programmes (at least 02 each)

For Knowledge Assessments, *Patient case scenario presentations and discussions including interdepartmental sessions remain the cornerstone of Paediatric learning focused on critical thinking and clinical reasoning. This is also ideally achieved during teaching at the bedsides on rounds and in ambulatory settings such as outpatient clinics if not emergency. Clinical Pathologic Case discussions, Mortality-Morbidity discussions and Prescription-Medication Order Audits are of great value and are encouraged to improve quality of care as well teaching-learning preferably scheduled every month to routine educational program.*

For Psychomotor and Affective/Communication Assessments*, consider the use of OSCEs, DOPs and even mini-CEX that one may strengthen Formative Feedback/Assessments.*

The student to be assessed periodically as per categories listed in appropriate (non-clinical/clinical) postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT ie., assessment at the end of training

Essential pre-requisites for appearing for examination include:

1. **Log book** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.

2. At least one if not two presentation(s) at national/state level conference. If not presented at national level, alternatively, one research paper should be published / accepted in an indexed journal**.** (It is suggested that the local or University Review committee assess the work sent for publication).

The summative examination would be carried out as per the Rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination**.**

The postgraduate examination shall be in three parts:

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners**.**

2. **Theory examination**

   The examinations shall be organized based on 'Grading' or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training, as given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination. The examination for M.D./ M.S shall be held at the end of 3rd academic year.

   There shall be 4 theory papers (as per PG Regulations).

   Paper I: Basic Sciences as related to the subject

Paper II: General Paediatrics

Paper III: Systemic Paediatrics

Paper IV: Recent Advances

3. Practical/clinical and Oral/viva voce examination

Practical examination

Practical examination should be as per concerned university regulation.

Oral/Viva voce examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject focusing on psychomotor and affective domain.

The final clinical examination in broad specialty clinical subjects should include:

- Cases pertaining to major systems (eg. one long case and three short cases)
- OSCE Stations to cover clinical, procedural and communication skills
- Logbook Records and reports of day-to-day observation during the training
- It is emphasized that Oral/viva voce examination shall be comprehensive enough to test the post graduate stu overall knowledge of the subject.

RECOMMENDED READING:

Books (latest edition)

1. Nelson Textbook of Pediatrics, Ed: Kliegman RM, St. Geme J. Elsevier.
2. PG Textbook of Pediatrics, Ed: Gupta P, Menon PSN, Ramji S, Lodha R. Jaypee
3. Rudolph's Pediatrics, Ed: Kline MW, McGraw Hill.
4. Textbook of Clinical Neonatology (IAP/NNF), Ed: Pejavar RK, Thakre R. Paras.
5. Cloherty and Stark's Manual of Neonatal Care. Ed: Eichenwald EC, Hansen AR, Martin CR, Stark AR. Wolters Kluwer.
6. Principles of Pediatric& Neonatal Emergencies (IAP). Ed: Gupta P, Bagga A, Ramji S, Chugh K, Lodha R, Dewan P, Kaushik JS, Shah D. Shah. Jaypee.
7. Clinical Methods in Pediatrics. Gupta P. CBS Publisher.
8. The Harriet Lane Handbook. Hughes HK, Kahl LK, Elsevier.
9. Nutrition and Child Development. Elizabeth KE. Paras Medical Publisher.
10. Illingworth's Development of The Infant and The Young Child. Au: Illingworth RS; Elsevier Health.

11. Fenichel's Clinical Pediatric Neurology. Au: Piña-Garza JE, James KC. Elsevier.
12. Park's Pediatric Cardiology for Practitioners. Myung Park M, Salamat M. Elsevier.
13. Lanzkowsky's Manual of Pediatric Hematology and Oncology. Fish J, Lipton J, Lanzkowsky P. Elsevier.
14. Essential Paediatric Pulmonology. Lodha R, Kabra SK. Jaypee.
15. Textbook of Pediatric Rheumatology. Petty RE, Laxer R, Lindsley C, Wedderburn L, Fuhlbrigge RC, Mellins ED. Elsevier.

Journals

03-05 international Journals and 02 national (all indexed) journals.

Online Resources

a. IAP https://www.iapindia.org/https://diapindia.org/
b. GOI MOHFW and IIPS. http://rchiips.org/nfhs/
c. Pubmed. https://pubmed.ncbi.nlm.nih.gov/
d. Google Scholar. https://scholar.google.co.in/
e. Cochrane. https://www.cochranelibrary.com/
f. Uptodate. https://www.uptodate.com/login
g. Clinical Key. https://www.clinicalkey.com/#!/login
h. Medscape. https://www.medscape.com/
i. JM Rey's IACAPAP e-Textbook of Child and Adolescent Mental Health. Rey JM, Martin A. International Association for Child and Adolescent Psychiatry and Allied Professions. ISBN 9780646574400 Free on https://iacapap.org/english/

Annexure I

Student appraisal form for MD in Pediatrics											
	Elements	**Less than Satisfactory**			**Satisfactory**			**More than satisfactory**			**Comments**
		1	2	3	4	5	6	7	8	9	
1	**Scholastic Aptitude and Learning**										
1.1	Has Knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g. Posters, publications etc.)										
1.4	Documentation of acquisition of competence (eg Log book)										
1.5	Performance in work based assessments										
1.6	Self- directed Learning										
2	**Care of the patient**										
2.1	Ability to provide patient care appropriate to level of training										
2.2	Ability to work with other members of the health care team										
2.3	Ability to communicate appropriately and empathetically with patients families and care givers										
2.4	Ability to do procedures appropriate for the level of training and assigned role										
2.5	Ability to record and document work accurately and appropriate for level of										

	training										
2.6	Participation and contribution to health care quality improvement										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethically appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment been discussed with the trainee?	Yes	No								
	If not explain										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

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NATIONAL MEDICAL COMMISSION

Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/13 **Date: 05-08-2022**

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PHYSIOLOGY

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PHYSIOLOGY

Preamble

The purpose of postgraduate medical education in Physiology is to produce experts with necessary knowledge, skills and attitude to function as competent physiologists who actively contribute towards growth of the subject through research and intellectual contribution, participate in the training of budding health professionals, participate meaningfully in patient care and lifestyle disorders, stay abreast with the advancements in the field and serve the community at large. Physiology being the basis of entire practice of Medicine, a postgraduate in Physiology needs to acquire all necessary competencies that would enable him or her to function efficiently in domains of preclinical, para- clinical and clinical sciences.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes. The Expert group of the National Medical Commission has endeavored to render uniformity without compromise to purpose and content of this document. The revision within the document are mainly aimed to introduce competencies that ensure application of Physiology beyond preclinical boundaries and thereby improve health outcomes, embrace research and pedagogy as a vital part of training and reduce redundancy of contents. This document envisions a competent Physiologist who performs the roles of a Medical Teacher, Researcher, Member of Health Care Team (Clinical Physiologist), Administrator and Life Long learner with equal zeal and efficiency.

SUBJECT SPECIFIC LEARNING OBJECTIVES

Goal:

The goal is to have uniform standards in the teaching of Physiology at the postgraduate level throughout the country. The guidelines will help in achieving such standards which will ensure availability of competent physiologists equipped with required skills for teaching, patient care (diagnostic, therapeutic and rehabilitative) and applied research.

Learning Objectives

A postgraduate student having qualified for the MD (Physiology) examination should be able to:

1. Achieve comprehensive knowledge of general, systemic and applied Physiology.
2. Teach effectively the basic physiological mechanisms of human body in the context of pathophysiological basis of evolution, clinical presentation and management of disease states to undergraduate and postgraduate medical, dental and paramedical courses.
3. Acquire in-depth knowledge of physiology while catering to the learning needs of specific courses such as sports physiology, speech pathology etc.
4. Understand general principles of medical education (use of appropriate teaching techniques and resources) and apply theoretical frameworks in pedagogy.
5. Interpret and evaluate research publications critically.
6. Conduct research in core physiology, applied physiology and Education which may have significant application towards improving health, patient care and student learning.
7. Generate credible evidence towards advancement of Physiology and its application in basic and applied significance.
8. Acquire skills in conducting collaborative research in the field of physiology with allied sciences, clinical sciences and biomedical engineering.
9. Explain how the knowledge of physiology can be effectively applied in diagnostic and therapeutic clinical settings.
10. Integrate physiology with Diagnostic, Therapeutic, Preventive and Rehabilitative Medicine.
11. Interact with the allied departments and render services in advanced laboratory investigations.
12. Interact effectively with other paraclinical, clinical and allied health sciences departments to develop integrated modules in basic sciences and teach competencies related to the same.
13. Acquire administrative skills to set up concerned department / laboratories and initiate purchase procedures and procure necessary items for running such laboratories.

14. Be an efficient Leader and member of academic, research and health care team.
15. Participate actively in various workshops/seminars/journal clubs of allied subjects to acquire various skills for collaborative research.

SUBJECT SPECIFIC COMPETENCIES

At the end of the course, the postgraduate student should be able to:

A. Predominant in Cognitive Domain

1. Demonstrate in-depth understanding of basic physiological concepts, their clinical applications and physiological demands in special circumstances such as sports, environmental changes, yoga, meditation etc.
2. Demonstrate comprehensive knowledge of physiology of specific organ systems to cater to the learning needs of specialized courses such as speech pathology, kinesiology, aerospace physiology etc.
3. Impart knowledge about the basic physiological mechanisms of human body with reference to their implications in the pathophysiology of disease and the physiologic basis of their management to undergraduate medical and paramedical students.
4. Demonstrate knowledge of integrated study of basic sciences as per the needs of current CBME.
5. Demonstrate higher order thinking and problem-solving skills to exhibit interactive teaching techniques and facilitate contextual study of physiology in various teaching learning sessions.
6. Demonstrate knowledge and ability to participate in the present student centric TL strategies of CBME such as ECE, SDL, AETCOM and AITo (Aligned and Integrated Topic).
7. Demonstrate knowledge of the current assessment practices in undergraduate CBME such as DOAP.
8. Demonstrate knowledge of research methodologies and statistics.
9. Conduct such clinical and experimental research, as would have a significant bearing on human health and patient care.
10. Incubate ideas and contribute towards generation of patents and copyrights related to the subject.

11. Interact with other departments by rendering services in advanced laboratory investigations and relevant expert opinion.
12. Participate actively in various workshops/seminars/journal clubs/demonstration in the allied departments, to acquire various skills for collaborative research.
13. Contribute to society by imparting physiological understanding of health problems. Disseminate knowledge of human physiology, the clinical applications and research as per the needs or specific demands of the society at large.
14. Outline the components of a basic physiology curriculum, demonstrate ability to develop or implement the same in future academic career.
15. Serve as interface with society at large.

B Predominant in Affective domain

At the end of the course, the postgraduate student should be able to:

1. Demonstrate responsibility, professionalism and ethical conduct in all professional undertakings.
2. Demonstrate ethical conduct in biomedical or animal research.
3. Follow ethical guidelines with regards to research and publications.
4. Demonstrate appropriate behavior of not letting his/her personal beliefs, prejudices and limitations come in the way of duty.
5. Display principles of integrity and social accountability as a teacher.
6. Appreciate the issues of equity and social accountability while exposing students to early clinical exposure (Equity and social accountability).
7. Mentor/ counsel students to facilitate their holistic development.
8. Communicate effectively with peers, students and teachers in various curricular [teaching-learning, research] activities.
9. Function effectively as a member of the department, professional bodies and maintain professional conduct in interactions with students, peers, patient and staff.
10. Demonstrate the ability to give effective student feedback to undergraduate students.
11. Demonstrate the ability to receive feedback from teachers and peers.

12. Develop the capacity to reflect on own academic progress, develop self-directed learning skills and assess own learning needs.

C. Predominant in Psychomotor Domain

The postgraduate student should acquire practical competencies in the following tasks:

At the end of the course the postgraduate student should be able to:

1. Demonstrate physiological concepts of various organ systems by performing amphibian experiments using simulated models.
2. Demonstrate physiological concepts of specific organ systems by performing mammalian experiments using simulated models.
3. Perform and interpret a complete hematological profile.
4. Perform clinical examination of various organ systems.
5. Perform human experiments pertaining to specific organ systems and interpret results of the same.
6. Perform human experiments related to physiological challenges such as exercise, yoga and meditation.
7. Perform studies in stimulated environment - microgravity; high altitude; hot and cold environment.

Syllabus

Course contents:

A: Cognitive domain

Paper-I: ***General and Cellular Physiology including Genetic Basis and Historical perspectives:***

1. Physiology of cell, various cellular mechanisms and genetic control mechanisms.
2. Various principles of Physics and Physical Chemistry involved in physiological phenomenon e.g. haemo-dynamics, bio-electrical potentials, body fluids, methods of measurements.
3. History of Physiology, Noebl laurates and discoveries.
4. Biostatistics, Biophysics, Biochemistry, Micro-anatomy.
5. Growth and Development including aging.

6. Excretion, pH, water and electrolyte balance.
7. Comparative Animal Physiology

Paper-II: ***Systemic Physiology (system providing transport, nutrition and energy) including comparative Physiology.***

1. Blood and Immunity.
2. Cardiovascular System.
3. Respiratory System.
4. Gastro- Intestinal Tract (GIT) and dietary requirements.

Paper-III: ***Systemic Physiology (system concerned with procreation, regulation and neural control)***

1. Nerve-Muscle Physiology including muscle mechanics
2. Endocrine Physiology
3. Nervous System (Central, peripheral and autonomic)
4. Special Senses
5. Reproduction & family planning/fetal & neonatal Physiology

Paper-IV: ***Applied Physiology including recent advances***

1. Recent advances relevant to Physiology
2. Patho-physiology pertaining to systemic Physiology
3. Physiological basis of various clinical investigation tests
4. Interaction of human body in ambient environment- high altitude, space and deep sea
5. Exercise & Sports physiology
6. Transgender Physiology
7. Integrated Physiology
8. Yoga and Meditation
9. Social responsibilities of physiologists
10. Application of Artificial Intelligence in Physiology

B: Psychomotor domain:

A. The postgraduate student during the training period must PERFORM independently the following procedures:

i. Hematological profile

1. Estimation of hemoglobin
2. Determination of Total Erythrocyte (RBC) Count and RBC Indices (Blood Standards)
3. Determination of Total Leucocytes (WBC) Count : TLC
4. Preparation of a peripheral Blood Smear and Determination of Differential Leucocyte Count: DLC
5. Determination of Arneth Count
6. Determination of Bleeding Time (BT) and Clotting Time (CT)
7. Determination of Blood groups (A, B,O and Rh system)
8. Determination of Erythrocyte Sedimentation Rate (ESR) and Packed cell volume (PCV)
9. Determination of Osmotic Fragility of Red Blood Cells
10. Determination of Platelet Count
11. Determination of Reticulocyte Count

ii. Human Physiology

a. Clinical Physiology

1. Detailed clinical examination of various systems.

b. **Nerve muscle physiology**

1. Ergography and hand grip spring dynamography and study of human fatigue.
2. Recording of electromyography (EMG) and its application.
3. Recording of nerve conduction.

c. Cardiovascular system (CVS)

1. Clinical examination of CVS
2. Examination of arterial & venous pulses
3. Measurements of arterial blood pressure and effect of head-up/head-down tilt
4. Recording of 12 lead Electrocardiography (ECG) and its interpretation
5. Measurement of blood flow

6. Heart rate variability
7. Ambulatory Blood pressure monitoring

d. Respiratory system

1. Clinical examination of respiratory system.
2. Stethography – study of respiratory movements and effect of various factors.
3. Assessment of respiratory functions (spirometry, vitalography, and gas analysis).
5. Measurement of BMR.
6. Cardio pulmonary resuscitation (CPR) and Artificial respiration.

e. Gastrointestinal system:

1. Clinical examination of abdomen.

f. Integrative Physiology / Excretory system

1. Recording of body temperature/effect of exposure to cold and hot environment

g. Reproductive system

1. Determination of ovulation time by basal body temperature chart and pregnancy diagnostic test - Immunological Tests.
2. Semen analysis: sperm count, motility and sperm morphology.

h. Nervous System including Special senses

1. Clinical examination of the nervous system and its physiological basis.
2. Examination of higher mental functions.
3. Examination of cranial nerves.
4. Examination of sensory system.
5. Examination of motor system including reflexes.
6. Clinical examination of special senses:
    (i) Smell and Taste
    (ii) Test for hearing to differentiate deafness
    (iii) Physiology of eye:
        (a) Clinical examination of the eye and pupillary reflex
        (b) Visual acuity
        (c) Perimetery – mapping out of visual field and blind spot
        (d) Accommodation
        (e) Fundoscopy
        (f) Colour vision and colour blindness
7. Reaction (visual and auditory) and reflex time.

8. Electroencephalography (EEG) and Polysomnography
9. Autonomic Nervous System (ANS) Testing.
10. **Neuro-electrodiagnostic techniques:** Nerve conduction study, Visual evoked potential (VEP), Brainstem auditory evoked potential (B.A.E.P), Somato-sensory evoked potential (SEP), Motor evoked potential (MEP).
11. Use of various test batteries for psychological evaluation of subject.

i. Sports Physiology

Tests for physical fitness: Cardio – respiratory responses to steady state exercise using:

(i) Body Composition
(ii) Conducting the Clinical Exercise Test
(iii) Harvard step test
(iv) Bicycle Ergometry
(v) Treadmill test for determination of VO_2 max

j. Yoga and Meditation Physiology

i. Physical, Mental and Emotional well being
ii. Effect of yoga and pranayama on physiological parameters
iii. Mindfulness
iv. Concentration, anxiety and stress
v. Counseling in health and diseases

k. Others

1. Construction of dietary chart for growing children, pregnant woman, elderly individuals, hypertensive patients, & diabetes mellitus patients.
2. Basic Life Support and Cardiac Life Support
3. Effective Digital presentation, medical photography, Good Clinical Practice, Humanities and Bioethics.

iii. Amphibian (Frog) Experiments

All animal experiments must be compliant with Govenment of India Regulations, notified from time to time). Experiments in Amphibian/Dog/Cat should be conducted by computer assisted simulation models/ facilities. Other experiments should be performed as permissible by CPCSEA guidelines.

1. Effect of temperature on simple muscle twitch.
2. Effect of two successive stimuli (of same strength) on skeletal muscle.
3. Effect of increasing strength of stimuli on skeletal muscle.
4. Effect of increasing frequency of stimuli on skeletal muscle (genesis of tetanus).
5. Effect of free load and after load on skeletal muscle.
6. Effect of repeated stimuli on skeletal muscle (study of phenomenon of Fatigue).
7. Study of isometric contraction in skeletal muscle.
8. Determination of conduction velocity of sciatic nerve and effect of variables on it.
9. Properties of cardiac muscle – Refractory period, All-or-None Law, extra-systole and compensatory pause, beneficial effect.
10. Regulation of Heart, Vagus dissection and effect of Vagal and WCL stimulation.
11. Effect of physiological and pharmacological variables on intact frog's heart.
12. Perfusion of isolated frog's heart-role of sodium, potassium, calcium ions and drugs.

B. **The postgraduate student during the training period must ASSIST in the following procedures:**

Human Physiology

i. **Cardiovascular system (CVS)**

- Cardiac TMT Holter Monitoring
- Collection and Assessment of Arterial blood gas

ii. Nervous System including Special senses

- Intra operative neuro monitoring (IONM)

C. The postgraduate student during the training period must OBSERVE the following procedures:

i. Hematological profile

- Determination of Absolute Eosinophil Count
- Study of Haemopoietic Cells present in the Bone Marrow

- Other high end hematological investigations (specify): Flow cytometry, Platelet functions, D Dimers, coagulation profile etc.

ii. Human Physiology

- **Cardiovascular system (CVS)**
  - Echocardiography
  - Central venous line insertion, CVP monitoring
- **Respiratory system**
  - Introduction to working of continuous positive airway pressure and Bilevel positive airway pressure (CPAP & BiPAP) Therapy
    - Ventilator setting
- **Gastrointestinal system:**
  - GI Manometry
- **Reproductive system**
  - Ovulation study by using ultrasonography
- **Integrative Physiology / Excretory system**
  - Pressure and PH studies in esophagus, stomach, intestine and rectum
- **Others**
  - Genetic testing and introduction to procedural skills for clinical genetics/ prenatal diagnosis/ adult genetics - birth defects, genetic hematology, dysmorphology, skeletal dysplasia, neurological and muscular disorders, primary immunodeficiency diseases, autoimmune and multi-factorial disorders, biology and genetics of cancer.
  - Interaction of human body in ambient environment - high altitude, space and deep sea
  - Exercise & Sports physiology
  - Integrated Physiology
  - Yoga and Meditation
  - Social responsibilities of physiologists
  - Application of Artificial Intelligence in Physiology

iii. Mammalian Experiments (Dog/Rabbit/Guinea pig/Rat/Mice)

- General management of mammalian experiments.

- Recording of heart rate, blood pressure and respiration and study the effects of various factors; drugs; asphyxia; occlusion of common carotid artery.
- Effect of stimulation of central and peripheral end of vagus on arterial blood pressure and respiration after vagotomy.
- Effect of stimulation and distension of carotid sinus on blood pressure and respiration.
- Effect of stimulation of splanchnic nerve.
- Effect of stimulation of peripheral somatic nerve (sciatic nerve).
- Study of hypovolemic shock and its reversal.
- Perfusion of isolated mammalian heart and study the effects of drugs and ions.
- Recording of Isolated Intestinal movement and tone and studying the effect of drugs and ions.
- Study of various stages of menstrual cycle, cervical smear and vaginal smear.

Departmental resources

It is to be mandatory for the department to establish and develop the following laboratories. In addition to teaching, these laboratories should be involved in active research and in patient care services in one or more well defined fields.

1. Clinical Neurophysiology Laboratory

The department should generate liaison with clinical department and provide routine services for health monitoring and diagnostics (disease).

(i) Electroencephalography
(ii) Evoked potential recording
(iii) Electromyography
(iv) Nerve conduction studies
(v) Autonomic nervous system (ANS) testing
(vi) Any other newer technology like Functional Near infrared spectroscopy (fNIRS), Intra operative neuro monitoring (IONM), polysomnography
(vii) Diabetic neuropathy assessment kit

(viii) Reaction time apparatus

(ix) Electroretinography

2. Cardio-Respiratory Laboratory

The department should generate liaison with clinical department and provide routine services for health monitoring and diagnostics (disease).

(i) Electrocardiography

(ii) Blood-gas Analysis

(iii) Computerized multifunctional spirometry

(iv) Laboratory for measuring pulmonary diffusion capacity and functional residual capacity (FRC)

(v) Whole-body plethysmography

(vi) Laboratory for Blood flow measurements (Impedance plethysmograph/Laser flow meter/ Doppler flow meter)

(vii) Ankle brachial pressure index/ Vascular Doppler

3. Exercise Physiology Laboratory

The department should generate liaison with sports authorities and clinical departments to provide services for testing and grading exercise and physical efficiency for health monitoring and diagnostics (disease). This should be done by using the following techniques:

(i) Two step test exerciser

(ii) Bicycle Ergometry

(iii) Tread mill

(iv) Respiratory gas analysis and measurement of basal metabolic rate (BMR)

4. Metabolic/Endocrinology/Reproductive Bio-medicine laboratory

This laboratory should perform various tests pertaining to gastrointestinal, renal, metabolic, endocrinal and reproductive bio-medicine. The department should generate liaison with clinical departments and provide routine services for health monitoring and diagnostics (disease).

1. Body Fat Analysis
2. Spectrophotometer
3. pH meter
4. Elisa Reader/Washer

5. Luminometer
6. Semi-autoanalyzer
7. Artificial reproductive techniques/ semen laboratory/ infertility laboratory

Post graduate students should be posted in the above laboratories and extend the required services on routine basis.

The Department should be equipped with general facilities like PG resource room with internet access and a departmental library with books especially those related to pertinent higher studies in Physiology and field of research. The college/department should make important journals available (at least four Indian journals and two international journals – Online/Offline).

TEACHING AND LEARNING METHODS

General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skills oriented. Learning in the program, essentially autonomous and self-directed, and emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the postgraduate (PG) courses shall work as full-time (junior) residents during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a log book for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real time.

Teaching-Learning methods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinical meetings, seminars, small group discussion, bed-side teaching, case-based learning, simulation-based teaching, self-directed learning, integrated learning, interdepartmental meetings and any other collaborative activity with the allied departments. Methods with exposure to the applied aspects of the subject relevant to

basic/clinical sciences should also be used. **The suggested examples of teaching-learning methods are given below but are not limited to these. The frequency of various below mentioned teaching-learning methods can vary based on the subject's requirements, competencies, work load and overall working schedule in the concerned subject.**

A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures per year in the concerned PG department is suggested. Topics to be selected as per subject requirements All postgraduate trainees will be required to attend these lectures. Lectures can cover topics such as:

1. Subject related important topics as per specialty requirement
2. Recent advances
3. Research methodology and biostatistics
4. **Salient features of** Undergraduate/Postgraduate medical curriculum
5. Teaching and assessment methodology.

Topic numbers 3, 4, 5 can be done during research methodology/biostatistics and medical education workshops in the institute.

B. Journal club: Minimum of once in 1-2 weeks is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once every 1-2 weeks is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive evidence-based review of the topic. The student should be graded by the faculty and peers.

D. Student Symposium: Minimum of once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by the faculty and peers.

E. Laboratory work / Bedside clinics: Minimum - once every 1-2 weeks.

Laboratory work/Clinics/bedside teaching should be coordinated and guided by faculty from the department. Various methods like DOAP (Demonstrate, Observe, Assist, Perform), simulations in skill lab, and case-based discussions etc. are to be used. Faculty from the department should participate in moderating the teaching-learning sessions during clinical rounds.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main Department and other department/s on topics of current/common interest or clinical cases.

G. a. Rotational clinical / community / institutional postings

- Depending on local institutional policy and the subject specialty needs, postgraduate trainees may be posted in relevant departments/ units/ institutions including Medical Education Unit (MEU) or Department of Medical Education (DOME). The aim would be to acquire more in-depth knowledge as applicable to the concerned specialty. Postings would be rotated between various units/departments and details to be included in the specialty-based Guidelines.
- **Clinical Postings:** Compulsory clinical postings in following departments must be undertaken as per specified number of days in table 1 depicted below:

Table 1: Plan of Clinical postings for MD Physiology

Prof Year	Department	Period of posting	Focus areas
1st year	Biochemistry	15 days	1. Auto & Semi auto Analyzer, Electrophoresis, Chromatography, RIA, Study of serum chemistry (proteins, Lipid, glucose, electrolytes, enzymes etc.) – 8 days 2. Constituents of normal and abnormal urine, liver function tests, Renal function tests, Gastric function tests – 7 days
I st year	Pharmacology	20 days	1. Animal House (to learn technique of Animal Handling, Blood sampling, anesthesia, Euthanasia, effective Analgesia and infection control after

			surgery. Study of Animal behavior like eating, drinking, locomotion, sexual activity etc.) 2. Experimental Pharmacology lab to study ongoing animal experimental procedures including dissection for rat phrenic nerve hemidiaphragm and others – 10 days 2. Study various guidelines related to ethical use of animals in experiments. To study preparation of different animal models and various tests to study physiological parameters. – 15 days
I st year	Pathology	30 days	1. Blood bank - Cross matching, blood Storage, Immunohistochemistry, Immunological tests – 15 days 2. Central Lab. - Tests for bleeding & clotting disorders, study of Haemopoietic Cells present in the Bone Marrow – 10 days 3. Semen analysis, determination of ovulation time by basal body temperature chart and pregnancy diagnostic tests – 5 days
I st year	Microbiology	10 days	1. Fluorescent microscopy, use of Elisa reader & Washer – 5 days 2. Immuno-physiology and other facilities available in the dept. – 5 days
IInd year	Ophthalmology	15 days	1. Direct and indirect Ophthalmoscopy, Retinoscopy – 8 days 2. Slit lamp microscopy, Tonometry, Pachymetry, Study of corneal topology, Optometry, Auto-refractometer – 7 days
IInd year	Tuberculosis & Chest Disease (Pulmonary Medicine)	15 days	1. Whole body plethysmography – 8 days 2. Bronchoscopy & other facilities available in the dept. – 7 days
IInd year	ENT	15 days	1. Audiometry – 7 days

			2. Oto-rhino-laryngoscopy, direct and Indirect Laryngoscopy, BERA, BSAEP – 8 days
IIIrd year	General Medicine	20 days	1. TMT, Holter analysis, ABG, ECG – 10 days 2. EMG, NCV – 10 days
IIIrd year	Psychiatry	10 days	1. EEG 2. Biofeedback
IIIrd year	Casualty	15 Days	1. To know basics of how to handle emergency 2. Minor procedures

Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

G b. Posting under "District Residency Programme" (DRP):

All postgraduate students pursuing MD/MS in broad specialities in all Medical Colleges/Institutions shall undergo a compulsory rotation of three months in District Hospitals/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th or 5th semester of the postgraduate programme and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident".

Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists / clinicians in different hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

I. Teaching research skills

Writing a thesis should be used for inculcating research knowledge and skills. All postgraduate students shall conduct a research project of sufficient depth to be presented to the University as a postgraduate thesis under the supervision of an eligible faculty member of the department as guide and one or more co-guides who may be from the same or other departments.

In addition to the thesis project, every postgraduate trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be reinforced.

J. Training in teaching skills

MEU/DOME should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on the teaching skills of the student.

K. Log book

During the training period, the postgraduate student should maintain a Log Book indicating the duration of the postings/work done in Wards, OPDs, Casualty and other areas of posting (as specified in table 1) . This should indicate the procedures assisted and performed and the teaching sessions attended. The log book entries must be done in real time. The log book is thus a record of various activities by the student like: (1) Overall participation & performance, (2) attendance, (3) participation in sessions, (4) record of completion of pre-determined activities, and (5) acquisition of selected competencies.

The purpose of the Log Book is to:

a) help maintain a record of the work done during training,
b) enable Faculty/Consultants to have direct information about the work done and intervene, if necessary,
c) provide feedback and assess the progress of learning with experience gained periodically.

The Log Book should be used in the internal assessment of the student, should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce completed log book in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate from the Head of Department regarding the clinical competence and skillful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in log book particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and at least two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty are referred to the MCI Logbook Guidelines uploaded on the Website.

L. **Course in Research Methodology**: All postgraduate students shall complete an online course in Research Methodology within six months of the commencement of the batch and generate the online certificate on successful completion of the course.

Other aspects

- The postgraduate trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The postgraduate trainees should undergo training in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS).
- The postgraduate trainees must undergo training in information technology and use of computers.

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learnt initially on the models, later to be performed under supervision followed by independent performance. For this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, i.e. assessment to improve learning

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

The Internal Assessment should be conducted in theory and practical/clinical examination, should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

Quarterly assessment during the MD training should be based on:

- Case presentation, case work up, case handling/management : once a week
- Laboratory performance : twice a week
- Journal club : once a week
- Seminar : once a fortnight
- Case discussions : once a fortnight/month
- Interdepartmental case or seminar : once a month

Note: These sessions may be organized and recorded as an institutional activity for all postgraduates.

- Attendance at Scientific meetings, CME programs (at least 02 each)

The student to be assessed periodically as per categories listed in appropriate (non-clinical/clinical) postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

Essential pre-requisites for appearing for examination include:

1. **Log book** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.

2. At least **two presentations** at national level conference. One research paper should be published / accepted in an indexed journal**. (It is suggested that the local or University Review committee assess the work sent for publication).**

The summative examination would be carried out as per the Rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination**.**

The postgraduate examination shall be in three parts**:**

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A postgraduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners**.**

2. **Theory examination**

   The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify postgraduate student's level of knowledge, skill and competence at the end of the training, as given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ M.S shall be held at the end of 3rd academic year.

   There shall be four theory papers (as per PG Regulations).

   Paper I: Basic sciences as applied to the subject (General and Cellular Physiology including Genetic basis and historical perspectives)

Paper II: Systemic Physiology (system providing transport, nutrition and energy) including comparative Physiology

Paper III: Systemic Physiology (system concerned with regulation, neural control and procreation)

Paper IV: Recent advances in the subject (including applied Physiology)

3. Practical/clinical and Oral/viva voce examination

Practical examination

Practical examination should be spread over **two** days and include various major components of the syllabus focusing mainly on the psychomotor domain.

Oral/Viva voce examination on defined areas should be conducted by each examiner separately. Oral examination shall be comprehensive enough to test the postgraduate student's overall knowledge of the subject focusing on psychomotor and affective domain.

The practical examination should include:

- Case presentation pertaining to major systems
- Stations for clinical, procedural and communication skills
- Log Book Records and reports of day-to-day observation during the training
- It is emphasized that Oral/viva voce examination shall be comprehensive enough to test the postgraduate student's overall knowledge of the subject

Recommended Reading:

Books (latest edition)

1. A.C. Guyton – Text book of Medical Physiology
2. W.F. Ganong – Review of Medical Physiology
3. William's Textbook of Endocrinology
4. J.E. Cotes- Respiratory Physiology
5. D.T. Harris – Experimental Physiology
6. Wintrobe's – Clinical Hematology
7. **P**rinciples of medical physiology by Sircar
8. Brown B.L. – Cell signaling, Biology and medicine of signal transudation
9. Berne and Levy- Medical Physiology

10. Textbook of Medicine by Harrison
11. Principles of Neural sciences edited by E. R. Kandel, J. H. schwartz and T. M. Jessell
12. Williams Hematology edi. by M.A. Lichtman, E. Beutter, K. Kaushansxy, T.J. Kipps, U. Seligsohn, J. Prachal
13. Medical Physiology: by W. F. Boron and E. L. Boulpep
14. Medicat Physiology: by A. Rhodes and G. A. Tanner
15. Neuroscience : by Dale Purves

Practical Books:

1. Hutchison's Clinical Methods: An Integrated Approach to Ctinical Practice.
2. Macleod’s clinical Examination
3. Textbook of Practical Physiology: by Dr. G. K. Pal and Dr. Pravati Pal
4. Textbook of Practical Physiology: by Dr. C. L. Ghai
5. Textbook of Practical Physiology: by Dr. Ranade
6. Textbook of Practical Physiology: by Dr. A. K. Jain

Journals:

03-05 International Journals and 02 National (all indexed) journals

Annexure 1

Student appraisal form for MD in Physiology

	Elements	Less than Satisfactory			Satisfactory			More than satisfactory			Comments
		1	2	3	4	5	6	7	8	9	
1	**Scholastic aptitude and learning**										
1.1	Has knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g Posters, publications etc.)										
1.4	Documentation of acquisition of competence (eg Log book)										
1.5	Performance in work based assessments										
1.6	Self-directed Learning										
2	**Work related to training**										
2.1	Practical skills that are appropriate for the level of training										
2.2	Respect for processes and procedures in the work space										
2.3	Ability to work with other members of the team										
2.4	Participation and compliance with the quality improvement process at the work environment										
2.5	Ability to record and document work accurately and appropriate for level of training										

3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethically appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment pattern been discussed with the trainee?	Yes	No								
	If not explain.										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

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NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/15 **Date: 05-08-2022**

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR M.D. IN PSYCHIATRY

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PSYCHIATRTY

Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

A postgraduate specialist having undergone the required training should be able to recognize the health needs of the community, should be competent to handle medical problems effectively and should be aware of the recent advances pertaining to his specialty. The post graduate student should acquire the basic skills in teaching of medical/para-medical students. She/he is also expected to know the principles of research methodology and modes of consulting library.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies".

SUBJECT SPECIFIC LEARNING OBJECTIVES

The primary **goal** of the MD course in Psychiatry is to produce a post graduate clinician able to provide health care in the field of Psychiatry. A physician qualified in Psychiatry, at the end of the course, should be able to diagnose and treat psychiatric disorders, take preventive and curative steps for the disease in the community at all levels of health care and qualify as a consultant and teacher in the subject.

At the end of the MD course in Psychiatry, the student should be able to:

- Understand the relevance of mental health in relation to the health needs of the country,
- Ethical considerations in the teaching and practice of Psychiatry,
- Identify the social, economic, biological and emotional determinants of mental health,
- Identify the environmental causes as determinants of mental health,
- institute appropriate diagnostic, therapeutic and rehabilitative procedures to the mentally ill patient,

- Take detailed history, conduct appropriate ethically valid physical examination and institute appropriate evaluation procedures to make a correct clinical diagnosis,
- Perform relevant investigative and therapeutic procedures for the psychiatric patient,
- Recommend appropriate laboratory and imaging examinations and interpret the results correctly,
- Plan and deliver comprehensive treatment of a psychiatric patient using principles of rational drug therapy,
- Plan rehabilitation of psychiatric patient suffering from chronic illness,
- Clinically manage psychiatric emergencies efficiently,
- Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities,
- Demonstrate communication skills of a high order in explaining management and prognosis, providing counselling and giving health education messages to patients, families and communities,
- Develop appropriate skills to practice evidence-based psychiatry,
- Demonstrate competence in basic concepts of research methodology and epidemiology,
- Be aware of and take appropriate steps in the implementation of national mental health programs, effectively and responsibly,
- Be aware of the concept of essential drugs and rational use of drugs,
- Be aware of the legal issues in the practise of Psychiatry,
- Be aware of the special requirements in the practice of Child and adolescent Psychiatry and Geriatric Psychiatry.
- Be aware of the role of sex and gender in the practice of psychiatry
- Be able to determine the capacity and capability of the individual (especially children and adolescents) to identify and articulate a gender identity

- **Research:** The student should know the basic concepts of research methodology and plan a research project in accordance with ethical principles. S/he should also be able to interpret research findings and apply these in clinical practice. S/he should know how to access and utilize information resources and should have basic knowledge of statistics.
- **Teaching:** S/He should learn the basic methodology of teaching and develop competence in teaching medical/paramedical students, health professionals, members of allied disciplines (e.g. behavioural sciences), law enforcement agencies, families and consumers and members of the public.

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. Cognitive domain

By the end of the course, the student should demonstrate knowledge in the following:

1. General topics:

1. The student should be able to demonstrate knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology and Pharmacology) as applied to Psychiatry.
2. The student should be able to explain aetiology, assessment, classification and management and prognosis of various psychiatric disorders (including psychiatric sub-specialities including Neuroanatomy, Neurophysiology, Neurochemistry, Neuroimaging, Electrophysiology, Psychoneuroendocrinology, Psychoneuroimmunology, Chronobiology and Neurogenetics.
3. Acquire knowledge of delirium, dementia, and amnestic and other cognitive disorders and mental disorders due to a general medical condition.
4. The student should be able to discuss long term care of persons with chronic mental health problems
5. The student should acquire knowledge of emergency measures in acute crisis arising out of various psychiatric illnesses including drug detoxification and withdrawal.
6. The student should acquire knowledge of pharmacokinetics & pharmacodynamics of drugs involved in psychiatric management of patients.
7. The student should acquire knowledge of (a) normal child development and adolescence (b) neurodevelopmental disorders, intellectual disability and specific learning disability and their management
8. The student should acquire knowledge and be able to explain mechanisms for rehabilitation of psychiatric patients.
9. The student should acquire knowledge of substance related disorders and their management.
10. The student should acquire knowledge of psychotic disorders, mood disorders, and anxiety disorders and their management
11. The student should understand difference between sex and gender/ biological and social construction of personhood; sexual/gender identity; transgender, gender non-conformity, and other gender diverse identities, sexual/sexuality identity, sexual orientation, sexual desire; the wide variety, and cultural presence of various sexual orientations and desires; gender dysphoria and its management.

12. The student should acquire knowledge of eating disorders and sleep disorders and their management
13. The student should be conversant with recent advances in Psychiatry.
14. The student should be conversant with routine bedside diagnostic and therapeutic procedures and acquire knowledge of latest diagnostics and therapeutics procedures available.
15. The student should be conversant with various policy related aspects of Psychiatric practice in India (e.g. Mental Health Act, National Health Mental Health Programmes etc.).
16. The student should be conversant with research methodologies.
17. Student should be conversant with the role of Yoga and Meditation in the management of psychiatric disorders.

B. Affective Domain:

1. The student should be able to function as a part of a multidisciplinary team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. The student should always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information, confidentiality and second opinion.
3. The student should develop communication skills to prepare reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

At the end of the course, the student should acquire the following clinical skills and be able to:

1. Obtain a proper relevant history and perform thorough clinical examination including detailed mental state examinations using proper communication skills.
2. Able to do risk assessment and mental capacity assessment.
2. Provide a clinical formulation, arrive at a logical working diagnosis and differential diagnosis after clinical examination.
3. Order appropriate investigations keeping in mind their relevance and cost effectiveness and obtain additional relevant information from family members to help in diagnosis and management.

4. Identify psychiatric situations calling for urgent or early intervention and refer at the optimum time to appropriate centres.
5. Write a complete case record with all necessary details.
6. Write a proper discharge summary with all relevant information.
7. Obtain informed consent for any examination/procedure.
8. Perform clinical audit.
9. Must be able to perform modified Electroconvulsive therapy (ECT).
10. Should have the following skills in relation to gender related issues:
    - Demonstrate the ability to assess the gender identity of an individual and distress caused (if any) due to the individual's own gender identity in simulated environment.
    - Describe and understand how to discuss sexual orientation, sexuality identity, gender identity, as well as intersex identity (differences in sex development) as part of routine history taking.
    - Demonstrate the ability to educate and counsel individuals or family members about intersex variations, sexual orientations, sexuality identities, gender incongruence, gender dysphoria, and gender identities. Demonstrate ability to identify when a mental health referral is needed for the above.
    - Demonstrate knowledge that conversion therapy practices for sexual orientation or gender identity or on people with intersex variations is unethical.
    - Describe differences between Gender Incongruence and Gender Dysphoria.
    - Describe and understand gender identity, the biological and gender binaries, rejection of gender binary, gender non-conforming, gender non-binary, androgynous, and other identities.
    - Demonstrate the ability to educate an individual and family members that Gender Incongruence by itself is not a disorder and does not require clinical intervention. Any form of conversion therapy is unethical.
    - Discuss situations where there is a role for mental health support in Gender Dysphoria i.e., discussing with family, deciding on hormonal treatments or Sex Reassignment Surgery (Gender Affirming Care or Gender Affirmative Therapies or Gender Confirmation Surgery).

The student, at the end of the course should be able to perform independently, the following:

1. Conduct detailed Mental Status Examination (MSE)
2. Cognitive behaviour therapy
3. Supportive psychotherapy
4. Modified ECT and non-invasive neuromodulation
5. Clinical IQ assessment
6. Management of alcohol withdrawal
7. Alcohol intoxication management
8. Opioid withdrawal management
9. Delirious patients
10. Crisis intervention

The student must be able to assess a patient with following symptoms:

1. Psychotic symptoms
2. Seizures true and pseudo seizure
3. Anxiety symptoms
4. Affective symptoms
5. Cognitive symptoms
6. Catatonia
7. Delirium
8. Malingering
9. Behavioral symptoms of developmental disorders

The student, at the end of the course should be able to perform under supervision, the following:

1. Behaviour therapy
2. Family therapy
3. Interpersonal therapy
4. Cognitive behaviour therapy and other newer therapies
5. First level psychological intervention for sexual abuse, sexual assault and domestic violence
6. Genetic counselling

Syllabus

Course Contents:

No limit can be fixed and no fixed number of topics can be prescribed as course contents. The student is expected to know the subject in depth; however emphasis should be on the diseases/health problems most prevalent in that area. Knowledge of recent advances and basic sciences as applicable to his/her specialty should get high priority. Competence in managing behavioural problems commensurate with the specialty must be ensured.

The student must acquire knowledge in the following:

Theoretical concepts:

1. Neurophysiology and Neuro-chemistry
2. Functional and behavioural neuroanatomy
3. Genetics
4. Psychoneuroendocrinology
5. Psychoneuroimmunology
6. Electrophysiology and cognitive neuroscience
7. Neuro-imaging
8. Memory

9. Sleep and circadian rhythm

10. Learning – Theories

11. Theory of personality

12. Clinical Psychology including Psychometry and Psychodiagnostics

13. Transcultural Psychiatry

14. Research Methodology and Statistics

15. Psychodynamics

16. Psychiatric assessment (including History Taking, Neurological Examination, Mental Status Examination, Investigations, Use of rating scales, etc.).

17. Classification In Psychiatry

18. Organic Psychiatry (including Psychological Features and Clinical Assessment of Cerebrovascular Disorders, Delirium, Epilepsy, Head Injury, Headache, HIV – AIDS, Infections, etc.)

19. Movement Disorders (including Medication-Induced Movement Disorders, etc)

20. Substance Related Disorders (including Alcohol-Related Disorders, Amphetamine-Related Disorders, Caffeine-Related Disorders, Cannabis-Related Disorders, Cocaine-Related Disorders, Hallucinogen-Related Disorders, Inhalant-Related Disorders, Nicotine-Related Disorders, Opioid-Related Disorders, Phencyclidine-Related Disorders, Sedative-, Hypnotic-, or Anxiolytic-Related Disorders, etc.)

21. Psychosis (including Schizophrenia, Schizophreniform Disorder, Schizoaffective Disorder, Delusional Disorder, Brief Psychotic Disorder, Shared Psychotic Disorder, etc).

22. Mood Disorders (including Depressive Disorders, Bipolar Disorders, Cyclothymic Disorder, etc.)

23. Anxiety Disorders (including Panic Disorder, Agoraphobia, Phobias, Obsessive-Compulsive Disorder, Generalized Anxiety Disorder, etc).

24. Stress and related disorders (Posttraumatic Stress Disorder, Acute Stress Disorder Adjustment Disorder etc.)

25. Somatoform Disorders (including Somatization Disorder, Undifferentiated Somatoform Disorder, Conversion Disorder, Pain Disorder, Hypochondriasis, Body Dysmorphic Disorder, etc.)

26. Factitious Disorders

27. Dissociative Disorders (including Dissociative Amnesia, Dissociative Fugue, Dissociative Identity Disorder, Depersonalization Disorder, etc.)

28. Personality disorders

29. Sexual disorders, gender dysphoria and psychological issues among LGBTQIA+ groups (including Sexual Desire Disorders, Sexual arousal

Disorders, Orgasmic Disorders, Sexual Pain Disorders, Vaginismus, Paraphilias, etc)

30. Eating Disorders (including Anorexia Nervosa, Bulimia Nervosa, etc.)

31. Sleep Disorders (including Insomnia, Narcolepsy, Breathing-Related Sleep Disorders, Circadian Rhythm Sleep Disorders, Parasomnias, Nightmare Disorder, Sleep Terror Disorder, Sleepwalking Disorder, etc.)

32. Impulse-Control Disorders (including Intermittent Explosive Disorder, Kleptomania, Pyromania, Pathological Gambling, Trichotillomania, etc

33. Psychosomatic Disorders including Consultation Liaison psychiatry

34. Miscellaneous: Non-compliance, Malingering, Antisocial Behaviour, Borderline Intellectual Functioning, Age-Related Cognitive Decline, Bereavement [including Death], Academic Problems, Occupational Problems, Identity Problems, Religious or Spiritual Problems, Acculturation Problems, Phase of Life Problems, Chronic Fatigue Syndrome, etc.)

35. Abuse (Physical / Sexual) or Neglect Of Child /Adult

36. Culture Bound Syndromes

37. Pre-Menstrual Dysphoric Disorder

38. Perinatal Psychiatry

39. Emergencies In Psychiatry including suicide, its management and medico-legal aspect

40. Psychotherapy

41. Psychopharmacology

42. Electro-Convulsive Therapy,Other brain stimulation methods (rTMS, DBS, tDCS and others) and Neurosurgery

43. Child and Adolescent Psychiatry (including Learning Disorders, Motor Skills Disorder, Communication Disorders, Pervasive Developmental Disorders (Autistic Disorder, Rett's Disorder, Childhood Disintegrative Disorder, Asperger's Disorder), Attention-Deficit/Hyperactivity Disorder, Conduct Disorder, Oppositional Defiant Disorder, Pica, Tic Disorders, Elimination Disorders, Separation Anxiety Disorder, Selective Mutism, Reactive Attachment Disorder of Infancy or Early Childhood, Stereotypic Movement Disorder, etc.)

44. Intellectual disability

45. Geriatric Psychiatry (including dementia, legal and ethical issues, positive psychiatry in aging, psychiatric aspects of long term care)

46. Community psychiatry

47. Rehabilitation of psychiatric patients

48. Ethics In Psychiatry

49. Forensic and Legal Psychiatry (including Mental Health Care Act, Persons with Disability Act, Narcotic Drugs and Psychotropic Substance Act etc.)

The student may know the following:

1. History of Psychiatry
2. Epidemiology
3. Mind – the evolving concepts
4. Psychiatry rating scales
5. Placebo Effect
6. Sex and Gender Issues in Psychiatry
7. Psychosurgery

TEACHING AND LEARNING METHODS

Teaching methodology

1. **Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated. Didactic lectures are of least importance; small group discussion such as seminars, journal clubs, symposia, reviews and guest lecturers should get priority for theoretical knowledge. Bedside teaching, grand rounds, structured interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning. The student should have hands-on training in performing various procedures and ability to interpret various tests/investigations. Exposure to newer specialized diagnostic/therapeutic procedures concerning the subject should be given. Self learning tools like assignments and case base learning may be promoted.

   The post graduate student should have knowledge of:

   - Psycho-pharmacology and broadening the treatment options using medicines.
   - Neuro-imaging techniques to understand behaviour and psychiatric illness.
   - Community-Psychiatry.
   - Functioning of psychiatric hospital.

   Community Psychiatry should go beyond familiarization with the National Mental Health Programme. The post graduate student should have hands on experience with:

   - Training programmes for primary care physicians
   - Organizing Mental Health Camps

- Carrying out Health Education Activities
- Forensic /Legal Psychiatry
- Integration of Mental Health Care with General Health Care

2. **Thesis writing:** Thesis writing is compulsory.
3. **Research Methodology:** The student should know the basic concepts of research methodology and biostatistics, plan a research project, understand ethical issues of research especially in vulnerable groups such as those with mental illness and intellectual disability as well as minors, be able to retrieve information from the library, use reference managers .
4. **Teaching skills:** The post graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
5. **Continuing Medical Education Programmes (CME):** Each student should attend at least two CME programmes, in 3 years.
6. **Conferences:** The student should attend courses, conferences and seminars relevant to the specialty, and encouraged to make presentation in conferences
7. A post graduate student of a postgraduate degree course in broad specialties/super specialties would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
8. **Seminars:** There should be a weekly seminar in which the PG students present material on assigned topics in rotation. It should be followed by discussion in which all trainees are supposed to participate. Generally, the topics covered should be those that supplement the formal teaching programme.
9. **Case Conference**: A case conference should be held every week where a PG student prepares and presents a case of academic interest by rotation and it is attended by all the members of the Department.
10. **Psychosomatic Rounds**: This is a presentation of a case of psychosomatic illness, or a medical illness with pronounced psychiatric problems. It should be held weekly in collaboration with various departments and attended by the faculty and the PG students of psychiatry and the concerned Department.
11. **Research Forum**: There should be a monthly meeting of one hour each in which the PG students present their plan of research as well as the report of the completed work of their projects. The other research scholars/staff in the department also may participate in it. The faculty, PG students and the non-medical professionals should make critical comments and suggestions.

12. **Journal Club**: A monthly meeting of Journal club should be held in which a senior PG student presents a critical evaluation of a research paper from a journal. All PG students are expected to attend.
13. **Case presentations**: All new in-patients and outpatients cases should be routinely reviewed with one of the Consultants. In addition, the PG student is required to present case material at routine rounds and other case conferences. Senior PG students will conduct evening classes on clinical topics.
14. **Extra-mural activities**: The post graduate students are encouraged to attend certain academic activities in allied subjects held outside parent department e.g. seminars/lectures held at Departments of Sociology, Psychology, Neurology etc.
15. **Psychotherapy tutorials**: These should be held in small groups supervised by a consultant, in which a case is presented by a PG student and psychotherapeutic management discussed.
16. **Rotation:**

Clinical Postings

- A major tenure of posting should be in General Psychiatry. It should include care of in-patients, out-patients, special clinics and maintenance of case records for both in and out patients.
- Exposure to the following areas should be given :-

Schedule of clinical postings for M.D Psychiatry *(36 months)

Area/ Specialty	
Ward and OPD (Concurrent)	18 months
Neurology	2 months
Emergency Medicine/ Internal Medicine	1 month
Consultation Liaison Psychiatry	3 months
Psychiatric hospital and Forensic Psychiatry	1 month
Clinical Psychology	1 month
Addiction Psychiatry	3 months
Child and Adolescent Psychiatry	3 months
Community psychiatry	2 months#
Elective posting	2 months (as per choice in the same Institute)

* The stated duration can be subjected to minor modifications depending on available resources

 # Exposure to community based services should be integral to various postings.

Applicable only for trainees in General Hospital Psychiatric units: Facilities for these need to be arranged.

The post graduate student in Psychiatric hospitals would have extended period of exposure to consultation - liaison psychiatry and other medical specialties. Exposure to community based services should be integral part of various postings. The post graduate student shall be given full responsibility for patient care and record keeping under the supervision of the senior PG students and consultants. The post graduate

student shall also take patients for psychological interventions in an individual as well as group setting. S/he must complete a minimum of 100 hours of supervised psychological interventions.

- **Inter-Unit Rotation of posting**

  Inter-unit rotation in the department should be done for a period of up to one year (divided during the first year and third year while the post graduate student stays in the parent unit throughout the duration of his thesis work).

17. **Clinical meetings:**

    There should be intra - and inter - departmental meetings for discussing the uncommon / interesting medical problems.

18. **Log book:**

    Each student must be asked to present a specified number of cases for clinical discussion, perform procedures/present seminars/review articles from various journals in inter-unit/interdepartmental teaching sessions. They should be entered in a Log Book and signed by the authorized teacher and Head of Department.

19. The Department should encourage e-learning activities.

During the training programme, patient safety is of paramount importance, therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently. For this purpose, provision of clinical skills laboratories in medical colleges is mandatory. Objective structured clinical examination (OSCE) modules may be developed and used in teaching.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., assessment during the training

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

Quarterly assessment during the MD training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs
6. Professionalism and teamwork

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., at the end of training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The examination shall be in three parts:

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. **Theory Examination:**

   There shall be four papers each of three hours duration.

   Paper I: Basic Sciences as related to Psychiatry

   Paper II: Clinical Psychiatry

   Paper III: Psychiatric Specialties

   Paper IV: Recent Advances

3. **Clinical/Practical and Oral/viva voce examination should consist of:**

   - Presentation of long case of Psychiatry
   - Neurology short case
   - A short case Psychiatry
   - Viva –voce

   Due importance should be given to Log Book Records and day-to-day observation during the training.

Recommended Reading

Books (latest edition)

1. Textbook of Psychiatry Publisher: Lippincott Williams and Wilkins, Editors: Benjamin James Sadock, Virginia Alcott Sadock, Pedro Ruiz
2. Kaplan and Sadock's Synopsis of Psychiatry, Editor: RJ Boland, ML Verduin, P Ruiz; Publisher: Wolters Kluver India
3. Introduction to Psychology by Clifford T. Morgan Editors: Clifford T Morgan, Richard A King, John R Weiss, John Schopler, Publisher: MC Graw Hill

4. New Oxford Textbook of Psychiatry Edited by: John R. Geddes, Nancy C. Andreas and Guy M. Goodwin, Publisher: Oxford
5. Stahl's Essential Psychopharmacology: Neuroscientific Basis and Practical Applications, Editor: Stephen M Stahl, Publisher: Cambridge
6. Forensic Psychiatry: RC Jiloha, D Kataria, P Kukreti (Jaypee)
7. ECT administration manual, NIMHANS Editors: Bangalore N Gangadhar, A Shyam Sundar, Jagadisha Thirthalli, Shivarama Varambally, Kesavan Muralidharan, C Naveen Kumar, Preeti Sinha, Biju Viswanath, Publisher: NIMHANS
8. Community Psychiatry in India (Eds Chavan, Gupta, Arun, Sidana, Jadav) Jaypee.
9. Fish's Clinical Psychopathology – Signs and Symptoms In Psychiatry By Patricia Casey, Editor: Patricia Casey, Brendan Kelly, Publisher: Tree Life Media
10. Sims Symptoms in the Mind: Textbook of Descriptive psychopathology, Editor: Femi Oyebode, Publisher: Elsevier
11. Bickerstaff's Neurological Examination in Clinical practice, Editor: Kameshwar Prasad, Ravi Yadav, John Spillane, Publisher: Wiley
12. A Primer of Research, Publication and Presentation: Sandeep Grover, Shahul Amin, Jaypee
13. Maudsley's Prescribing Guidelines in Psychiatry, Editors: Author: David M. Taylor, Thomas R. E. Barnes, Allen Young, Publisher: Wiley
14. Lishman's Organic Psychiatry Editor: Anthony S. David, Simon Fleminger, Michael D. Kopelman, Publisher: Wiley Blackwell
15. Kaufman's Clinical Neurology for Psychiatrists, Elsevier.

Journals

03-05 international Journals and 02 national (all indexed) journals.

Appendix 1

Student appraisal form for MD in Psychiatry

	Element	Less than Satisfactory			Satisfactory			More than satisfactory			Comments
		1	2	3	4	5	6	7	8	9	
1	**Scholastic Aptitude and Learning**										
1.1	Has Knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g. Posters, publications etc.)										
1.4	Documentation of acquisition of competence (eg Log book)										
1.5	Performance in work based assessments										
1.6	Self- directed Learning										
2	**Care of the patient**										
2.1	Ability to provide patient care appropriate to level of training										
2.2	Ability to work with other members of the health care team										
2.3	Ability to communicate appropriately and empathetically with patients families and care givers										
2.4	Ability to do procedures appropriate for the level of training and assigned role										
2.5	Ability to record and document work accurately and appropriate for level of training										
2.6	Participation and contribution to health care quality improvement										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethically appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment been discussed with the trainee?	Yes	No								
	If not explain										

	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

Module on Gender related Issues and Gender Dysphoria for the MD Curriculum of Psychiatry

At the end of the course the student will be able to:

- Demonstrate the ability to assess the gender identity of an individual and distress caused (if any) due to the individual's own gender identity in simulated environment.
- Describe and understand how to discuss sexual orientation, sexuality identity, gender identity, as well as intersex identity (differences in sex development) as part of routine history taking.
- Demonstrate the ability to educate and counsel individuals or family members about intersex variations, sexual orientations, sexuality identities, gender incongruence, gender dysphoria, and gender identities. Demonstrate ability to identify when a mental health referral is needed for the above.
- Demonstrate knowledge that conversion therapy practices for sexual orientation or gender identity or on people with intersex variations is unethical.
- Describe differences between Gender Incongruence and Gender Dysphoria.
- Describe and understand gender identity, the biological and gender binaries, rejection of gender binary, gender non-conforming, gender non-binary, androgynous, and other identities.
- Demonstrate the ability to educate an individual and family members that Gender Incongruence by itself is not a disorder and does not require clinical intervention. Any form of conversion therapy is unethical.
- Discuss situations where there is a role for mental health support in Gender Dysphoria i.e., discussing with family, deciding on hormonal treatments or Sex Reassignment Surgery (Gender Affirming Care or Gender Affirmative Therapies or Gender Confirmation Surgery).

Subject Expert Group members for preparation of REVISED Guidelines for competency based postgraduate training programme for MD in Psychiatry

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN ANATOMY

Preamble:

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

These guidelines would help to achieve a uniform level of training of MD Anatomy to post graduate students throughout the country. The student, after undergoing the training, should be able to deal effectively with the needs of the medical community and should be competent to handle all problems related to the specialty of Anatomy and recent advances in the subject. The post graduate student should also acquire skills in teaching anatomy to medical and para-medical students and be able to integrate teaching of Anatomy with other relevant subjects, while being aware of her/his limitations.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

The **Goal** of MD Anatomy is to train a doctor to become a competent teacher and researcher in Anatomy who:

1. Is aware of *contemporary advances and developments* in the field of Anatomy.
2. Has *acquired the competencies* pertaining to the subject of Anatomy that are required to be practiced at all levels of health system.
3. Is able to discharge responsibilities and participate in National Health Education Programme.
4. Is oriented to the *principles of research methodology*.
5. Has acquired *skills in educating* medical and paramedical professionals.
6. Has acquired *skills in effectively communicating* with the students and colleagues from various medical and paramedical fields.
7. Has acquired skills of integrating anatomy with other disciplines as and when needed.
8. Has acquired qualities of a good teacher capable of innovations in teaching methodology**.**

9. Has been able to demonstrate adequate management skills to function as an effective leader of the team engaged in teaching and research.

After completing the three year course in MD Anatomy the student should have achieved competence in the following:

1. Knowledge of Anatomy

1.1. Acquire competencies in gross and surface anatomy, neuroanatomy, embryology, genetics, histology, radiological anatomy, applied aspects and recent advances of the above mentioned branches of anatomy to clinical practice. These are given in detail in subsequent sections.

2. Practical and Procedural skills

2.1 Acquire mastery in dissection skills, embalming, tissue preparation, staining and museum preparation.

3. Training skill in Research Methodology

3.1 Acquire skills in teaching, research methodology, epidemiology & basic information technology.

3.2 Acquire knowledge in the basic aspects of Biostatistics and research methodology.

3.3 Has knowledge to plan the protocol of a thesis, carry out review of literature, execution of research project and preparation of report.

3.4 Has ability to use computer applications Microsoft office (Microsoft word, excel, power point), Internet, Searching scientific databases (e.g. PubMed, Medline, Cochrane reviews).

3.5 Acquire skills in paper & poster preparation, writing research papers and Thesis.

4. Professionalism, attitude and communication skills:

4.1 Develop honest work ethics and empathetic behavior with students and colleagues.

4.2 Acquire capacity of not letting his/her personal beliefs, prejudices, and limitations come in the way of duty.

4.3 Acquire attitude and communication skills to interact with colleagues, teachers and students.

5. Teaching Anatomy

5.1 Practicing different methods of teaching-learning.

5.2 Making presentations of the subject topics and research outputs.

6. Problem Solving

6.1 Demonstrate the ability to identify applied implications of the knowledge of anatomy and discuss information relevant to the problem, using consultation, texts, archival literature and electronic media.

6.2 Demonstrate the ability to correlate the clinical conditions to the anatomical/ embryological/hereditary factors.

6.3 Demonstrate the ability to evaluate scientific/clinical information and critically analyze conflicting data and hypothesis.

SUBJECT SPECIFIC COMPETENCIES

At the end of the course, the student should have acquired following competencies:

A. Cognitive domain

1. Describe gross anatomy of entire body including upper limb, lower limb, thorax, abdomen, pelvis, perineum, head and neck, brain and spinal cord.
2. Explain the normal disposition of gross structure, and their interrelationship in the human body. She/He should be able to analyze the integrated functions of organs systems and locate the site of gross lesions according to deficits encountered.
3. Describe the process of gametogenesis, fertilization, implantation and placenta formation in early human embryonic development along with its variation and applied anatomy.
4. Demonstrate knowledge about the sequential development of organs and systems along with its clinical anatomy, recognize critical stages of development and effects of common teratogens, genetic mutations and environmental hazards. She/He should be able to explain developmental basis of variations and congenital anomalies.
5. Explain the principles of light, transmission and scanning, compound, electron, fluorescent and virtual microscopy.
6. Describe the microscopic structure of various tissues & organs and correlate structure with functions as a prerequisite for understanding the altered state in various disease processes.
7. Demonstrate knowledge about cell and its components, cell cycle, cellular differentiation and proliferation.
8. Describe structure, number, classification, abnormalities and syndromes related to human chromosomes.
9. Describe important procedures in cytogenetics and molecular genetics with its application.
10. Demonstrate knowledge about single gene pattern inheritance, intermediate pattern and multiple alleles, mutations, non-mendelian inheritance, mitochondrial inheritance, genome imprinting and parental disomy.
11. Describe multifactorial pattern of inheritance, teratology, structure gene, molecular screening, cancer genetics and pharmacogenetics.
12. Demonstrate knowledge about reproduction genetics, assisted reproduction, prenatal diagnosis, genetic counseling and ethics in genetics.

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13. Explain principles of gene therapy and its applied knowledge.
14. Describe immune system and cell types involved in defense mechanisms of the body. Also explain gross features, cytoarchitecture, functions, development and histogenesis of various primary and secondary lymphoid organs in the body.
15. Demonstrate knowledge about common techniques employed in cellular immunology and histocompatibility testing.
16. Demonstrate applications of knowledge of structure & development of tissue-organ system to comprehend deviations from normal.
17. Demonstrate knowledge about recent advances in medical sciences which facilitate comprehension of structure function correlations and applications in clinical problem solving.
18. Explain collection, maintenance and application of stem cells, cryobanking and principles of organ donation from recently dead bodies.
19. Demonstrate knowledge about surface marking of all regions of the body.
20. Able to interpret various radiographs of the body, normal CT Scan, ultrasound and MRI.
21. Demonstrate knowledge about different anthropological traits and use of related instruments.
22. Demonstrate knowledge about outline of comparative anatomy of whole body and basic human evolution
23. Demonstrate knowledge about identification of human bones, determination of sex, age, and height for medico legal application of anatomy

B. Affective domain

1. Demonstrate self-awareness and personal development in routine conduct. (*Self-awareness*)
2. Communicate effectively with peers, students and teachers in various teaching-learning activities. (*Communication*)
3. Demonstrate

a. Due respect in handling human body parts & cadavers during dissection. (*Ethics & Professionalism*)

b. Humane touch while demonstrating living surface marking in subject/patient. (*Ethics & Professionalism*)

4. Acquire capacity of not letting his/her personal beliefs, prejudices and limitations come in the way of duty.
5. Appreciate the issues of equity and social accountability while exposing students to early clinical exposure. (*Equity and social accountability*)

C. Psychomotor domain

At the end of the course the student should be able to:

1. Identify, locate and demonstrate surface marking of clinically important structures in the cadaver and correlate it with living anatomy.
2. Acquire mastery in dissection skills, embalming, tissue preparation, staining and museum preparation.
3. Locate and identify clinically relevant structures in dissected cadavers.
4. Locate and identify cells & tissues under the microscope.
5. Identify important structures visualized by imaging techniques, specifically radiographs, computerized tomography (CT) scans, MRI and ultrasonography.
6. Demonstrate various movements at the important joints and actions of various groups of muscles in the human body.
7. Demonstrate anatomical basis of common clinical procedures expected to be performed by a basic medical doctor.
8. Demonstrate different methods of teaching-learning and make presentations of the subject topics and research outputs.

Specific practice based competencies:

Name/Description of practice based competencies
1. Gross anatomy: 1.1 Procurement, Embalming and Preservation of human cadavers 1.2 Preparation of tanks for preserving bodies 1.3 Dissection of cadaver 1.4 Window dissection of important regions 1.5 Preparation of specimens for museum with display a) soft parts b) models c) charts 1.6 Preparation and preservation of human bones / skeleton as assigned by the faculty
2. Histology 2.1 Preparation of common fixatives embalming fluid 10% formalin, Bouin's fluid etc 2.2 Making paraffin blocks and section cutting and mounting 2.3 Preparation of staining set for H and E staining and staining paraffin sections with the stain 2.4 Making celloidin, araldite, gelatin blocks and their section cutting 2.5 Processing hard tissues, decalcification of bones, block making and sectioning, preparation of ground sections of calcified bones. 2.6 Frozen section cutting on freezing microtome and cryostat 2.7 Honing and Stropping of microtome knives, including sharpening by automatic knife sharpener 2.8 Histology file in which LM and EM pictures of all the organs and tissues of the body should be drawn and a small description of salient features written

3. Histochemical Methods 3.1 Practical classes for staining of glycogen, mucopolysaccharides, alkaline phosphatase acid phosphatase, and calcium
4. Cytogenetics 4.1 Preparation of media, different solutions, stains etc. 4.2 Preparation of buccal smear for sex chromatin Human chromosome preparation from peripheral blood and karyotyping. 4.3 Banding techniques (G and C) 4.4 Making of Pedigree charts for study of patterns of inheritance. 4.5 Chromosomal Analysis.
5. Neuroanatomy: 5.1 Dissection of brain and spinal cord for teaching and learning purpose 5.2 Preparation of brain and spinal cord macroscopic and microscopic sections and identification of different parts in them. 5.3 Discussions on clinical problems related to neurological disorders and anatomical explanation for the same.

Syllabus

A post graduate student, after three years of training in M.D. (Anatomy) should have acquired knowledge in the following aspects of anatomy:

Gross anatomy

Section - I

Gross Anatomy of entire body including upper limb, lower limb, thorax, abdomen, pelvis, perineum, head and neck, brain and spinal cord

Section - 2

Developmental anatomy/embryology

- General embryology: gametogenesis, fertilization, implantation and placenta, early human embryonic development.
- Systemic embryology: development of organ systems and associated common congenital abnormalities with teratogenesis.
- Physiological correlations of congenital anomalies.

Section - 3

Histology and histochemistry

Cell Biology:

- Cytoplasm - cytoplasmic matrix, cell membrane, cell organelles, cytoskeleton, cell inclusions, cilia and flagella.
- Nucleus - nuclear envelope, nuclear matrix, DNA and other components of chromatin, protein synthesis, nucleolus, nuclear changes indicating cell death.
- Cell cycle - mitosis, meiosis, cell renewal.
- Cellular differentiation and proliferation.

- **Microscopic structure of the body:**
- Principles of light, transmission and scanning, electron, fluorescent, confocal and virtual microscopy.
- The systems/organs of body - Cellular organization, light and electron microscopic features, structure - function correlations, and cellular organization.

Section - 4

Neuroanatomy:

- Brain and its environment, Development of the nervous system, Neuron and Neuroglia, Somatic sensory system, Olfactory and optic pathways, Cochleovestibular and gustatory pathways, Motor pathways, Central autonomic pathways, Hypothalamo-hypophyseal system, Limbic system, Basal ganglia, Reticular system, Cross Sectional anatomy of brain and spinal cord.
- Detailed structure of the central nervous system and its applied aspect.

Section - 5

Genetics

- Human Chromosomes - Structure, number and classification, methods of chromosome preparation banding patterns. Chromosome abnormalities, Autosomal and Sex chromosomal abnormalities syndromes, Molecular and Cytogenetics.
- Single gene pattern inheritance: Autosomal and Sex chromosomal pattern of inheritance, Intermediate pattern and multiple alleles, Mutations, Non-Mendelian inheritance, Mitochondrial inheritance, Genome imprinting, parental disomy.
- Multifactorial pattern of inheritance: Criteria for multifactorial inheritance, Teratology, Structure gene, Molecular Screening, Cancer Genetics - Haematological malignancies, Pharmacogenetics.

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- Reproduction Genetics - Male and Female Infertility, Abortuses, Assisted reproduction, Preimplantation genetics, Prenatal diagnosis, Genetic Counseling and Ethics of Genetics.
- Principles of Gene therapy and its applied knowledge.

Section - 6

Immunology

- Immune system and the cell types involved in defense mechanisms of the body. Gross features, cytoarchitecture, functions, development and histogenesis of various primary and secondary lymphoid organs in the body.
- Biological and clinical significance of the major histocompatibility complex of man including its role in transplantation, disease susceptibility/resistance and genetic control of the immune response.
- Common techniques employed in cellular immunology and histocompatibility testing.
- Molecular hybridization and PCR technology in immunology research particularly mechanism of antigen presentation, structural and functional relevance of the T cell receptor, genetic control of the immune response. Molecular basis of susceptibility to disease.

Section - 7

Applied anatomy and recent advances

- Clinical correlations of structure and functions of human body. Anatomical basis and explanations for clinical problems.
- Applications of knowledge of development, structural (microscopy), neuro anatomy to comprehend deviations from normal.
- Recent advances in medical sciences which facilitate comprehension of structure function correlations and applications in clinical problem solving.
- Collection, maintenance and application of stem cells, cryobanking and principles of organ donation from recently dead bodies.

Section - 8

- **Surface Marking and Radiology**

  Surface marking of all regions of the body. Interpretation of normal radiographs of the body including special contrast procedures including barium studies, cholicystrography, pylography, salphingography. Normal CT Scan, MRI and Ultrasound.

- **Anthropology**

  Different anthropological traits, Identification and use of Anthropological instruments.

- **Forensic Medicine:**

  Identification of human bones from their remains and determination of sex, age, and height. for medico legal application of Anatomy.

- **Outline of comparative anatomy of the whole body and basic human evolution**

Departmental Resources:

It is mandatory for the department of Anatomy to develop at least three of the following laboratories, in addition to the other facilities. The laboratory should be involved in active research in at least one well defined field.

1. Histology
2. Immunology
3. Electronmicroscopy/ Fluorescence microscopy/ confocal and other forms of microscopy laboratories
4. Developmental anatomy
5. Anthropometry
6. Neuroanatomy
7. Cytogenetics
8. Imaging technique for Radiological Anatomy

TEACHING AND LEARNING METHODS

Teaching methodology

During the course, students should have formal training in teaching and research. The sessions should be in the form of:

1. **Didactic Teaching**

   Topics in gross, surface and cross sectional anatomy, microanatomy, embryology, neuroanatomy, histochemistry, and genetics taught by faculty members.
2. **Training in c**ommunication skills - journal club, seminars, demonstrations, tutorials, lectures, quizzing.
3. Hands-on experience - techniques in microanatomy, neuroanatomy, gross anatomy, embryology, histochemistry, genetics, microscopy. Embalming and preservation of cadavers
4. Teaching: participate in the teaching and training programme of undergraduate students and interns.
5. Participate in seminars, symposia, group-discussions and Journal clubs.

6. Educational technology - preparation of Audio Visual aids for teaching, posters/manuscripts for presentation in conferences/workshops and publication in journals.
7. Participation in formulating evaluation methods: Setting objective questions, Short Answer Questions, Multiple Choice Questions and Objective Structured Practical Examination (OSPE).
8. Prepare teaching modules and museum specimens.
9. Participation in organization of symposia/workshops
10. Explain and interpret normal radiological anatomy and sectional anatomy of the human body as studied by various imaging techniques.
11. Comprehend and demonstrate surface and living anatomy of the human body.
12. Relate forensic anatomy to the study with medico-legal aspects of bone in particular.
13. Explain the general principles of Anatomy Act and Organ Transplantation Act.
14. Comprehend ethical aspects of biomedical research.
15. Comprehend the basis of disposal of biomedical waste.
16. Comprehend horizontal integration of various subdivisions of anatomy with relevant physiology and biochemistry.
17. **Log Book:** Every student should maintain a logbook in which a record of the practical exercises completed should be entered. The Log books shall be checked and assessed periodically by the faculty members imparting the training.
18. A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
19. Department should encourage e-learning activities.

ASSESSMENT

FORMATIVE ASSESSMENT:

Formative assessment should be continual and should assess medical knowledge, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

During the three year training period,

- A record of all theoretical, practical and experimental work done by the post graduate student and its assessment will be kept and shall be available for examiners at the time of the final practical and viva voce examination and
- There will be periodical examinations during the course of training. The pre-final theory and practical examination will be conducted by the faculty of the

concerned college. During last six months the post graduate student will have weekly assessment tutorials conducted by the faculty. All activities will be evaluated.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination.

Quarterly assessment during the MD training should be based on:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT:

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The Post Graduate examination will be in three parts:

1. Thesis:

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory

and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period**.**

There shall be four theory papers.

Paper I: Gross Anatomy
Paper II: Embryology, Microscopic Anatomy and Genetics
Paper III: Neuroanatomy
Paper IV: Applied Human Anatomy and recent advances in anatomical Sciences

Theory Papers

Paper I: Gross Anatomy

a). Gross Anatomy of whole human body i.e. upper limb, lower limb thorax, abdomen, pelvis, head and neck
b). Method of preservation of human body and its parts, radiological anatomy, sectional anatomy.

Paper II: Embryology, Microscopic Anatomy and genetics

a). General Principles of genetics, Cytogenetic as applicable to medicine and different genetic disorders, gene therapy.
b). General Embryology, Systemic Embryology, methods of experimental embryology, clinically oriented embryology and teratology
c). Histology (including fine structure) of tissues and organs of the body.
d) Principles of light, transmission and scanning electron microscopy, confocal, virtual microscopy.

Paper III: Neuroanatomy

Neuroanatomy - gross and applied aspects

Paper IV: Applied Human Anatomy and recent advances in medical sciences

(a) Clinical and applied aspect of Anatomy
(b) Recent advances in the application of knowledge of anatomy on human

body

(c) Collection, maintenance and uses of stem cells

(d) Cryobanking

(e) Basics of principles of organ donation from recently dead bodies.

3. Practicals: spread over a minimum of 2 days

First Day Practical:

(a): Gross Anatomy

Dissection and related viva voce

(b): Histology

Spotting (10 spots) and viva voce

Techniques paraffin block making, section cutting. Staining (H and E) stain) with related viva

Second Day Practical:

a) Microteaching of a short topic to assess teaching skills

b) A short synopsis of the thesis work should be presented by the post graduate student

c) Grand viva including Gross anatomy, cross sectional anatomy, radiological Anatomy, Surface Anatomy, Embryology

Practical and Oral/Viva-Voce Examination

Practical Examination to be organized as per details given below:

Dissection on cadaver

Histology spotting

Histological techniques

Surface Marking

Radiology

Teaching ability

Thesis presentation

Oral/Viva-voce Examination

Grand viva

On dissected parts of the whole human body including nervous system, and Embryology models, teratology, skeletal system including short bones, embalming techniques and genetics, radiographs, MRI, CT & ultrasonographs.

Recommended reading:

Books (latest edition)

Gross Anatomy:

1. Susan Strandring: Gray's Anatomy: The anatomical basis of clinical practice, Churchill Livingstone Elsevier.
2. Dutta A.K. Human Anatomy vol. I-III Current Publisher.
3. Dutta A.K. Principle of General Anatomy. Current Publisher.
4. Romanes. Cunningham's Manual of Practical Anatomy vol. I-III, Oxford.
5. Keith and Moore Clinical Oriented Anatomy. Lippincot Williams and Willkins.
6. R.S Snell. Clinical Anatomy by regions. Lippincot Williams and Wilkins.
7. J.V. Basmajin. Grant's Method of Anatomy. Williams and Wilkins.
8. R.J. Last. Anatomy Regional and Applied. Churchill Livingston.
10. Lee McGregar. Surgical Anatomy. K.M. Varghese.
11. A.G. R Deckeg, D.J du Pless Lee. Mc Gregor's Synopsis of Surgical Anatomy. Varghese Publishing House.
12. Snell. Clinical anatomy by regions. Lippincotts, Williams and Wilkins.
13. S. Chummy Sinnatanmy. Last's Anatomy Regional and Applied. Churchill Livingston.
14. Hollinshed W Henry. Anatomy for surgeons. Vol. I-III Lippincotts, Williams and Wilkins.
15. Vishram Singh. Clinical and Surgical Anatomy. Elsevier.
16. Vishram Singh. Textbook of general anatomy. Elsevier.
17. Frank H. Netter. Atlas of Human Anatomy. Saunders Elsevier.

Histology

1. Young B. and Heath J. Wheater's Functional Histology.Churchill Livingstone.
2. M.H. E Ross. Histology: A textbook and atlas. Williams and Wilkins.
3. V. Bharihoke. Text book of human histology. Delhi AITBS.
4. Difiore's. Atlas of histology with functional co-relation.
5. Bloom and Fawcett. Text book of histology.
6. Carlton's. Histology Technique.
7. E.C. Clayden. Practical of section cutting and staining.
8. D W Cormack. Ham's Histology. Lippincotts, Williams and Wilikins.
9. Bloom and Fawcett. Textbook of Histology.

Genetics

1. J.S Thompson and Thompson . Genetics in medicine. W.B. Saunders and Co. Philadelphia, London.
2. George Fraser and Oliver Mayo. Text book of Human Genetics. Blackwell Scientific Publications London, Oxford Edinburg, Melbourne.
3. Hann Sellwerger and Jame Simpson. Chromosomes of Man. Sparsher's International Medical Publications.

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Embryology

1. Hamilton, Boyd. and Mossman. Human Embryology.
2. TW Sadler. Langman's Medical Embryology. Lippincotts, Williams and Wilikins.
3. Keith L Moore and T.V.N. Persaud. The Developing Human. Saunders.
4. Rani Kumar. Text book of embryology. I.K. International New Delhi

Neuroanatomy

1. Richard S. Snell. Clinical Neuroanatomy for Medical Students. Williams and Wilkins.
2. A. Parent. Carpenter's Human neuroanatomy. Williams and Wilkins.
3. Vishram Singh. Clinical Neuroanatomy. Elsevier.
4. A. K. Dutta. Essentials of Neuroanatomy. Current books international.
5. John A. Kiernan. Barr's the human nervous system, Lippincott, Williams and Wilkins.

Statistics

1. David E. Matthews and Vernon T. Farewell. Using and Understanding Medical Statistics. Karger.

Radiology

1. T.B. Moeller et.al. Sectional Anatomy CT and MRI Vol. I, II, III New York. Theme Stuttgart.
2. J.B. Walter et.al. Basic Atlas of Sectional Anatomy with correlated imaging. Saunders Elsevier.

Surface anatomy

1. SP John, Lumley editors. Surface Anatomy, The Anatomical basis of clinical examination. London: Churchill Livingstone.
2. A. Halim. and A.C. Das. Surface Anatomy Lucknow. ASI, KGMC.

Journals

03-05 international Journals and 02 national (all indexed) journals

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Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE of ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN ANAESTHESIOLOGY

Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

A post graduate specialist having undergone the required training in anesthesiology should be able to recognize the health needs of the community. He or she should be competent to handle effectively medical problems and should be aware of the recent advances pertaining to his/her specialty. She/he should be highly competent anesthesiologist with broad range of skills that will enable him/her to practice anesthesiology independently. The PG student should also acquire the basic skills in teaching of medical/para-medical students. She/he is also expected to know the principles of research methodology and modes of consulting library. She/he should attend conferences, workshops and CMEs regularly to upgrade his/her knowledge.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

The training should have clear objective, is competency based, is well planned & evaluated, is supervised and delivered by well trained teachers. It will have special emphasis on attitude and behavior, safety, communication, presentation, audit, teaching, ethics and law and management.

No limit can be fixed and on the number of topics that can be prescribed as course contents. The student is expected to know his/her subject in depth from various text books and journals; however more emphasis should be on the diseases/health problems most prevalent in that area. Knowledge of recent advances and basic sciences as applicable to his/her specialty should get high priority. Competency in anaesthesia skills commensurate with the specialty (actual hand on training) must be ensured.

Specific learning objectives:

1. **Theoretical knowledge**: The student should have fair knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology, Pharmacology, Statistics and Physics) as applied to Anaesthesia. The student should acquire in-depth knowledge including recent advances. He/she should be fully conversant with the bedside procedures (diagnostic and therapeutic) and have knowledge of latest diagnostics and therapeutics procedures available including radiological methods.

2. **Teaching:** The student should learn the basic methodology of teaching and develop competence in teaching medical/paramedical students. The student should be familiar with the latest teaching (computer and power point presentation) modes including simulators training and evidence based medical education.
3. **Attitude development:** The student should develop attitude that leads to appropriate communication with colleagues to function in a group in Operating Room /Intensive Care Unit, and develop the ability to function as a leader in the operating room.

SUBJECT SPECIFIC COMPETENCIES

The student during the training programme, should acquire the following competencies:

A. Cognitive domain

- Demonstrate knowledge of Anatomy related to;
  - ❖ Diaphragm, upper and lower airway, heart and coronary circulation ,
  - ❖ Regional anaesthesia - field block, central neuraxial, blockade, block for acute pain states
  - ❖ Procedures like -Intramuscular injections, arterial and venous cannulations and
  - ❖ Patient Positioning under anaesthesia

- Demonstrate knowledge of Physiology of various systems (respiratory, cardiovascular, hepatobiliary, renal, endocrine, pregnancy, haematological, neuromuscular, regulation of temperature and metabolism, stress response, cerebral blood flow and ICP, central, autonomic and peripheral nervous systems, metabolic response to stress and trauma) in detail and translate its application in a problem solving manner.
- Demonstrate knowledge of Biochemistry relevant to fluid balance and blood transfusion, perioperative fluid therapy, acid base homeostasis in health and diseases.
- Demonstrate knowledge of commonly used drugs in anaesthesia practice (premedication, induction agents - intra-venous and inhalational, neuromuscular blocking agents and reversal of muscle relaxants) - general principles, concepts of

pharmacokinetics and pharmacodynamics, drug interactions with the other drugs taken concomitantly by the patient and anaphylactoid reactions.

- Demonstrate knowledge of gas laws, medical gas supply system, fluidics, electricity, diathermy and oxygen therapy.
- Demonstrate knowledge of 'principles of physics' that govern functions of basic anaesthesia delivery equipment, airway devices – (laryngoscopes, airways etc), breathing systems and monitors, fiber optics, Lasers, Pacemakers and defibrillators, monitoring equipments (used for assessment of cardiac functions, temperature, respiratory functions, blood gases, intracranial pressure, depth of anaesthesia and neuromuscular block), Sterilization of equipments, manufacture, filling and transport of gases and liquid oxygen. etc.
- Demonstrate knowledge of importance of pre-anaesthetic assessment and optimization of a patient; consisting of evaluation, interpretation of laboratory investigation as applied to the care of the patients in planning and conduct of general anaesthesia.
- Demonstrate knowledge of basic life support, advanced cardiac, trauma life support, and neonatal resuscitation according to latest guidelines.
- Demonstrate knowledge of principles of sterilization and universal precautions, selection, maintenance and sterilization of anaesthesia and related equipment, Infection control, cross contamination in OT and ICU. Immune response and anaesthesia.
- Describe the development and history of anaesthesia as a specialty with knowledge of important personalities who have contributed towards it.
- Demonstrate knowledge of principles of artificial ventilation, management of unconscious patients, oxygen therapy, shock- (pathophysiology and management) and various protocols related to Intensive Care Unit.
- Demonstrate knowledge of post-operative care in the post-anaesthesia recovery room, in terms of management of
    - ❖ Post-operative pain: various modalities
    - ❖ Nausea and vomiting
    - ❖ Identified emergencies and postoperative complications.
    - ❖ Special precautions to be taken in specific surgical patients.
- Demonstrate knowledge of acute pain management, chronic pain therapy & therapeutic nerve blocks, acupuncture, acupressure and other non-conventional methods of treatment.
- Describe documentation, medico-legal aspects of anaesthesia and concept of informed consent.
- Demonstrate knowledge of research methodology and basics of biostatistics relevant to data collection, analysis, record keeping in anaesthesia, comparison and estimation of significance.

- Demonstrate ability to interpret blood gas analysis and other relevant biochemical values, various function tests and basics of measurement techniques, ECG.
- Explain blood coagulation mechanism, and their disturbances, rational use of blood and blood components.
- Demonstrate knowledge pertaining to special anaesthetic techniques as relevant to:
    - ❖ Outpatient anaesthesia, hypotensive anaesthesia, anaesthesia in abnormal environments including rural area and calamitous situations
    - ❖ Associated medical disorders in surgical patients
    - ❖ Geriatric and pediatric anaesthesia, Emergency, ENT, orthopedic, ophthalmology, obstetrics, dental, radio-diagnosis and radiotherapy.
    - ❖ Induced hypothermia, incidental, environmental safety of patient.
    - ❖ Malignant hyperthermia, myasthenia gravis, GB syndrome and other neuromuscular diseases, obesity, COPD, Diabetes mellitus, bronchial asthma and hypertensive crises..
    - ❖ Principles of anaesthetic management of neuro/cardiac/thoracic/vascular/ transplantation/burns and plastic surgery.
    - ❖ Anaesthesia for patients with severe cardiac, respiratory, renal and hepatobiliary disorder posted for unrelated surgery
    - ❖ Shock, types, pathogenesis and management of patients in shock, renal failure, critically ill and/or on ventilator, Multiple organ failure
- Demonstrate knowledge pertaining to care of terminally ill, Hospices management, Do not resuscitate orders.
- Demonstrate knowledge of general principles of medical audit and Critical incident reporting.
- Demonstrate knowledge of Ethics and clinical trial.
- Demonstrate knowledge of Hospital, ICU and OT design and planning.
- Demonstrate knowledge of Medical education including evidence based medical education.
- Demonstrate knowledge of principles of human resources and material management.

B. Affective Domain:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.

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3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

At the end of the course, the student should acquire skills in the following broad areas and be able to:

- Demonstrate ability **as a perioperative physician**, in terms of
  - ❖ Acquiring mastery in careful and relevant history taking, physical examination in clinical evaluation of the patient preoperatively.
  - ❖ Collecting and synthesizing preoperative data from parent hospital and other sources and to develop a rational strategy for the peri-operative care of the patient.
  - ❖ Thorough and systematic approach to preoperative evaluation of patients with and without systemic diseases, undergoing different types of operations.
  - ❖ Prioritizing problems, present cases clearly and systematically to attending consultants.
  - ❖ Developing working relationships with consultants in other specialties to assist in preoperative evaluation and get a good consultation.
  - ❖ Interacting with preoperative patients and developing effective counseling techniques for different anaesthetic techniques and peri-operative procedures.
  - ❖ Assessing and explaining risk of procedure and taking informed consent.
  - ❖ Managing information in preoperative evaluation and outcome enhancement and communication skill to patients and relatives.
  - ❖ Ability to choose and order the required investigations to be done in a particular patient peri operatively

- Demonstrate ability in performing
  - ❖ Pre-operative equipment check
  - ❖ selection of drugs
  - ❖ Preparation of work table etc.

- Identify conditions like difficult airway by following difficult airway algorithms.
- Demonstrate ability to establish topical airway anaesthesia for awake intubation
- Demonstrate management of a Failed intubation drill on a Mannequin according to latest guidelines
- Demonstrate ability to monitor and assess depth of anaesthesia
- Demonstrate abilities to manage body fluid composition; volume status; replacement of fluid and blood loss; use of whole blood and blood components.

- Demonstrate abilities to manage Electrolyte and acid base derangements; osmolarity and osmolality.
- Demonstrate acquisition of skills to initiate mechanical ventilation; select appropriate type and mode of ventilator; and monitor proper functioning of ventilator.
- Identify the need to perform intra-operative laboratory tests, blood gases, coagulation profile and interpret the results with clinical co relation
- Demonstrate ability to manage co-morbid conditions and anaesthesia
- Demonstrate ability to perform cannulation of arteries, central and peripheral veins.
- Demonstrate ability in using and interpreting the following routine non-invasive and invasive monitors intra-operatively:
    a. Electrocardiogram with ST-segment analysis
    b. Noninvasive blood pressure
    c. Capnograph: values and changes in values and waveform.
    d. Pulse oximetry: values and changes in values
    e. Neuromuscular blockade monitor
    f. Invasive arterial pressure: waveform and changes in the waveform
    g. Central venous pressure: values and waveform
    h. Pulmonary artery pressure: Values and waveforms, pulmonary capillary wedge tracing.
        i) Cardiac output
        ii) Mixed venous oxygen saturation
        iii) Evoked potential
        iv) Transesophageal echocardiography: basic understanding

- Demonstrate skills in providing basic life support, advanced cardiac life support, trauma life support and paediatric-neonatal life support, train medical and paramedical staff in BLS and ALS.
- Demonstrate mastery in common procedures like vascular access, use of latest invasive and non-invasive monitoring equipment, lumber puncture, management of appropriate mechanical ventilation and total care of Intensive Care Patient.
- Demonstrate ability to administer general anaesthesia and regional anaesthesia for ASA I to V, under supervision.
- Demonstrate ability to give extradural block (EDB) lumbar and thoracic, Spinal Block, and Peripheral Nerve Blocks under supervision.
- Demonstrate ability to use ultrasound machine for giving blocks and venous cannulation.
- Demonstrate ability to plan and administer anaesthesia to all emergency patients under supervision including patients for Cardiac, Neurosurgery, Pediatric surgery,

and for all major surgeries, able to manage critically ill patients and treat intractable pain.

- Demonstrate following abilities in **Emergency Anaesthesia, Trauma and Resuscitation:**
  - ❖ Organize resources in case of mass casualty.
  - ❖ Perform triage.
  - ❖ Assess, transport and manage mass casualties / disaster management and camp anaesthesia.
  - ❖ Manage massive haemorrhage and massive blood transfusion.
  - ❖ Transport critically ill patient.
  - ❖ Perform anaesthetic management of geriatric patients with fracture neck of femur
  - ❖ Manage severe burns patients, rapidly progressing spinal compression, massive haemoptysis and lobectomy, peritonitis from various suspected causes, preparation and management of bowel obstruction, septicaemic shock, acute upper airway obstruction such as foreign body, epiglottitis, infections, cardiac tamponade from examples post cardiac surgery, malignant pericardial effusion, peri-operative management of rupture aneurysm of abdominal aorta
  - ❖ Basic Cardiac Life Support and Advanced Cardiac Life Support, Basic Trauma Life Support, Advanced Trauma Life Support, and Cerebral preservation.
  - ❖ Management of intra-operative cardiac arrest
  - ❖ Management of intra-operative bronchospasm

- Demonstrate ability to document a Medico-legal aspect.
- Demonstrate ability to provide special sedation /**anaesthesia requirements outside operating Room,** eg **Radiology**: for CT, MRI (especially in relation to dye allergy and embolization, **Oncho radiotherapy**, **Electroconvulsive shock therapy** (modified ECT. **Non-invasive cardio-radiologic procedures** including balloon angioplasty and cardiac catheterization, **Non-invasive neuro-radiologic procedures, lithotripsy** etc **.**
- Demonstrate ability to analyze data and write a thesis, present scientific data, participate in anaesthesia audit.
- Demonstrate ability to critically review and acquire relevant knowledge from the journals about the new development in the specialty
- Demonstrate following abilities in the **Post Anaesthesia Care Unit (PACU)**
  - ❖ Assess the patient's recovery and condition for a safe discharge or transfer.
  - ❖ Observe, recognize and treat the commonly occurring problems likely to arise in the Post-anaesthsia Care Unit (PACU) especially those in relation to cardio-respiratory systems:
    1. Airway integrity and compromise.

2. Arrhythmia
3. Hypertension
4. Hypotension
5. Pain prevention and pain relief
6. Nausea and vomiting
7. Decreased urine output
8. Emergence delirium
9. Delayed emergence from anaesthesia
10. Shivering
11. Post-obstructive pulmonary edema.

- ❖ Assess patient recovery and the parameters for transfer from the PACU to the ward, ICU, home.
- ❖ Score the patient's condition according to the Aldrete system, including fast tracking after out-patient surgery.

- Demonstration of following abilities in **Intensive Care Unit**
  - ❖ **Understanding the spectrum of critical illnesses requiring admission to ICU.**
  - ❖ Recognizing the critically ill patient who needs intensive care -Trauma, burns, all types of shock, Sepsis, SIRS and ARDS, Poisoning, infectious patient (HIV, Hepatitis) and patients with metabolic disturbances.
  - ❖ Monitoring progress of patients by physiological scoring systems
  - ❖ Practicing infection control practices and control of nosocomial infections.
  - ❖ Inserting central venous lines, arterial lines using ultrasound and interpreting the data.
  - ❖ Managing cardiovascular instability, respiratory failure and postoperative pulmonary complications
  - ❖ Understanding of the operation of mechanical ventilators including different ventilatory modalities non-invasive ventilation, complications and modes of weaning.
  - ❖ Principles and application of Oxygen Therapy
  - ❖ Glycemic control in the critically ill patient
  - ❖ Practice of Hypothermia and prevention of cerebral injury after cardiac arrest
  - ❖ Delivering appropriate nutritional support - enteral and parenteral.
  - ❖ Proper use of sedative/hypnotic drugs in the ICU.
  - ❖ Practicing ethical and legal aspects of critical care
  - ❖ Good communication skills with patient and relatives.
  - ❖ Proper Sterilization of ICU equipment.

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- Demonstration of following abilities in **Acute and Chronic Pain Management**
  - ❖ Assessment of patients with pain including: history taking, physical examination, and interpretation of investigations.
  - ❖ Classify types of pain - acute chronic, traumatic, cancer pain, etc. with the knowledge of Pain pathways in detail.
  - ❖ Practice the different modalities of physical therapy that may relieve both acute and chronic pain
  - ❖ Practice the acute pain, cancer pain guidelines and WHO treatment ladder.
  - ❖ Practice routes of administration and risk/benefits of drugs used for acute and chronic pain relief, patient controlled analgesia and treat the common pain syndromes.
  - ❖ Demonstrate practice of pain management in patients with problem drug use, drug dependency and addiction and identify the parameters for referral to a pain medicine specialist.
- Demonstrate Organization of acute pain service and role of acute pain nurse for pain assessment in various groups of patients, Physiological changes secondary to Pain, practice different modalities of pain control. Pharmacology and side effects of opioid analgesia and non-opioid analgesia, principle of patient-controlled analgesia and assessment of its efficacy, Pharmacology and side effects of epidural/intra-thecal opioid. Neurological assessment of epidural blockade and management of failed block. Management of regional blockade – brachial plexus, para-vertebral and intra-pleural block. Management of epidural abscess. Substance abuse and acute pain control. Pain control in concurrent medical diseases – COAD, IHD, bleeding tendency, geriatric. Pain control in burns patients. Pain control in trauma patients included multiple rib fracture
- Demonstration of abilities to manage **Chronic Pain**
  - ❖ Practice different modalities of chronic pain management - physical therapy, psychotherapy, (including cognitive behavioural approaches), neuro-ablation, neuro-augmentation, spinal opioid, interventional neuro-blockade, non-opioid analgesia.
  - ❖ Anatomy, indication, technique and complication of chemical sympathectomy (lumbar sympathectomy, stellate ganglion block, celiac plexus block).
  - ❖ Practice principles of management of cancer pain, principle of management of non-cancer neuropathic pain - phantom limb pain, post-herpetic neuralgia, complex regional pain syndrome, trigeminal neuralgia. Principle of management of non-cancer nociceptive pain - myofascial pain, lower back pain, intractable angina, burns, chronic pancreatitis, PVD.
  - ❖ Practice Epidural steroid injection (all levels) and long-term epidural catheterization.
  - ❖ Observe and practice following blocks: Infra-orbital nerve, Intercostal nerve

- ❖ Recognize complications associated with each blocks and know appropriate treatment of each
- ❖ Know the indications for stimulation techniques such as transcutaneous electrical nerve stimulation (TENS), dorsal column stimulation, and deep brain stimulation.
- ❖ Mechanisms and side effects of other therapies used for treating pain.
- ❖ The principles of pain management in special patient groups including the elderly, children, disabled, intellectually handicapped and those unable to communicate.
- ❖ Awareness of the principles for insertion and management of implantable drug delivery pumps.
- ❖ Awareness of the basic principles of palliative care.

- **Demonstrate practice of Regional Anaesthesia**
  - ❖ Applying general principles of pharmacology of local anaesthetics and various adjuvants.
  - ❖ Familiarizing with the relevant anatomy for regional techniques.
  - ❖ Application of indications and contraindications to regional anesthetic technique including central neuraxial blocks, peripheral nerve blocks and sympathetic nerve blocks.
  - ❖ Assessing adequacy of regional anaesthesia, and learn techniques of supplementation of inadequate blocks.
  - ❖ Providing effective anxiolytics and sedation of patients by both pharmacologic and interpersonal technique.
  - ❖ Performing the following regional anaesthesia techniques:
    - o Brachial plexus, cervical plexus, stellate ganglion block, lumbar plexus, lumbar sympathetic, Sciatic nerve block, Femoral nerve block, 3 in 1 block, Wrist block, Popliteal Nerve block, Trigeminal nerve block, Retro bulbar blocks, Paravertebral blocks, Intercostal blocks, Caudal block – adult and pediatric, Ankle block, Epidural block/Catheter, Subarachnoid block, Bier's block, All peripheral nerves of the upper and lower limbs.

- **Demonstrate practice of Thoracic Anaesthesia**
  - ❖ Pre-operative assessment of patients undergoing Thoracotomy (lung resection), thoracoscopy, video assisted thoracoscopy and mediastinoscopy
  - ❖ Various approaches and their relevant equipments for lung isolation.
  - ❖ Various double lumen tubes and their placement.
  - ❖ Application of Principle of chest drain.
  - ❖ Respiratory Physiology and management of one lung ventilation (OLV). Indications, contraindications and hazards of OLV.

- ❖ Application of the knowledge of Anatomy of lung and broncho-pulmonary segments.
- ❖ Anatomy and techniques for intercostals nerve block and thoracic epidural. Management of thoracic epidural anaesthesia and analgesia
- ❖ Anatomy, techniques and placement of paravertebral block/catheter.
- ❖ Post-operative care of patients after lung surgery.
- ❖ Peri-operative management of patients with myasthenia gravis.
- ❖ Peri-operative management of patients with mediastinal mass.
- ❖ Anaesthetic management of mediastinoscopy, major airway stenting.
- ❖ Lung volume reduction surgery and problems.

- **Demonstrate practice of Cardiovascular Anaesthesia**:

  - ❖ Application of the knowledge of Anatomy and physiology of valvular disease, coronary arteries and their territories. Pulmonary circulation, coronary circulation, cerebral circulation, visceral circulation.
  - ❖ Application of the knowledge of Distribution of blood volume to different organs and systems and their control. Microcirculation. Venous system, venous pressure, its influence on various functions.
  - ❖ Regulation of blood pressure, hypotensive anaesthesia.
  - ❖ Anatomy and physiology of all operable congenital heart disease like ASD, VSD, PDA, TOF, transposition of great vessels.
  - ❖ Application of the knowledge of anatomy and physiology of vascular heart disease like co-arctation of aorta.
  - ❖ Assessment of cardiac patient with ischaemic heart, valvular heart disease and other diseases listed above. Understanding of cardiac catheterization, echocardiography, stress testing, and radio-nucleide imaging.
  - ❖ Application of Principle and complication of cardiopulmonary bypass
  - ❖ Application of Principle of trans-esophageal echocardiography
  - ❖ Application of Principle of circulatory support: inotropes, IABP, pacing
  - ❖ Coagulation and management of coagulopathy.
  - ❖ Off pump bypass
  - ❖ Intra-operative management of aortic surgery and major peripheral vascular surgery, aneurysm grafts, recanalisation procedures.
  - ❖ Understanding of the adult patient with congenital heart disease and their management during anaesthesia.
  - ❖ Postoperative cardiac critical care, including cardiovascular problems, analgesia.
  - ❖ Insertion of invasive monitoring for arterial monitoring, central venous pressure monitoring, pulmonary artery catheter insertion and interpretation.
  - ❖ Robotic cardiac surgery.

- **Demonstrate practice of Paediatric Anaesthesia**
  - ❖ Application of knowledge of Anatomical changes in paediatric patient and neonates.
  - ❖ Application of knowledge of Physiology and pharmacology in paediatric patient.
  - ❖ Guideline for pre-operative fasting in children and pre-medication.
  - ❖ Anaesthetic equipment: laryngoscopes, airways, endotracheal tubes, LMAs, PLMA and breathing circuit for children.
  - ❖ Anaesthesia management for premature and newborn.
  - ❖ Emotional problems for parent and child and principles of premedication. Consent by parents and their presence during induction. To become skilled in communicating with children, parents and other relatives.
  - ❖ Problems of transporting a sick pediatric patient from the ward to the operating room and back with regard to temperature maintenance, cardiovascular stability, ventilation and oxygenation.
  - ❖ Estimate preoperatively blood volume, hourly fluid requirements, fluid deficit, third space loss, acceptable blood loss and apply principles of fluid and blood replacement in the perioperative period.
  - ❖ Induce and maintain anaesthesia by inhalation, intravenous, intramuscular and rectal routes and monitor pediatric patients.
  - ❖ Understand the benefits, risks and techniques of regional anaesthesia in children. Anatomy and techniques of caudal, dorsal penile and inguinal regional block, spinal and epidural block
  - ❖ Learn to recognize and treat post anaesthesia complications like apnea, laryngospasm, acid-base and electrolyte disturbances, febrile and convulsing child and bleeding child.
  - ❖ Common problems related to common congenital syndromes presenting for surgery. Anaesthetic management of a child with concurrent disease – Down's, Pierre Robin syndrome, von Willebrand's disease, Goldenhar's, Sturge-Weber, Tracher-Colin, Prune-Belly, and cyanotic and non-cyanotic congenital heart disease.
  - ❖ Paediatric resuscitation: drugs, doses and defibrillation of children of all ages, from the very premature neonates to those children with complex coexisting disease.
  - ❖ Management of patients requiring paediatric intensive care, ventilatory management, and support of circulation.
  - ❖ Resuscitation of neonates and children of all ages. A period of one to two months in a PICU is recommended for all post graduate students undergoing advanced training in paediatric anaesthesia.
  - ❖ Paediatric pain management
  - ❖ Assessment of a child with URTI, with a heart murmur.
  - ❖ Management of fluid and electrolytes in children.

- ❖ Anaesthetic management of a malignant hyperthermia susceptible child.
- ❖ Anaesthetic management of FB bronchus, oesophagus, Wilm's tumour, congenital diaphragmatic hernia, tracheo-oesophagus fistula, thoracotomy.
- ❖ Anaesthesia for Fetal Surgery.
- ❖ Sedation techniques including the selection, management and monitoring of children for diagnostic and therapeutic procedures, with particular attention to working in areas outside the theatre suite.

- **Demonstrate practice of Transplant anaesthesia**
  - ❖ Application of knowledge of basic pathophysiology of renal and liver failure. Principles of anesthetizing an immuno-compromised patient.
  - ❖ Principles of anesthetizing patient with end stage renal/liver disease and patient with organ transplantation. Perioperative management.
- **Demonstrate practice of Neuroanaesthesia**
  - ❖ Application of basic knowledge of cerebral circulation and intra cranial pressure and its implications
  - ❖ Anaesthesia to patients with neurologic disease, head injury undergoing neurologic or non-neurologic surgery and for diagnostic procedures requiring anaesthesia.
  - ❖ Anesthetic implications of the most common neurosurgical procedures, transnasal, trans-sphenoidal pituitary surgery. Posterior fossa surgery. Surgery for supratentorial pathology.
  - ❖ Application of basic concepts behind electrophysiologic monitoring of the brain and spinal cord.
  - ❖ Application of knowledge of general principles of positioning the patient for surgery and the advantages and disadvantages of each position.
  - ❖ Effects of anaesthesia on the electroencephalogram (EEG) and evoked potentials.
  - ❖ Differential diagnoses and treatment alternatives of intraoperative intracranial hypertension ("tight brain")
  - ❖ Management of Head Trauma, and its anesthetic management and various protocols regarding their management and associated trauma.
  - ❖ Intracranial surgery and spinal surgery, both routine and emergency.
  - ❖ Monitoring: techniques for detection and management of air embolism.
  - ❖ Lumbar puncture and CSF drainage.
  - ❖ Non-surgical management of the head trauma patient, Systemic complications of severe brain injury.
  - ❖ Management of subarachnoid haemorrhage and vasospasm.
  - ❖ Diagnosis and management of patients with brainstem death; and dealing with patient's relatives

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- **The following are special procedures which the post graduate student must be able to perform**

Sr. No.	**Name of procedure**
1.	Blind Nasal intubation
2.	Failed intubation drill (includes Fiberoptic Laryngo/ Bronchoscope)
3.	Double Lumen Tube
4.	Bronchial Blocker placement
5	Jet Ventilation
6.	Suctioning and physiotherapy of wet lung
7.	Intubation in Neonates
8.	Initiation and management of ventilation
9.	Combined Spinal Epidural
10.	Brachial Plexus Block
11.	Intravenous Regional Anaesthesia
12.	Elbow, Wrist, Digital, Sciatic, Femoral, Lateral Cutaneous Nerve of thigh, Ankle - each
13	Cervical-Superficial and Deep, Stellate, Splanchnic - each
14.	Central Venous Line by Brachial, Jugular and Subclavian veins
15.	Radial and Femoral Artery cannulation
16.	CVP monitoring
17.	Pulmonary Capillary Wedge Pressure
18.	Neuro-muscular transmission Monitoring
19.	Anaesthetic Depth eg. BIS monitoring

- Demonstration of anesthetic abilities in the intraoperative period keeping into consideration the specific requirement of the surgical procedure – ENT, Orthopaedic, Gynaecology – Obstetrics, General surgery, Onchosurgery, replacement surgeries, urosurgery, vascular, plastic, Thoracic, Dental etc

Suggested Time Frame for Training the PG Students:

The student should be taught as per the following schedule to acquire the skills:

1. **First 6 months:**
   - During the first 6 months, the student should be taught expertise in the management of uncomplicated cases not belonging to any super specialty (ASA I and II cases). To start with, the student will observe and slowly become independent in giving general anaesthesia and spinal aneasthesia to ASA I and II cases for minor and major surgery, under graded supervision.
   - The postgraduate student should learn the basic principles of safe and effective anaesthesia, resuscitation, and both the prevention and treatment of pain,

perioperative care of the surgical patient, care of handling equipments, basic techniques in anaesthesia, and anaesthetic pharmacology, and electrical safety.

- He/she should select the thesis topic and submit the protocol for his thesis.

2. Next 18 months

- The student should widen his experience and should be able to undertake anaesthetic care of all routine cases, assist in the anaesthetic care for routine obstetric practice, understand basic principles of critical care, pain management, and participate in audit.
- The student should be trained in administration of general anaesthesia and regional anaesthesia for ASA I to V under supervision. The student should be able to give extradural block (EDB) lumbar and thoracic, Spinal Block, and Peripheral Nerve Blocks under supervision, and use of Ultrasound machine for giving blocks and venous cannulation. The student should learn paediatric and trauma life supports and maintain skills for basic and advanced cardiac life support.
- It is advised that they should be posted in the following specialties: general surgery including gastrointestinal surgery, transplant, ENT, Urology, Obstetrics, Dental Surgery, Eye, ICU, Pain Clinic and peripheral theatres like ECT, radiodiagnostic and therapeutic procedures (CT scan, MRI scan, angiography).
- The student should be able to analyze data and write a thesis. He/she should be able to present scientific data.

3. Last 12 months

- Thesis should be submitted minimum of 6 months before the final MD examination.
- The post graduate student should be given experience of various super-specialties like cardiothoracic and vascular surgery, neurosurgery and transplantation, and paediatric surgery. The student should be able to plan and administer anaesthesia to all emergency patients under supervision including patients for Cardiac, Neurosurgery, Pediatric surgery, and for all major surgeries. The aim at the end is to be competent and independent soon after the third year of junior residency in providing anaesthesia to elective and emergency cases.
- The post graduate student should be able to manage critically ill patients and treat intractable pain. They should also know how to organize resources in case of mass casualty. The curriculum should be able to provide 04 months of elective Intensive Care Unit posting (2 months during initial years under supervision and 2 months independently in the last six months).

4. At the end of 3 years, the post graduate student should have the skills to:

- Plan and conduct anaesthesia and provide post-operative care including pain relief for elective and emergency surgical procedures related to all surgical specialties.

- Carry out basic life support (BLS) and advanced life support (ALS) and train medical and paramedical staff in BLS and ALS.
- Manage patients admitted to an intensive care unit with the help of latest equipment.
- Manage patients suffering from acute and chronic intractable pain.
- Organize the hospital environment to manage mass casualty situation and camp anaesthesia.
- Critically review and acquire relevant knowledge from the journals about the new development in the specialty.
- Should be able to participate in anaesthesia audit.

Overall the student should acquire skills in the following practical competencies:

- ❖ Information management in preoperative evaluation and outcome enhancement and communication skill to patient and relatives.

Syllabus

The course content of **1st year** should cover the following:

1. **Anatomy related to:**
    - Diaphragm, upper and lower airway
    - Regional anaesthesia, field block, central neuraxial, blockade, block for acute pain states
    - Intramuscular injections, arterial and venous cannulations and positioning.
2. **Physics related to:**
    - Anaesthesia machine - assembly of necessary items.
    - Airway equipment including laryngoscopes, airway devices
    - Breathing systems
    - Monitoring in anaesthesia with concepts of minimum monitoring
    - Gas laws, medical gas supply system
    - Fluidics
    - Electricity and diathermy
    - Oxygen therapy
3. **Physiology related to:**
    - Theories of anaesthesia
    - Respiratory, cardiovascular, hepatobiliary, renal and endocrine system, pregnancy, blood, muscle and N-M junction, Nerve impulse transmission, ECG, regulation of temperature and metabolism, stress response, cerebral blood flow and ICP.

- Central, autonomic and peripheral nervous systems.
- Metabolic response to stress and trauma.

4. **Pharmacology related to**

    - General principles, concepts of pharmacokinetics and pharmacodynamics
    - Drug interactions in anaesthesiology, anaphylactoid reactions
    - Drugs used for premedication, induction of anaesthesia, general anaesthetics- intra-venous and inhalational, neuromuscular block and reversal of muscle relaxants.

5. **Biochemistry** relevant to fluid balance and blood transfusion, perioperative fluid therapy, acid base homeostasis in health and diseases.
6. Theoretical background of the commonly used anaesthetic techniques of general and regional anaesthesia, general principles of pre-anesthetic assessment and medication, recovery from anaesthesia and post operative care, effects of positioning during anaesthesia.
7. Introduction to the operation theatre, post-anaesthesia care rooms
8. Introduction to acute, chronic pain and pain management.
9. Documentation and medico-legal aspects of anaesthesia. Defensive anaesthesia. Concept of informed consent.
10. Resuscitation - basic and advanced life support (cardiac and trauma life support), neonatal resuscitation.
11. Intensive care of critical patients with introduction to artificial ventilation, management of unconscious patients, oxygen therapy, shock - pathophysiology and management.
12. Introduction to Research methodology, basics of biostatistics.

The course content of **2nd year** should cover the following:

Anatomy related to blocks for chronic pain, chemical neurolysis and different organ systems.

1. **Physics related to:**
    - equipments used in anaesthesia monitors, ventilators, vaporizers,
    - fibroptics.
    - Laser
    - Pacemaker and defibrillator
    - Monitoring equipment used for assessment of cardiac functions, temperature, respiratory functions, blood gases, intracranial pressure, depth of anaesthesia and neuromuscular block.
    - Sterilization of equipment
    - Computers in anaesthesia

2. Pharmacology of drugs used in cardiovascular, respiratory, endocrine, renal diseases and CNS disorders.
3. Interpretation of blood gases and other relevant biochemical values, various function tests and basics of measurement techniques, ECG.
4. Blood coagulation mechanism, disturbances, blood components.
5. Special anaesthetic techniques as relevant to –

    - Outpatient anaesthesia, hypotensive anaesthesia, anaesthesia in abnormal environments including rural area and calamitous situations
    - Associated medical disorders in surgical patients

6. Geriatric and pediatric anaesthesia
7. Emergency, ENT, orthopedic, ophthalmology, obstetrics, dental, radio-diagnosis and radiotherapy.
8. Medical statistics relevant to data collection, analysis, record keeping in anaesthesia, comparison and estimation of significance.
9. Care of terminally ill, Hospices management. Do not resuscitate orders.
10. Postures and anaesthesia.
11. Induced hypothermia, incidental, environmental safety of patient.
12. Malignant hyperthermia, myasthenia gravis, GB syndrome and other neuromuscular diseases, obesity, COPD, Diabetes mellitus, bronchial asthma and hypertensive crises..
13. Third world anaesthesia.
14. Inherited metabolic diseases and anaesthesia.

The course contents of **3rd year** should cover the following:

1. Principles of anaesthetic management of neuro/cardiac/thoracic/vascular/ transplantation/burns and plastic surgery.
2. Anaesthesia for patients with severe cardiac, respiratory, renal and hepatobiliary disorder posted for unrelated surgery
3. Shock, types, pathogenesis and management of patients in shock, renal failure, critically ill and/or on ventilator.
4. Multiple organ failure
5. Infection control, cross contamination in OT and ICU.
6. Immune response and anaesthesia.
7. Concept of cytokines, and other enzymes.
8. Selection, maintenance and sterilization of anaesthesia and related equipment
9. Chronic pain therapy and therapeutic nerve blocks.
10. Acupuncture, acupressure and other non-conventional methods of treatment.
11. Principles of neonatal resuscitation, ventilation and critical care.
12. Principles of human resources and material management.

13. General principles of medical audit. Critical incident reporting
14. Ethics and clinical trial.
15. Hospital, ICU and OT design and planning.
16. Medical education including evidence based medical education.

TEACHING AND LEARNING METHODS

Postgraduate Training

Teaching methodology

Didactic lectures are of least importance.

- Teaching should include seminars, journal clubs, symposia, tutorials, case discussions, and research presentations.
- Reviews and guest lectures should get priority for theoretical knowledge.
- Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning.
- Student should have hands-on training in performing various procedures (medical/surgical concerning his specialty) and ability to interpret various tests/investigations.
- Exposure to newer specialized diagnostic/therapeutic procedures concerning his/her subject should be given.
- A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- Log books shall be maintained regularly and should be checked and assessed periodically by the faculty members imparting the training.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Department should encourage e-learning activities.

Thesis: Supervision

- The postgraduate is responsible to a Faculty member and the latter should be available to advise and assist the student in his clinical assignments
- Departmental teaching committee will be responsible for the educational activities of the department and the teaching schedule.
- This involves providing services for emergencies and it makes different demands upon the anaesthesiologist. It should be learned through experience, with reduced staff. The clinical work during emergency should have a close supervision. The standards should be maintained of the agreed competence on schedule. The

emergency duties should be properly arranged with duty off. The postgraduates may have to do emergency duty as per schedule

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

Simulators:

Simulators should be used for the events of high importance but infrequent occurrence and where there may be high risks to the patients. The simulators can also be used for assessment purposes.

Rotation:

Schedule for three years of MD Anaesthesia postings:

The post graduate student should be exposed to the following areas of clinical anaesthesia practice:

1. Pre-anaesthesia clinic
2. Pain clinic
3. Recovery and Post anaesthesia Care Unit (PACU)
4. Intensive Care Units
5. Dialysis and transplant
6. All specialty theatres
7. Peripheral areas: Radiology, MRI, ECT and other interventional laboratories

The suggested schedule of the Operating Theatre can be as follows: This may change as per availability of specialities.

Operation theatre	**Months**
General Surgery	6
Urology	1
Ophthalmology	1
Otorhinology	2
Dental	1
Orthopedics/Trauma/casualty	3
Gynecology	3
Obstetrics	3
Pediatrics surgery	2
Burns/Plastic	1
CTVS	2
Neurosurgery	2

ICU	4
Pain	1
Recovery	1
Organ Transplant posting in the other areas. ECT, Cardiac Cath)	(Radiology,Radiotherapy)

ASSESSMENT

FORMATIVE ASSESSMENT, during the training programme

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination. The thesis is assessed separately.

Quarterly assessment during the MD training should be based on:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I)

SUMMATIVE ASSESSMENT ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

Post graduate Examination

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

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The final examination consists of three parts:

1) Thesis
2) Theory evaluation
3) Practical/Clinical and Oral evaluation

1. Thesis

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory consists of four papers of 3 hours each having 10 short structured questions with 10 marks each:

Paper I: Basic Sciences as applied to Anaesthesiology

Paper II: Practice of Anaesthesia: Anaesthesia in relation to associated systemic and medical diseases.

Paper III: Anaesthesia in relation to subspecialties/superspecialties

Paper IV: Intensive Care Medicine, Pain Medicine and Recent advances.

3. Practical/Clinical Examination: will consist of: 3 clinical cases,

Long case: One, duration 30 min (history, examination, Diagnosis and Management, Discussion)

Short cases: Two, 15 minutes each for short case. In short cases only relevant history important to anaesthesia to be taken (history, clinical examination and diagnosis, discussion).

Oral/Viva-voce should be conducted preferably on four tables with one examiner on each table:

Table one: ECG, X-rays, ABG Cards, Pulmonary function tests, Capnographs, clinical exercises card. Table two: Anaesthetic Drugs, Emergency Drugs, IV Fluids, Nerve Bocks (skeleton) .

Table three: Anaesthesia machine including circuits and Vaporizers, ETT, Supraglottic Airway devices, ICU Ventilator and oxygen therapy equipment.

Table four: Resuscitation equipments, resuscitation demonstration, Difficult Airway Equipment, monitoring equipments.

Alternatively,

1. One long case, viva voce at one station with all examiners, and : 150 marks
2. 28 OSCE station covering two stations of short cases, drugs ECG, X-rays, PFT, ABG, Respiratory loops, Resuscitation etc.,: 150 marks

Recommended Reading

Books (latest edition)

1. Lee's Synopsis of Anaesthesia
2. Clinical Anesthesiology by Morgan
3. Cardiac Anaesthesia By Joel Kaplan
4. Clinical Anaesthesia by Barash, Cullen and Stoelting
5. Textbook of Anaesthesia by Aitkenhead Rowbotham and Smith
6. Anaesthesia for neonates and infants by Smith
7. Pharmacology and Physiology for Anaesthetists by Stoelting
8. Principles of Obstetric Anaesthesia by Craford
9. Miller's Anesthesia
10. Stoelting RK, Miller RD Basics of Anaesthesia
11. ICU Book, Paul Marino
12. Text Book of Critical Care, by Fink et al
13. Regional Anaesthesia, P Prithviraj
14. Practical Management of Pain, Raj
15. Stoelting and Dierdorf: Anaesthesia and Co-existing Disease
16. Dorsch and Dorsch: Understanding Anaesthesia Equipments
17. ECG by Shamroth/Goldman
18. Anatomy for Anaesthetists by Harold Ellis
19. Clinical Anesthesia by P.G.Barash
20. Longneckers Anaesthesiology- Mcgraw Hill

Must refer:

1. Cucchiara and Michenfelder: Clinical Neuroanaesthesia
2. Cottrell and Smith: Anaesthesia and Neurosurgery
3. Complications in Anaesthesiology by Orkin
4. Complications in Anaesthesia by Raven
5. Airway management by JL Benumof
6. Obstetric Anaesthesia by Chestnut

Journals

03-05 international Journals and 02 national (all indexed) journals

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Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

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NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/24 **Date: 16-11-2022**

National Medical Commission

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN BIOCHEMISTRY

GUIDELINES FOR COMPETENCY-BASED POSTGRADUATE TRAINING FOR MD IN BIOCHEMISTRY

Preamble

A competency is the capability to apply or use a set of related knowledge, skills, and abilities required to successfully perform "critical work functions" or tasks in a defined work setting. Competency-based training is a learning model in which the required level of knowledge and skill (competency) on a task must be demonstrated. The purpose of the competency-based postgraduate education in Biochemistry is to create specialists, with the required knowledge, skills, and attitude, who would provide high-quality healthcare complying with the principles of personal integrity and professional ethics and would advance the cause of science through teaching, research & training along with constant updating of his/her knowledge and skills as a lifelong self-directed learner.

The student, after undergoing training in MD Biochemistry, should be able to demonstrate his/her knowledge of the basic concepts and recent advances in the subject, and a defined set of skills including expertise in various laboratory techniques applicable to metabolic and molecular aspects of medicine, planning and executing research projects, writing research papers/ articles demonstrating the acquired training in research methodology. The postgraduate training course should equip the student with skills to become a competent teacher who is also able to demonstrate his/her competence in planning teaching programs and apply those to facilitate the learning of the students in medical and allied health science courses in compliance with the curriculum while advancing the same with needful and feasible innovations. He/she should demonstrate competence in integrating teaching-learning of Biochemistry with other relevant subjects/disciplines to facilitate the holistic application of the subject of Biochemistry in patient care. He/she should be able to demonstrate his/her training in good laboratory practices with the ability to set up/manage a quality-controlled and quality-assured diagnostic laboratory, generate, evaluate, interpret and report the diagnostic laboratory data, with a good understanding of the sources of errors,

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corrective and preventive actions, hospital and laboratory information system network, and interact with clinicians as may be needed for effective patient care.

This document aims to provide teachers and learners with comprehensive guidelines to achieve a defined set of outcomes through learning and assessment and apply those in a given setup. This document has been framed by the Expert Group of the National Medical Commission with an aim to render a uniform PG medical curriculum to be implemented by all the medical colleges in the country. The curriculum so designed has been named the competency-based PG medical education curriculum in conformity with the purpose and content of PG medical education.

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SUBJECT-SPECIFIC LEARNING OBJECTIVES

Goal:

The goal of the training program in MD Biochemistry is to enable a student to become a competent teacher/facilitator of teaching-learning processes, researcher, problem solver, and healthcare provider. He/ she should be able to acquire a defined set of cognition and skills as detailed below and demonstrate his ability to apply the same in a given healthcare setup.

a. Acquisition of Knowledge

The student should be able to explain the molecular, physical, and physiological logic of the processes involved in the maintenance of normal health and their deviation in a disease state. He/should be able to integrate his/her acquired knowledge in principles and concepts of classical biochemistry, biophysics, and molecular biology, comprehend and apply his/her cognition and skills in a professional patient care setup.

b. Acquisition of Skills

The student should be able to facilitate the UG and PG learning of biochemical concepts and principles and should be able to render hands-on training in the Biochemical laboratory investigations and experimentations relevant to the strengthening of biochemical concepts, scientific and clinical problem-solving, and biomedical research. He/she should be able to

analyze, interpret and evaluate the data, and rationalize their application in clinical management and experimental research.

c. Teaching and training

As a competent healthcare personnel, the student should develop his/her learning skills by applying the fundamental principles of medical education, through teaching and assessing the undergraduate students in medicine and allied health science courses and, by contributing to the training of postgraduate students.

d. Diagnostic laboratory skills

The student should be competent in setting up/supervising/managing a diagnostic laboratory in Biochemistry in a hospital or in any other setup (diagnostic units in remote places or independent of a hospital setting) ensuring quality control along with quality assurance and providing reliable healthcare support services. The student should be able to provide consultation to clinicians and also contribute to community healthcare by conducting screening tests.

e. Professionalism, Ethics, Communication skills

The student should be able to develop and sustain work ethics and empathetic behavior with students and colleagues. He/she should be able to demonstrate professional integrity, honesty, and higher ethical standards and be able to display appropriate attitude and communication skills to interact with colleagues, teachers, students, laboratory personnel, and other healthcare professionals. While dealing with the patients and their relatives, he/she should exhibit compassion, care, and concern.

f. Research

The student should be able to demonstrate his/her competence in carrying out research work and related activities from the planning phase to writing (dissertation/thesis, research report/research paper) by applying the principles of research methodology.

LEARNING OBJECTIVES

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At the end of three years of training in the MD Biochemistry course, a postgraduate student should be able to:

- Demonstrate his/her knowledge of Biochemistry, Cell Biology, Molecular Biology, Molecular diagnostics, Biophysics, and applied aspects of all the mentioned branches to contribute to the teaching-learning processes and healthcare management.
- Identify learning needs and set the learning objectives for his/her self-directed learning and acquire and apply the needful learning in subjects like Genetics, Nutrition & Dietetics, Immunochemistry, and Laboratory Medicine in a relevant context.
- Apply the Medical Education principles to effectively contribute to Teaching-Learning processes, Assessment & Integrated learning.
- Demonstrate his/her knowledge about various aspects of the Competency-based UG medical education implemented w.e.f academic year 2019-20.
- Explain, comprehend and analyze the basics of Cellular and Molecular Biochemistry, functional mechanisms of the biomolecules and their logistics in the human body in normal health and their deviations in the disease conditions. He/she should be able to integrate his/her cognition and skills to facilitate medical education for undergraduate, postgraduate, and allied health sciences students and for patient management.
- Demonstrate administrative, decision-making, group activity, teamwork, and leadership skills in (a) setting up a department in the medical institution and (b) diagnostic services in the hospital and managing them as a part of the healthcare team.
- Analyze, interpret and evaluate laboratory data and provide consultancy to the clinician for judicious use of lab tests, with appropriate interpretation whenever needed, to facilitate the diagnosis, treatment, follow-up, and overall management of patients.
- Conduct research and related activities in the field of Biochemistry, Clinical Biochemistry, Molecular diagnostics, and Medical Education.
- Analyze, interpret, evaluate, appraise and present research-related data and publications to identify the best clinical evidence for research and demonstrate his/her competence in scientific /clinical work presentation.
- Describe the principles of evidence-based medicine, evidence-based practice, good laboratory practice, and good clinical practice.

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- Communicate effectively to fellow colleagues, teachers, patients & their relatives and other healthcare members for providing services to the community.
- Actively participate in all the teaching-learning-related activities like CMEs/workshops/conferences/hands-on-training/Interdepartmental meets/clinical meetings and acquire interpersonal skills.

SUBJECT/DOMAIN-SPECIFIC COMPETENCIES

At the end of three years training course, the postgraduate student should be able to demonstrate the competencies under the following three domains:

A. Cognitive domain (Knowledge domain)

1. Describe the biochemical principles and mechanisms to define and explain a healthy, and a diseased state, and execute the application of the biochemical mechanisms in the perception, diagnosis, and treatment of a disease.
2. Describe the biomolecules and their importance in sustaining life processes.
3. Explain the concept of intermediary metabolism, energy transactions, and metabolic and molecular homeostasis in the sustenance of life.
4. Explain the characteristics, components, and functional significance of different metabolic pathways, their specific intermediates, their inter-conversions, pathway-specific, organ-specific, and interrelated regulation of metabolic pathways, and apply that in explaining the biochemical logic in the functioning of the body in health and disease.
5. Describe and apply the concept of nutrition in health and disease, and critically evaluate the role of essential micro- and macro-nutrients, and their interlinks with cellular metabolism.
6. Apply the integrated knowledge and understanding of biochemical principles and mechanisms in clinical problem-solving.
7. Demonstrate knowledge of genetic engineering in various fields of medicine.
8. Apply the principles of biostatistics in research, clinical laboratory practices, community-based health data collection, and epidemiological surveys.
9. Demonstrate knowledge of the establishment of a diagnostic laboratory and its accreditation process.

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10. Analyze, interpret and evaluate biochemical laboratory findings in integration with the relevant clinical data to evaluate, analyze and monitor a disease state.
11. Apply the knowledge acquired in the basic principles of research methodology to develop a research protocol.
12. Make use of the latest available statistical tools for analyzing the research data, and interpreting and disseminating the results.
13. Demonstrate familiarity with the advances in artificial intelligence and computer-based modeling as and when required.
14. Describe and implement various components of the Competency-based UG Medical Education.
15. Apply the principles of teaching-learning technology while taking interactive classroom lectures, prepare modules for case-based learning (CBL) and problem-based learning (PBL), organize and conduct CBLs/PBLs, case discussions, small group discussions, seminars, journal clubs, and research presentations.
16. Explain the principles of instrumentation and their automation in the Biochemistry laboratory and demonstrate knowledge about the latest advances in technology.
17. Exhibit knowledge of professional ethics and integrity in his/her day-to-day conduct and services rendered.
18. Apply the updated knowledge to suggest and implement judicious use of clinical laboratory investigations.
19. Demonstrate knowledge on the use of laboratory gadgets and instruments taking necessary precautions.
20. Demonstrate knowledge on the preparation of solutions and reagents with necessary precautions as may be required for the estimations in experimental and diagnostic laboratories.
21. Display knowledge about recent advances and trends in the core subject area, research, and laboratory practice along with point-of-care testing (POCT) in the field of biochemistry.

B. Affective domain (Attitudes including Communication and Professionalism)

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1. Communicate appropriately with peers, teachers, healthcare professionals, and patients coming from a variety of backgrounds to explain the molecular and metabolic basis of health and disease in integration with lifestyle management.
2. Demonstrate care, concern, respect, empathy, and compassion while dealing with patients and their relatives at any point of interaction.
3. Demonstrate progressive improvement in AETCOM in routine endeavors through self-assessment, feedback from the peers, stakeholders and adapting to relevant learning.
4. Explain effectively to the patients/their relatives the precautions and preparations needed for them to comply with for specific biochemical analysis/laboratory tests that they will be subjected to.
5. Ensure that the related technical staff is apprised of the above and is duly trained while dealing with the patients.
6. Apply ethical principles and display proper etiquette in dealing with patients, relatives, and other health personnel.
7. Demonstrate appropriate attitude and ethical behavior in exchanging feedback with peers, teachers, clinicians, patients, and their relatives.
8. Display ethical behavior, and personal and professional integrity in his/her conduct and services.
9. Demonstrate the ability to maintain confidentiality in declaring the laboratory results to the concerned personnel wherever applicable.
10. Display awareness and respect for the rights of the patients.
11. Demonstrate counseling skills, especially in the context of nutritional and genetic counseling.
12. Demonstrate competency in judicious decision-making free from personal beliefs/thoughts, pride, and prejudice and, that, no such limitations impact his/her professional performance.

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C. Psychomotor domain

1. Demonstrate the principles and facts of cellular and molecular biochemistry by performing relevant laboratory exercises and analytical tests on body fluids, and other

biologically important substances, along with documentation of the test procedures, results, and interpretation of findings.

2. Develop a differential diagnosis, wherever applicable, based on the results obtained after performing the requisite tests.
3. Plan & conduct lectures, practical demonstrations, tutorial classes, and case-based or problem-based small group discussions for undergraduate students of medical and allied disciplines.
4. Identify, select and perform various biochemical tests in the clinical laboratory which are useful in the diagnosis, treatment, follow-up, and overall management of diseases and be able to interpret the results of such tests.
5. Perform relevant biochemical, immunological, and molecular biology techniques, wherever applicable.
6. Demonstrate compliance with the standard operating procedures of various methods and techniques used in a clinical biochemistry laboratory.
7. Perform enzymatic assays and conduct experiments to study enzyme kinetics affirming the ability to discuss, interpret and document the related data.
8. Perform routine investigations in hematology and microbiology, as and when required.
9. Demonstrate presentation skills at academic meetings and scientific paper writing skills.
10. Prepare research protocols and conduct relevant experimental studies.
11. Analyze and solve clinical and experimental problems.

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By the end of the course, the postgraduate student should be able to demonstrate his competency in performing the following procedures independently:

- Demonstrate the use of all the routine glassware/equipment used in UG teaching-learning in Biochemistry (as per MSR) and advanced instruments used in the clinical laboratory attached to the respective hospital for patient care.
- Preparation of buffers, normal laboratory solutions like molar/molal/normal and reagents with validation.
- Perform all the undergraduate practicals as per the new competency-based medical education prescribed by NMC.

- Perform experiments to study selected reactions of carbohydrates, amino acids and proteins, and lipids.
- Perform experiments to demonstrate constituents of milk.
- Perform experiments to demonstrate normal and abnormal constituents of urine.
- Perform Paper chromatography for separation of amino acids.
- Determination of enzyme activity and study of enzyme kinetics, using any two suitable enzymes (e.g., alkaline phosphatase from any liver tissue or acid phosphatase from potatoes).
- Plot standard curve for different estimations.
- Estimate (including calibration) and interpret clinical analytes as detailed below:
    - Blood glucose, glycated hemoglobin, the performance of glucose tolerance test and glucose challenge test,
    - Total protein, albumin, and A:G ratio,
    - Electrolytes, arterial blood gas analysis,
    - Cholesterol, triglycerides, free fatty acids, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), phospholipids, Lp(a), and calculated parameters under lipid profile,
    - Amylase, lipase,
    - Urea, creatinine, uric acid, urinary microalbumin,
    - Parameters of liver function tests (bilirubin, hepato-biliary enzymes such as AST, ALT, ALP, GGT, serum proteins/albumin and prothrombin time, CRP),
    - Calcium, magnesium, phosphorus, copper (and ceruloplasmin), serum iron, TIBC, and ferritin,
    - Markers of myocardial damage (CK, CK-MB, troponins, LDH),
    - Vitamin D, $B_{12,}$ and folate,
    - Point-of-care testing (POCT).
- Electrophoresis of serum proteins**,** lipoproteins,
- Separation and molecular weight determination of proteins by SDS-PAGE,
- Electrophoretic separation of LDH isozymes or any other isoenzymes,
- Hb electrophoresis,

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- Renal clearance tests,
- CSF and other body fluid analysis,
- Stone analysis,
- Thyroid function tests, Tumor markers, and relevant hormone assays by ELISA/RIA/Chemiluminescence.

Clinical Laboratory

- Demonstrate familiarity with the essentials of a clinical laboratory setup, the working of autoanalyzer, data transfer, statistical considerations, authorizing and reporting results in an advanced clinical laboratory with an ability to enlist the possible sources of errors (pre-analytical, analytical and post-analytical), perform root cause analysis, and undertake corrective actions, and preventive actions (CAPA).
- Perform and demonstrate activities under total quality management (TQM) of the Laboratory:
  a. Specimen collection, handling, processing, and storage of the sample.
  b. Methods of standardization & calibration.
  c. Methods of quality control, quality assurance, CAPA & assessment.
- Demonstrate ability to prepare and interpret a Levy-Jennings chart and plot inter-assay and intra-assay variation for any analyte estimated in the laboratory.
- Implementation and interpretation of Westgard rules followed by their CAPA, as required.
- Determination of reference values for any one parameter for the clinical laboratory.
- Perform inter-instrumental comparison for at least four parameters.
- Perform in-house calibration of pipettes, centrifuge, hot-air oven, thermometer, and thermo-hygrometer.
- Student should undergo internal auditor training as per ISO 15189:2012, NABL (optional).
- Able to prepare a lab quality manual and frame relevant Standard Operating Procedure (SOP) and Work Desk Instructions (WDI), for every procedure followed in a clinical lab.

Molecular laboratory techniques

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The student should be able to perform the following:

- Isolation of genomic DNA from blood,
- Isolation of RNA, synthesis of cDNA by reverse transcription,
- PCR and Reverse transcriptase PCR (both conventional and real-time),
- Primer designing,
- Blotting techniques,
- Basic techniques and principles of protein/enzyme purification and determining homogeneity.

By the end of the course, the postgraduate student should be able to perform under supervision or, demonstrate familiarity with, as the case may be, the following procedures (at least any five):

1. Separation of peripheral blood leukocytes using relevant isolation technique,
2. Subcellular fractionation/marker enzymes for organelles to demonstrate fractionation and purity of the fraction,
3. Ultracentrifugation,
4. Isolation of plasmids,
5. Basic techniques and essentials in cell culture and establishing different cell culture facilities,
6. High-performance liquid chromatography (HPLC)/GC-MS/LC-MS,
7. Restriction fragment length polymorphism (RFLP),
8. Fluorescent in-situ hybridization (FISH),
9. DNA fingerprinting,
10. Immunodiffusion techniques,
11. Immuno-electrophoresis,
12. Therapeutic drug monitoring,
13. Flow cytometry,
14. Nephelometry,
15. HLA typing.

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SYLLABUS

The course contents are outlined below:

A. Cognitive Domain

Paper I

Biomolecules, Principles of Biophysics and its biomedical importance, Cell biology, Fluid, electrolyte and acid-base balance, Analytical techniques and instrumentation, Biostatistics and research methodology, Basics of medical education in teaching and assessment of Biochemistry.

BIOMOLECULES

Ionization of water, the concept of acid and base, weak acids and bases, pH, pK, Henderson-Hasselbalch equation, buffer and buffering capacity.

Proteins:

- Classification, structure, properties and functions of amino acids and peptides, biologically important peptides,
- Classification, biological significance and structural organization of proteins,
- Structure-function relationship of proteins (haemoglobin, myoglobin, collagen and immunoglobulins),
- Fractionation, purification, structural analysis and characterization of proteins,
- Protein folding and its associated disorders,
- Protein denaturation,
- Protein degradation – lysosomal and proteosomal,
- Plasma proteins.

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Carbohydrates:

- Classification, biomedical importance, functions, properties and reactions of carbohydrates,
- Structural aspects of monosaccharides, disaccharides and polysaccharides,
- Mucopolysaccharides/glycosaminoglycans, glycoproteins and glycolipids,
- Glycation, glycosylation and role of carbohydrates in blood group substances.

Lipids:

- Types, properties and biomedical importance of lipids,
- Fatty acids - nomenclature, classification, properties, reactions including essential fatty acids, polyunsaturated fatty acids and trans fatty acids,
- Mono, di- and triacylglycerols,
- Trans fats,
- Cholesterol - structure, properties and biomedical importance,

- Phospholipids – classification, properties, composition, and biomedical importance of various phospholipids,
- Glycolipids – classification, properties, composition, and biomedical importance,
- Lipoproteins – classification, properties, composition, and functions of various lipoproteins including the role of apoproteins, their importance in health and disease,
- Role of lipids in the structure and function of biological membranes,
- Structure, properties, and biomedical applications of micelles and liposomes.

Nucleotides and nucleic acids:

- Purine and pyrimidine bases in DNA and RNA,
- Nucleosides and nucleotides,
- Biologically important nucleotides (including synthetic analogs of purine/pyrimidine bases and nucleosides used as therapeutic agents),
- Structure, functions, properties, and types of DNA and RNA.

PRINCIPLES OF BIOPHYSICS AND ITS BIOMEDICAL IMPORTANCE

- Diffusion, osmosis, dialysis, surface tension, viscosity, colloids, crystalloids, and suspensoids.

CELL BIOLOGY

- Structural organization and functions of a biological cell and different subcellular organelles along with their marker enzymes,
- Molecular organization, functions, and structure-function relationship of a cell membrane,
- Solute transport across biological membranes with related disorders,
- Cell fractionation and separation of organelles,
- Disorders related to cell membrane and subcellular organelles,
- Intracellular traffic and sorting of proteins,
- Intracellular signaling pathways, membrane receptors and second messenger,
- Intercellular junctions, cellular adhesion molecules, intercellular signaling and communication,
- Extracellular matrix: composition, and biomedical importance,
- Components of the cytoskeleton, and their role in muscle contraction and cell motility,
- Cell cycle, its regulation, and mechanism of cell death,
- Structure and functions of specialized cells.

FLUID, ELECTROLYTE, AND ACID-BASE BALANCE

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- Fluid, electrolyte, and acid-base balance, mechanism of regulation and associated disorders.

ANALYTICAL TECHNIQUES AND INSTRUMENTATION

- Colorimetry,
- Spectrophotometry,
- Atomic absorption spectrophotometry,
- Flame photometry,
- Fluorometry,
- Turbidimetry and nephelometry,
- Gravimetry,
- Electrochemistry (pH electrodes, ion-selective electrodes, gas-sensing electrodes, enzyme electrodes),
- Chemical sensors (biosensors),
- Osmometry,
- Chemiluminescence,
- Water quality testing (TDS, pH, fluoride) for autoanalyzer,
- Electrophoresis (principle, types, applications; isoelectric focusing, capillary electrophoresis; 2-D electrophoresis),
- Chromatography [principle, types (including high-performance liquid chromatography and gas chromatography)],
- Mass spectrometry,
- Immunochemical techniques,
- Techniques in molecular biology,
- Nanotechnology and microfabrication,
- Techniques to study *in vivo* metabolism (NMR, SPECT, PET scan, etc.),
- Radioisotope-based-techniques and their applications (permissions, precautions, management of radioactive waste),
- Automation,
- Point-of-care testing.

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BIOSTATISTICS AND RESEARCH METHODOLOGY

- Basic concepts of biostatistics as applied to health science,
- Statistical tests: t-test, analysis of variance, chi-square test, non-parametric tests, correlation and regression,
- Statistical methods of validation of diagnostic tests,
- Types of study designs and sampling methodologies,
- Meta-analysis and systematic reviews,
- Planning and management of research,
- Electronic search of the literature,
- Ethical aspects related to research and publication,
- Brief introduction of software for data analysis,
- Essentials of intellectual property rights, patents and copyrights.

BASICS OF MEDICAL EDUCATION IN TEACHING-LEARNING AND ASSESSMENT OF BIOCHEMISTRY

- Group dynamics,
- Principles of adult learning, the taxonomy of learning,
- Curriculum planning,
- Educational objectives,
- Developing a lesson plan (appropriate to the objective and teaching learning method),
- Interactive and innovative teaching methods for large and small groups,
- Use of appropriate media (for a learning session),
- Principles of self-directed learning and giving feedback,
- Framing appropriate essay questions, short answer questions and multiple-choice questions,
- Item analysis and preparation of question bank,
- Principles and types of assessment,
- Methods of assessing cognitive skills, psychomotor skills, communication skills, and professionalism (including viva voice and OSPE),
- Developing a plan for internal assessment and formative assessment,

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- Preparation of blueprint and setting of question paper,
- Microteaching,
- Reflection writing.

Paper II

Enzymes, Bioenergetics, Biological oxidation, Intermediary metabolism and inborn errors of metabolism, Nutrition, Vitamins and Minerals, Detoxification and metabolism of xenobiotics, Free radicals and anti-oxidant defense systems

ENZYMES

- Properties, classification, mechanism of action, coenzymes and cofactors, proenzymes, ribozymes, nanozymes, catalytic antibodies,
- Factors affecting the rate of enzyme-catalyzed reaction,
- Kinetics of enzyme activity, regulation of enzyme activity,
- Isoenzymes and isoforms, role in metabolic regulation,
- Enzyme inhibition,
- Principles of enzyme assays,
- Applications of enzymes: diagnostic, therapeutic and commercial uses of enzymes,
- Enzymes as targets for drug development.

BIOENERGETICS

- Basic concepts of thermodynamics and its laws, as applicable to living systems,
- Exergonic and endergonic reactions and coupled reactions, redox potential,
- High energy compounds,
- Enzymes of biological oxidation,
- Cytochromes.

BIOLOGICAL OXIDATION

- Components, complexes and functioning of the respiratory chain including inhibitors,
- Process and regulation of oxidative phosphorylation including uncouplers,
- Mechanisms of ATP synthesis and regulation,
- Mitochondrial transport systems and shuttles,
- Mitochondrial diseases.

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INTERMEDIARY METABOLISM AND INBORN ERROR OF METABOLISM

Metabolism of carbohydrates:

- Digestion and absorption including associated disorders,
- Glycolysis and TCA (Kreb's cycle), including regulation,
- Glycogen metabolism and its regulation,
- Cori cycle, gluconeogenesis,
- Metabolism of fructose and galactose and their clinical significance,
- Pentose phosphate /HMP shunt pathway and uronic acid pathways and their clinical significance,
- Polyol/sorbitol pathway,
- Regulation of blood glucose, hyperglycemia, hypoglycemia and their clinical significance,
- Glucose tolerance test and its interpretation,
- Diabetes mellitus – classification, pathogenesis, metabolic derangements and complications, diagnostic criteria and laboratory investigations, principles of treatment (including diet and lifestyle modification),
- Inborn errors and disorders of carbohydrate metabolism.

Metabolism of Lipids:

- Digestion and absorption and associated disorders,
- Metabolism of fatty acids, regulation and related disorders,
- Metabolism of eicosanoids and their clinical significance,
- Metabolism of triacylglycerol, storage and mobilization of fats,
- Metabolism of adipose tissue and its regulation,
- Metabolism of cholesterol including its transport and hypercholesterolemia,
- Metabolism of lipoproteins, atherosclerosis, fatty liver and lipid profile,
- Metabolism of methanol and ethanol,
- Role of liver in lipid metabolism,
- Metabolism of phospholipids and associated disorders,
- Metabolism of glycolipids and associated disorders,

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- Inborn errors of lipid metabolism.

Metabolism of amino acids and proteins:

- Digestion, absorption and associated disorders,
- Deamination, transamination, disposal of the amino group, catabolism of the carbon skeleton of amino acids,
- Formation and disposal of ammonia (including urea cycle) and related disorders, ammonia toxicity,
- Metabolism of individual amino acids and associated disorders,
- One carbon metabolism,
- Biogenic amines,
- Inborn errors of amino acid metabolism.

Metabolism of nucleotides:

- Metabolism of purines and pyrimidines and their associated disorders.

Metabolism of haem:

- Metabolism of haem and associated disorders.

Interorgan and intraorgan interrelationships and integration of metabolic pathways:

- Metabolic adaptation in starvation, diabetes mellitus, obesity, and during exercise.

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NUTRITION

- Calorific value, Basal Metabolic Rate (BMR), Specific dynamic action (SDA) of food.
- Nutritional importance of proximate principles of food including sources and RDA.
- Glycemic index.
- Biological value of proteins and nitrogen balance.
- Thermogenic effect of food.
- General nutritional requirements.
- Balanced diet, diet formulations in health and disease, mixed diet.
- Calculation of energy requirements and prescribing diet.
- Nutritional supplements and parenteral nutrition.
- Food toxins and additives.

- Disorders of nutrition, obesity, protein energy malnutrition, under-nutrition and laboratory diagnosis of nutritional disorders.
- National Nutrition Programme.

VITAMINS AND MINERALS

- Structure, functions, sources, RDA, and metabolism of vitamins and minerals and their associated disorders.

DETOXIFICATION AND METABOLISM OF XENOBIOTICS

FREE RADICALS AND ANTI-OXIDANT DEFENSE SYSTEMS

- Free radicals and anti-oxidant defense systems in the body.
- Associations of free radicals with disease processes.
- Oxygen toxicity.
- Oxidative stress markers in blood, urine, and other biological fluids.

Paper III:

Molecular biology, Molecular and genetic aspects of cancer, Immunology, and Environmental Biochemistry

MOLECULAR BIOLOGY

Structure and organization of chromosomes and chromatin re-modeling

DNA replication:

- DNA replication in prokaryotes and eukaryotes (including important differences between the two).
- End replication problem: Telomere, telomerase and their role in health and disease.
- DNA repair mechanisms and their associated disorders.
- Inhibitors of DNA replication and their clinical significance.
- DNA recombination.
- DNA protein interaction.

Transcription:

- Structure of a gene - exons and introns, promoter, enhancers/repressors and response

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elements.

- Process of transcription in prokaryotes and eukaryotes.
- Post-transcriptional modifications.
- Inhibitors of transcription.
- RNA editing and stability.

Genetic code, gene polymorphism, and mutation:

- Characteristics of the genetic code.
- Molecular basis of the degeneracy of the genetic code (Wobble hypothesis).
- Mutation and gene polymorphism.
- Mutagens- examples of physical, chemical, and biological mutagens.
- Types of mutations.
- Mutation in health and disease.

Translation:

- Basic structure of prokaryotic and eukaryotic ribosomes.
- Process of protein synthesis (translation) in prokaryotes and eukaryotes.
- Post-translational modifications.
- Protein sorting, protein targeting, protein folding and related disorders.
- Inhibitors of translation in prokaryotes and eukaryotes, and their clinical significance.

Regulation of gene expression in prokaryotes and eukaryotes

Recombinant DNA technology and its applications in modern medicine

Overview of human genome project

Basics of bioinformatics

Principles of human genetics:

- Alleles, genotypes and phenotypes.
- Patterns of inheritance: monogenic and polygenic inheritance.
- Population genetics.
- Genetic factors in causation of diseases.
- Types of genetic diseases: Chromosomal, monogenic and polygenic disorders,

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mitochondrial disorders, nucleotide repeat expansion disorders, imprinting disorders.

- Screening for genetic diseases and prenatal testing.
- Ethical and legal issues related to medical genetics.

Stem cells and regenerative medicine:

- Basic concepts regarding stem cells
- Types of stem cells: embryonic and induced pluripotent stem cells (IPSC)
- Application in regenerative medicine and disease therapeutics
- Ethical and legal issues related to use of stem cells in medicine.

MOLECULAR AND GENETIC ASPECTS OF CANCER

- Biochemical characteristics of a cancer cell
- Biochemistry of carcinogenesis
- Carcinogens
- Role of oncogenes and tumor suppressor genes
- Genetic alterations and adaptations in cancer
- Tumor markers, cancer risk assessment, and community screening
- Biochemical basis of cancer chemotherapy and drug resistance
- Anti-cancer therapy.

IMMUNOLOGY

- Organization and components of the immune system
- Innate and adaptive immunity- components and functions
- Antigens, immunogens, epitopes and haptens, carriers, adjuvants
- Immunoglobulin: structure, types, and functions
- Mechanism of antibody diversity: organization and expression of immunoglobulin genes, immunoglobulin gene rearrangement, class switching
- Humoral and cell-mediated immunity, regulation of immune responses, immune response to infections
- Major histocompatibility complex, antigen processing, and presentation
- Antigen-antibody interaction, immune effector mechanisms
- Complement system

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- Hypersensitivity reactions
- Tolerance, autoimmunity
- Immunodeficiency, immune unresponsiveness, and their clinical implications
- Vaccines
- Immunology of chronic diseases
- Transplantation immunology
- Immunodiagnostics and immunotherapy.

ENVIRONMENTAL BIOCHEMISTRY

Health and pollution

Effects of environmental pollutants on the body

Paper IV

Basic principles and practice of clinical biochemistry, Biochemical analytes, Assessment of organ system functions, and Recent advances in biochemistry

BASIC PRINCIPLES AND PRACTICE OF CLINICAL BIOCHEMISTRY

- Units of measurement, reagents, clinical laboratory supplies, basic separation techniques, laboratory calculations, specimen collection, transport and processing, safety in the laboratory,
- Essentials of clinical investigations in Biochemistry, the clinical utility of laboratory tests (including accuracy, precision, sensitivity, specificity, ROC curves, etc), analysis in the laboratory, and selection and evaluation of methods (including statistical techniques),
- Evidence-based laboratory medicine, establishment and use of reference values, pre-analytical, analytical, and post-analytical variables and biological variations, total quality management (TQM), clinical laboratory and hospital informatics, concepts and reporting of critical values.

BIOCHEMICAL ANALYTES

Biochemical analyses and their clinical significance:

- Amino acids, peptides and proteins; non-protein nitrogenous compounds
- Enzymes

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- Carbohydrates
- Lipids, lipoproteins and apolipoproteins and other cardiovascular risk markers
- Electrolytes
- Blood gases and pH
- Hormones
- Catecholamines, serotonin, and other neurotransmitters
- Vitamins, minerals, trace and toxic elements
- Hemoglobin, and bilirubin
- Porphyrins
- Bone markers
- Tumour markers.

Body fluid analysis

Stone analysis

Therapeutic drug monitoring

Clinical toxicology

Pharmacogenomics

Pediatric and geriatric biochemical investigations

- Biochemistry of aging

ASSESSMENT OF ORGAN SYSTEM FUNCTIONS

Hematopoietic disorders:

- Hemostasis and thrombosis-biochemical mechanism, related laboratory tests, antiplatelet therapy anticoagulant therapy, and fibrinolytic therapy
- Anemia- classification, etiology, laboratory investigations, and management
- Hemoglobinopathies - sickle cell anemia, methemoglobinemia, thalassemia syndromes
- RBC membrane, metabolism, inherited defects in RBC membrane, and enzymes
- ABO blood group system – the biochemical basis of incompatibility and transfusion

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biology

- Plasma cell disorders
- Other disorders of hematopoietic cells and their progenitors.

Endocrine system:

- Classification and general mechanism of action of hormones
- Biosynthesis, secretion, regulation, transport, and mode of action of hypothalamic peptides, adenohypophyseal and neurohypophyseal hormones, thyroid and parathyroid hormones, calcitonin, pancreatic hormones, adrenocortical and medullary hormones, gonadal hormones, gastrointestinal hormones, opioid peptides, parahormones
- Neuro-modulators and their mechanism of action and physiological significance
- Biochemical aspects of diagnosis and treatment of endocrinal disorders
- Endocrinology of conception, reproduction, and contraception
- Antenatal testing, newborn screening, and inborn errors of metabolism.

Cardiovascular system:

- Atherosclerosis - pathogenesis, risk factors, prevention and treatment
- Biochemistry of cardiac failure, acute coronary syndrome, cardiomyopathies, and cardiac arrhythmias
- Cardiac biomarkers.

Respiratory system:

- Pulmonary gaseous exchanges in health and disease
- Biochemistry of respiratory disorders.

Renal system:

- Biochemistry of kidney functions
- Pathophysiology, biochemistry, laboratory findings and management in acute and chronic kidney diseases
- Nephrolithiasis, biochemical aspects of renal stones
- Biochemistry of renal transplant.

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Gastrointestinal system:

- Biochemistry of gastric functions
- Regulatory peptides in the gut
- Digestion and absorption of nutrients, evaluation of malabsorption
- Biochemical aspects of- Peptic ulcer diseases, Zollinger-Ellison syndrome, Celiac disease, Inflammatory bowel disease, Protein losing enteropathy and Neuroendocrine tumors.

Hepato-biliary and pancreatic system:

- Biochemistry of hepato-biliary and pancreatic functions
- Formation, composition and functions of bile
- Pathophysiology, biochemistry, laboratory findings and management in acute and chronic hepato- biliary and pancreatic disorders.

Skeletal system:

- Bone structure**,** metabolism, associated disorders and markers
- Bone mineral homeostasis.

Nervous system:

- Neurotransmitters and their receptors
- Ion channels and channelopathies
- Neurotrophic factors
- Infective and inflammatory diseases of nervous system (meningitis, encephalitis etc.)
- Protein aggregation, neurodegeneration and related disorders (Alzheimer's disease, Parkinson's disease, Huntington's disease, and others)
- Prions and prion diseases
- Ischemic and hemorrhagic neuro disorders
- Neuro-immune disorders (Guillain-Barre syndrome, Myasthenia gravis, multiple sclerosis and others)
- Pathophysiology and biochemistry of psychiatric disorders
- ***Recent advances in Biochemistry.***

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B. Psychomotor Domain

The course contents are mentioned under Subject/domain-specific competencies.

TEACHING AND LEARNING METHODS

General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skill oriented. Learning in the program, essentially autonomous and self-directed, and emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the postgraduate (PG) courses shall work as full-time (junior) residents during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a logbook for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real-time.

Teaching-Learning methods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinical meetings, seminars, small group discussion, bed-side teaching, case-based learning, simulation-based teaching, self-directed learning, integrated learning, interdepartmental meetings and any other collaborative activity with the allied departments. Methods with exposure to the applied aspects of the subject relevant to basic/clinical sciences should also be used. **The suggested examples of teaching-learning methods are given below but are not limited to these. The frequency of various below-mentioned teaching-learning methods can vary based on the subject's requirements, competencies, workload, and overall working schedule in the concerned subject.**

A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures per year in the concerned PG department is suggested. Topics to be selected as per subject requirements.

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All postgraduate trainees will be required to attend these lectures. Lectures can cover topics such as:

1. Subject related important topics as per specialty requirement
2. Recent advances
3. Research methodology and biostatistics
4. Salient features of Undergraduate/Postgraduate medical curriculum
5. Teaching and assessment methodology.

Topic numbers 3,4,5 can be done during research methodology/biostatistics and medical education workshops in the institute.

B. Journal club: Minimum of once in 1-2 weeks is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once every 1-2 weeks is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive evidence-based review of the topic. The student should be graded by the faculty and peers.

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D. Student Symposium: Minimum of once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by the faculty and peers.

E. Laboratory work / Bedside clinics: Minimum-once every 1-2 weeks.

Laboratory work/Clinics/bedside teaching should be coordinated and guided by faculty from the department. Various methods like DOAP (Demonstrate, Observe, Assist, Perform),

simulations in skill lab, and case-based discussions etc. are to be used. Faculty from the department should participate in moderating the teaching-learning sessions during laboratory work.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main department and other department/s on topics of current/common interest or clinical cases.

G. a. Rotational clinical / community / institutional postings

Depending on local institutional policy and the subject specialty needs, postgraduate trainees may be posted in relevant departments/ units/ institutions. The aim would be to acquire more in-depth knowledge as applicable to the concerned specialty. Postings would be rotated between various units/departments and details to be included in the specialty-based Guidelines.

Suggested departments and duration of rotational postings:

- General Medicine - 1 month (includes Endocrinology, Pediatrics, and ICU posting)
    - ✓ Endocrinology [Focus: Clinical correlation and important investigations related to diabetes mellitus and other diseases, dietary advice, point-of-care testing]
    - ✓ ICU/ICCU [Focus: ABG analysis and correlation, electrolyte imbalances, cardiac biomarkers and correlation, markers of septicemia and its management, basics of ventilation]
    - ✓ Pediatrics [Focus: Inborn errors of metabolism and other common diseases, nutritional disorders, and dietary advice]
- Hematology - 15 days
- Immunohematology and blood transfusion (Transfusion Medicine)/Blood bank - 15 days
- Microbiology- 15 days
- Medical Education Unit (MEU) or Department of Medical Education (DOME) - one week/ shall attend a specific workshop or a training course [Focus:

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Principles of teaching-learning-assessment and other important aspects of Medical Education].

G.b. Posting under "District Residency Programme" (DRP):

All postgraduate students pursuing MD/MS in broad specialties in all Medical Colleges/Institutions shall undergo a compulsory rotation of three months in the District Hospital/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th or 5th semester of the Postgraduate program and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident".

Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted.The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists/clinicians in different hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

H. Teaching research skills

Writing a thesis should be used for inculcating research knowledge and skills. All postgraduate students shall conduct a research project of sufficient depth to be presented to the University as a postgraduate thesis under the supervision of an eligible faculty member of the department as a guide and one or more co-guides who may be from the same or other departments.

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In addition to the thesis project, every postgraduate trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be reinforced.

I. Training in teaching skills

MEU/DOME should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on the teaching skills of the student.

J. Log book

During the training period, the postgraduate student should maintain a logbook indicating the duration of the postings/work done in wards, OPDs, casualty, and other areas of the posting. This should indicate the procedures assisted and performed and the teaching sessions attended. The logbook entries must be done in real-time. The logbook is thus a record of various activities by the student like (1) Overall participation & performance, (2) attendance, (3) participation in sessions, (4) record of completion of pre-determined activities, and (5) acquisition of selected competencies.

The purpose of the logbook is to:

a) help maintain a record of the work done during training,
b) enable faculty/consultants to have direct information about the work done and intervene, if necessary,
c) provide feedback and assess the progress of learning with experience gained periodically.

The logbook should be used in the internal assessment of the student, and should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce a completed log book in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate

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from the Head of Department regarding the clinical competence and skillful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in the logbook particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and atleast two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty are referred to the NMC (Erstwhile MCI) Logbook Guidelines uploaded on the website.

K. **Course in Research Methodology**: All postgraduate students shall complete an online course in Research Methodology within six months of the commencement of the batch and generate the online certificate on successful completion of the course.

Other aspects

- The postgraduate trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The postgraduate trainees should undergo training in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS).
- The postgraduate trainees must undergo training in information technology and use of computers.

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learned initially on the models, and later to be performed under supervision followed by independent performance. For this purpose, the provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

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The assessment for postgraduate student in Biochemistry will be of two types; Formative and Summative

FORMATIVE ASSESSMENT

Formative assessment is the assessment conducted during the training with the primary purpose of providing feedback for improving learning. It should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning, and ability to practice in the system. The formative assessment will be used to determine the existing knowledge base and future needs, and identify priority areas.

General Principles

The Internal Assessment will include both theory and practical examination. It should be frequent, cover all domains of learning, and should be used to provide feedback to improve learning; it should also cover professionalism and communication skills.

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Formative assessment during the MD training should be based on:

- Case presentation/case work up : once a week
    - The student will present a case from ward/lab along with investigations done in the clinical laboratory
- Laboratory performance : once a week
    - The student will analyze an unknown sample on an autoanalyzer, starting with calibration, quality control of the machine, and then loading the sample. He/she will do the reporting and interpret the results and will be evaluated the next day.
    - He/she will be evaluated separately for practicals listed in the undergraduate syllabus.
    - He/she will be evaluated at the end of each postgraduate practical session as listed under the psychomotor domain.

- Journal club : once a quarter

- The student will present and critically evaluate an original research article. The article should be preferably from outside his/her area of work so that he/she can learn newer techniques. The focus should be on understanding the research question and evaluating whether appropriate study design, methodology, and statistical tools were used to find answers to the same.

- Seminar : once a fortnight
    - The student will present a topic from the syllabus and will try to research and include recent advances on that topic. He/she will also present recent advances (not included in the syllabus) periodically.
- Micro-teaching : Once a week
    - The teaching skills of the student will be evaluated. Special topics can be given, and the student will teach that topic to the evaluators or he/she may be evaluated during pre-practical briefing of undergraduate students.
- Interdepartmental case or seminar : once in 3 months
    - This should be organized at the institute level and appropriate vertical and horizontal integration should be ensured.

  Note: These sessions may be organized and recorded as an institutional activity for all postgraduates.
- AETCOM : Once in every six months
    - The postgraduate student can be evaluated during the AETCOM sessions of the undergraduates.
    - Case scenarios should be provided and the postgraduate will be asked to demonstrate how he/she will respond to the situation.

- Attendance at Scientific meetings, CME programmes (at least 02 each during the course)

The student is to be assessed periodically as per categories listed in the appropriate (non-clinical/clinical) postgraduate student appraisal form (Annexure I).

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SUMMATIVE ASSESSMENT, ie., assessment at the end of training to evaluate whether the student has acquired sufficient knowledge and skills to be awarded MD degree

Essential pre-requisites for appearing for examination include:

1. **Logbook** of work done during the training period including rotational postings, departmental presentations, and reports of the internal assessment conducted during the training period should be submitted.

2. At least **two presentations** at national-level conferences. One research paper should be under submission for publication/ accepted for publication/ published in an indexed journal**. (It is suggested that the local or University Review committee assess the work sent for publication).**

The summative examination would be carried out as per the rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the clinical and practical examination so that the answer books can be assessed and evaluated before the commencement of the clinical/practical and oral examination**.**

The postgraduate examination shall be in three parts**:**

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners**.**

2. **Theory examination**

   The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and certify post-graduate student's level of knowledge, skill, and competence at the end of the training, as given in the latest POSTGRADUATE MEDICAL

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EDUCATION REGULATIONS. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing the examination as a whole. The examination for M.D./ M.S shall be held at the end of the 3rd academic year.

There shall be four theory papers (as per PG Regulations):

Paper I:
Biomolecules, Principles of Biophysics and its biomedical importance, Cell biology, Fluid, electrolyte and acid-base balance, Analytical techniques, and instrumentation, Biostatistics and research methodology, Basics of medical education in teaching and assessment of Biochemistry.

Paper II:
Enzymes, Bioenergetics, Biological oxidation, Intermediary metabolism and inborn errors of metabolism, Nutrition, Vitamins and Minerals, Detoxification and metabolism of xenobiotics, Free radicals, and anti-oxidant defense systems

Paper III:
Molecular biology, Molecular and genetic aspects of cancer, Immunology, and Environmental Biochemistry

Paper IV:
Basic principles and practice of clinical biochemistry, Biochemical analytes, Assessment of organ system functions, and Recent advances in biochemistry

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3. Practical/clinical and Oral/viva voce examination

Practical examination

The practical examination should be spread over **two** days and include various major components of the syllabus focusing mainly on the psychomotor domain. One day should be for conducting practical examination including table viva that will focus on the nuances of laboratory techniques and quality assurance.

The practical examination should include:

1. One Clinical / Paper case: An unknown sample will be analyzed by the student, and he/she will have to prepare the report along with the interpretation of the same. It should include both serum and urine analysis.
2. One practical exercise on any molecular biology technique.

3. One practical exercise on immunology technique.
4. OSPE: It shall be conducted on various topics which have not been covered in the above-mentioned practical and should include, if possible, evaluation of AETCOM (Attitude, Ethics, and Communication) skills of the students.
5. Evaluation of laboratory management skills.

Oral/Viva voce examination on defined areas should be conducted by each examiner separately. The oral examination shall be comprehensive enough to test the postgraduate student's overall knowledge of the subject focusing on the psychomotor and affective domains.

The **Oral/Viva-voce examination shall be conducted on the second day and should include:**

1. Thesis presentation
   The ability of the student to justify the methodology, and findings with interpretation, should be evaluated.
2. Micro-teaching
   The essentials of classroom teaching skills should be evaluated.
3. Grand viva voce

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Recommended Reading:

Books (latest edition)

1. Lehninger Principles of Biochemistry, David L. Nelson, Michael M. Cox. W H Freeman & Co (Sd).
2. Biochemistry (Stryer), Jeremy M. Berg , John L. Tymoczko , Lubert Stryer, W. H. Freeman.
3. Biochemistry (Voet & Voet), Donald Voet , Judith G. Voet, John Wiley & Sons Inc.
4. Textbook of Biochemistry with Clinical Correlations, Thomas M. Devlin, John Wiley & Sons.
5. Kuby Immunology, Judy Owen, Jenni Punt , Sharon Stranford, W. H. Freeman.
6. Principles and Techniques of Biochemistry and Molecular Biology. Wilson/Walker; Cambridge University Press

7. Clinical Chemistry: Principles, Techniques, and Correlations, Michael L Bishop, Edward P Fody, Larry E Schoeff, Lippincott Williams and Wilkins.
8. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, Carl A. Burtis, Edward R. Ashwood , Saunders.
9. Harpers Illustrated Biochemistry, Victor W. Rodwell , David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil , McGraw-Hill Education / Medical.
10. Biochemistry (Lippincott's Illustrated Reviews), Denise R Ferrier, Lippincott Williams and Wilkins.
11. Harrison's Principles of Internal Medicine, Dennis L. Kasper, Anthony S. Fauci, Stephen L. Hauser, Dan L. Longo, J. Larry Jameson, Joseph Loscalzo, McGraw-Hill Education / Medical.
12. Davidson's Principles and Practice of Medicine, Walker, Elsevier Health Sciences – UK.
13. Clinical Biochemistry: Metabolic and Clinical Aspects, William J. Marshall & Márta Lapsley & Andrew Day & Ruth Ayling, Imprint - Churchill Livingstone.
14. Biochemistry: A Case-oriented Approach, Rex Montgomery, Thomas W. Conway, Arthur A. Spector, David Chappell, Mosby.
15. Interpretation of Diagnostic tests, Jacques Wallach, Lippincott Williams & Wilkins.

Journals

03-05 international Journals and 02 national (all indexed) journals.

Annexure 1



Student appraisal form for MD in Biochemistry

	Elements	Less than Satisfactory			Satisfactory			More than satisfactory			Comments
		1	2	3	4	5	6	7	8	9	
1	**Scholastic aptitude and learning**										
1.1	Has knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g Posters, publications etc)										
1.4	Documentation of acquisition of competence (eg Log book)										
1.5	Performance in work based assessments										
1.6	Self-directed Learning										
2	**Work related to training**										
2.1	Practical skills that are appropriate for the level of training										
2.2	Respect for processes and procedures in the work space										
2.3	Ability to work with other members of the team										
2.4	Participation and compliance with the quality										

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	improvement process at the work environment										
2.5	Ability to record and document work accurately and appropriate for level of training										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethically appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment pattern been discussed with the trainee?	Yes	No								
	If not explain.										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN COMMUNITY MEDICINE

Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

Community Medicine is an academic subject, a branch of Medicine which deals with promotion of health and prevention of diseases, involving people's participation, utilizing professional management skills. The Community Medicine specialist, will inculcate a holistic view of health and medical interventions primarily focused on Community Health/Population Health. Thus, he/she should be equipped with the knowledge, skills, competencies in primary, secondary & tertiary care, control and prevention of outbreaks/epidemics, community diagnosis, health needs assessment, epidemiological assessment, research and planning evidence-based health policies and programmes.

The Guidelines for teaching Community Medicine, therefore, should be designed to create a cadre of professionals who are competent to meaningfully contribute their expertise in planning, implementation, co-ordination, monitoring, evaluation of Primary Health Care Programs based on scientific evidence. The competencies must cover a wide spectrum of skills viz., technical, managerial, administrative, organizational skills, applied skills in Health Information Management, software application and soft skills of communication, motivation, decision-making, team building, training in scientific communication and medical writing.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies".

SUBJECT SPECIFIC OBJECTIVES

1. To create a skilled cadre of medical professionals having expertise in application of principles of Public Health, Community Medicine and applied epidemiology, contributing meaningfully in formulating National Health Policies & Programmes with a systems approach for overall human development.
2. To standardize the teaching & training approaches at post- graduate level, for Community Medicine

3. Research: To formulate research questions, do literature search, conduct study with an appropriate study design and study tool; conduct data collection and management, data analysis and report.

SUBJECT SPECIFIC COMPETENCIES

At the end of the course the student should be able to acquire the following competencies under the three domains, Cognitive, Affective and Psychomotor:

A. Cognitive domain (The student should be able to:)

1. Describe conceptual (and applied) understanding of Public Health, Community Medicine, clinical and disease-oriented approach, preventive approach & health promotion, disease control & promotion.
2. Have knowledge about communicable and non-communicable diseases, emerging and re-emerging diseases, their epidemiology, control and prevention.
3. Apply the principles of epidemiology, health research and Bio-statistics, application of qualitative research methods
4. Calculate Odds Ratio, Relative Risk, Attributable risk and other relevant health and morbidity indicators.
5. To describe nutritional problems of the country, role of nutrition in health and disease and to describe common nutritional disorders
6. Develop nutrition plan for an individual based on his requirements and with concerns to special situations if applicable
7. Plan comprehensive programme to address issue of malnutrition in a given area for a specific group
8. To describe the concept of Environmental Health and its various determinants.
9. Identify environmental health issues in a given area/community
10. Assess impact of adverse environmental conditions on health of human beings
11. Plan awareness programmes at various levels on environmental issues and mobilize community resources and participation to safeguard from local adverse environmental conditions
12. Should be able to provide technical advice for water purification, chlorination, installing gobar gas plant, construction of soakage pits etc.
13. Be a technical expert to advice on protection measures from adverse environmental exposure
14. To describe the working of Primary Health Care system, Panchayat Raj system, National Health Programmes, urban/rural differences, RCH, Demography and Family Welfare.
15. Do orientation of the inter-linkage of health sector and non-health sector for promotion of Health & control and prevention of diseases.
16. Have familiarity with administrative procedures and protocols
17. Have knowledge about role of media and its use in health.

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18. Have knowledge of Health Care Administration, Health Management and Public Health Leadership
19. To describe Health Policy planning, Medical Education technology, Information Technology and integration of alternative Health system including AYUSH.
20. To describe the intricacies of Social & Behavioral sciences and their applications.
21. To describe Public Health Legislations
22. To understand and describe International Health & Global Diseases surveillance.
23. To relate the history of symptoms with specific occupation, diagnostic criteria, preventive measures, identification of various hazards in a specific occupational environment and legislations.
24. To keep abreast of recent advances in Public Health & formulate feasible, optimal, sustainable, cost effective strategies in response to the advances in public health & development.
25. To describe the principles of Health Economics and apply it in various public health settings.
26. To explain and correlate common health problems (medical, social, environmental, economic, psychological) of urban slum dwellers, organization of health services in urban slum areas
27. Develop workable interventions for control and prevention of emerging and re-emerging diseases at local, national and global level.
28. Identify behavior pattern of individual or group of individuals detrimental or adversely affecting their health
29. Define and identify vulnerable, under-privileged high risk communities and their special needs
30. To create awareness about various public health laws
31. Evaluate cost effectiveness and cost benefits of a Health Program
32. Understand and express implications of 'Poverty Line', 'Social Inclusion', 'Equity', 'taxations', 'Insurance' on Health care management.
33. To categorize hospital waste and be able to guide for proper disposal.
34. To provide a comprehensive plan for disaster management and mitigation of sufferings.

B. Affective domain:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

A. C. Psychomotor domain: ((The student should be able to:)

The student should be able to perform independently the following :

- Conduct community surveys for assessment of health & morbidity profile, epidemiological determinants, assessment of health needs, disease surveillance, evaluation of health programmes and community diagnosis
- Conduct epidemic investigations, spot maps, predict disease trends, preparation of reports, planning and implementation of control measures
- Demonstrate clinical skills of preparing case history, examination, provisional diagnosis, treatment and clinical case management and interpretation of laboratory findings. Conduct common procedures such as incision, drainage, dressings & injections.
- Do data collection, compilation, tabular and graphical presentation, analysis and interpretation, applying appropriate statistical tests, using computer-based software application for validation of findings
- Conduct epidemiological research studies to establish cause-effect relationships in elaborating the epidemiology of diseases and health events
- Develop appropriate IEC Material, assessment of community communication needs, training skills, counseling skills, conduct Health Education Programmes in urban and rural settings
- Conduct dietary surveys, assessment of nutritional status, nutritive values of common food menus, detection of food adulterants, use of lactometer, recording and interpretation of growth and development charts.
- Use and apply various instruments and processes concerned with environmental health and biological waste management eg. waste collection, segregation and disposal as per protocols, needle-disposers, disinfection procedures. Also use of Dosi-meters, Kata / Globe Thermometer, Slings Psychrometer, Gobar Gas Plant, Soakage pit, Solar Energy, functioning of ILRs, Deep Freezers, Cold Boxes, Vaccine Carriers.
- identify different types of mosquitoes, detect vector breeding places and orientation of the methods of elimination of breeding places and placement of a mosquito-proof water tank.
- Conduct clinical screening of various diseases and organize community health camps involving community participation in urban and rural settings. Use of Snellen charts for vision, Ischiara's chart for colour blindness, tourniquet tests for dengue diagnosis in fever, BMI and other physical measurements of infants, children and adults etc., copper-T insertions and preparation of pap smear.
- Conduct tests for assessment of chlorine demand of water (Horrock's Apparatus), procedure of well-water and urban water-tank chlorination, assessment of chlorination levels, physical examination of water, methods domestic water purification, oriented in use of water filters.
- Prepare health project proposals with budgeting based on the project objectives.

Miscellaneous skills: (The student should be able to)

1. Devise appropriate health education messages for public health awareness using various health communications strategies.

2. Identify family level and community level interventions and facilitate the implementation of the same e.g. food hygiene, food storage, cooking demonstrations, community kitchen, kitchen garden, empowerment of women for promoting nutritional health etc.
3. Demonstrate counselling skills for family planning services.
4. Plan and execute BCC strategy for individuals.
5. Conduct measurement of occupational exposure to harmful influences.
6. Diagnose occupational hazards and undertake surveys to identify occupational exposures as and when necessary.
7. Elicit appropriate response at individual and community level to prevent occupational hazards including IEC activities at different levels.
8. Use modern IT applications especially internet & internet-based applications.

Syllabus

Course contents:

1. Conceptual (and applied) understanding of Public Health, Community Medicine, clinical disease-oriented approach, Preventive approach & Health promotion, disease control & promotion.

Learning objectives:

At the end of this course topic, the student should be able to:-

i. Understand and explain the concept & application and give suitable analogies/examples related to Public Health/Community Medicine (with differences), Disease-oriented v/s Preventive approach, health promotion disease control & prevention.
ii. Explain correlation between health and human development with analogies/ examples.
iii. Explain concept of Primordial, Primary, Secondary and Tertiary prevention with examples.
v. Evolutionary History and mile-stones in Public Health – National and International levels.

2. Communicable and Non-Communicable diseases, emerging and re-emerging diseases

Learning objectives:

At the end of this course, the student should be able to:-

i. Understand and explain Epidemiology of Communicable/Non-communicable diseases- its causes, precipitating factors, social & other non- health causes, mechanisms of transmission, signs/systems, management, control & prevention measures, related national Health Programmes & national Guidelines, Directives, special projects, if any.
ii. Explain application of Disease surveillance system in control of Communicable/Non-communicable diseases.
iii. Explain & undertake steps to investigate & control outbreaks, epidemics and take measures to prevent the same.
iv. Evolve prevention & control measures based on local & regional epidemiological funding, synchronizing with National guidelines.

3. Applied Epidemiology, Health research, Bio-statistics

Learning objectives:

At the end of this course, the student should be able to:-

i. Explain the concept & application of Epidemiology of Disease and Health giving suitable examples.

ii. Explain Epidemiological approach, the terms Distribution & Determinants, uses, types of Epidemiological studies, interpretation, merits/demerits and limitations, odds ratio, relative risk, attributable & population attributable risks, Hybrid designs (with examples), validity of Epidemiological Data and application in practice at field level.

iii. Explain Epidemiological Research methods, Research related protocols, Literature review, estimating sample size, data collection/ compilation/Analysis/ Research, interpretation.

iv. Develop Health interventional programs based on Epidemiological Finding & create evidence for Public Health action.

v. Understand difference between data, information & intelligence, types of data, survey methods, formulating questionnaires, interview schedule, data presentation types & analysis.

vi. Apply computer based software application for data designing, data management & collation analysis e.g. SPSS, Epi-info, MS office and other advanced versions.

4. Nutrition

Learning objectives:

At the end of this course, the student should be able to:-

i. Identify various nutritional problems in the region, state and country and contributing factors for the same, with due emphasis on ecology perspectives.

ii. Explain importance of various nutrients (including micronutrients) in health, their sources, requirements and problems associated with their deficiencies as well as over consumption.

iii. Plan balanced diet and dietary requirements of various age and sex groups.

iv. Dietary/nutritional concerns of vulnerable groups – young children, adolescents, ANC/PNC/Lactating mothers/senior citizens/individuals with various health problems e.g hypertension, diabetes, renal problems etc.

v. Classification of food, food additives, food fortification, food enrichment, food toxins and food adulteration.

vi. Explain Food production, Food hygiene and safety, food storage, food preparation, food wastage and feeding practices.

vii. Assessment of nutritional status of a community by adopting different methodologies.

viii. Nutritional supplementation, surveillance, education and rehabilitation.

ix. National programmes in nutrition and their evaluation

x. National nutrition policy.

5. Environmental health

Learning objectives:

At the end of this course, the student should be able to:-

i. Highlight importance of external environment (air, water, noise, radiation, temperature, ventilation, solid waste disposal, insects and vectors, domestic and country yard pests, industrial waste disposal etc. and its impact on ecology and human health.
ii. Elaborate on health issues related to housing, air, water, noise, radiation pollution i.e. size of problems, area and specific groups affected, measurement of pollution levels and health impact of the same, corrective measures
iii. Elaborate on requirements of water, water chlorination and household purification measures, measurement of chlorine demand, Break-point chlorination levels, water quality.
iv. Assessment of quality of water and air, control of air pollution
v. Explain environmental sanitation and control measures (including appropriate technologies) – modern methods of sewage disposal, mechanical ventilation, soakage pits, gobar gas plants, smokeless Chula, solar energy, rainwater harvesting, sewage water recycling plants at society level etc.
vi. Explain global warming and its health impact.
vii. Elaborate on forest reserves, social forestry and health
viii. Study vectors of medical importance and integrated control measures against them.
ix. Explain dynamics of transmission of vector borne diseases
x. Explain pest control measures
xi. Explain environmental health issues in urban and rural areas
xii. Understand functioning of public sector measures to safeguard environmental health e.g water purification plant
xiii. Explain Legislative measures for protection of environmental health

6. Primary Health Care System, Panchayat Raj, National Health Programmes including RCH, Demography & Family Welfare:

Learning Objectives

At the end of this course, the student should be able to:-

i. Explain the meaning of Primary Health Care with suitable analogies with reference to India, and be able to define the systems approach for implementation of Primary Health Care.
ii. Enumerate the elements, principles, population coverage norms, staff patterns, day to day activities, programme schedule, stakeholders at PHC level.
iii. Explain the scope and implications of 3-tier system of Primary Health Care.
iv. Understand functioning of Rural Panchayat Raj system of development and its co-relation with health.
v. Promote community participation in Primary Health Care programme and motivate various stakeholders for the same.
vi. Understand and comply with medico-legal procedures related to Primary Health Care activities.
vii. Integrate, coordinate both health and non-health sectors for implementing various national health programmes.

viii. Deliver the provisions of various health schemes to eligible be beneficiaries such as Janani Suraksha Yojana, Rashtriya Swasthya Beema Yojana, Rajiv Gandhi Jeevandayi Arogya Yojana etc.

ix. Impart training in health programmes for paramedical workers, lab technicians, community health volunteer's, interns and provide health education in the community.

x. Implement Public Health Skills for investigations and containment of outbreaks & epidemics.

xi. Understand history of evolution of public health, important milestones in the world and in India.

xii. Enumerate the various health committees established and their major recommendations since 1947-48 to till date.

7. Health Care Administration, Health Management and Public Health Leadership

Learning Objectives:

At the end of this course, the student should be able to:-

i. Explain the conceptual difference between Administration and Management, Power and Authority with reference to health care.

ii. Explain the role of fundamental principles of constitution, principles of Democracy and its correlation with health care administration.

iii. Explain the role of Bureaucracy, Technocracy, Political system, Judiciary, Media and people in health care administration.

iv. Explain and identify the key positions and their role in health administration at State, District, Taluka (Tehsil block) and village level.

v. Explain the frame work of health care system at State, District, Taluka & village level and understand the mechanism of coordination between bureaucrats, technocrats, political, judiciary and media at each of these levels.

vi. Enumerate functions of a manager, explain concepts of management and leadership styles, various management techniques, planning process, monitoring & evaluation skills.

vii. Should be sensitive to quality issues in health care management and comply with relevant quality management techniques.

viii. Formulate and manage team approach for implementing health programmes.

ix. Apply skills of effective human resource management and identify relevant roles, responsibilities and duties of functionaries.

x. Implement skills of motivation, communication, negotiation and conflict management at PHC level.

xi. Develop budgetary statements based on evidence of needs assessment and be able to maintain account of expenditure as per norms.

xii. Undertake community health needs survey, conduct training & communication needs assessment of paramedical and health workers, identify vulnerable, underprivileged communities, implements high risk approach.

8. Health Policy, Medical Education, Integrating Alternative system of Medicine

Learning Objectives

At the end of this course, the student should be able to:-

i. Understand and elaborate implications of the policy provision with reference to the current health scenario in the country.
ii. Explain the role of health policy in promotion of Primary Health care, ensuring equity, inter-sectoral co-ordination, appropriate technology and community participation.
iii. Explain the various provisions for promotion of preventive and curative health services including National Health Mission, National Health Programs, Quality Hospital based services, Medical Education and AYUSH.
iv. Critically appreciate merits and demerits of the Health Policy.
v. Explain SWOT analysis of the policy and debate on evidence based recommendations, additions, deletions.
vi. Debate on suggestions or recommendations for future inclusions.

9. Social and behavioral sciences

Learning objectives:

At the end of this course, the student should be able to:-

i. Understand influence of social and behavioral practices on health.
ii. Understand principles of behavior change of an individual and community. Clearly understand difference between knowledge, attitude and practices..
iii. Understand importance of social medicine and health.
iv. Importance of behavior change communication (BCC).
v. Socio-cultural factors influencing behavior change.
vi. Formal and informal organizations in the community.
vii. Influence of peer pressure.
viii. Know the health problems, where BCC interventions are necessary.
ix. Understand factors promoting and detrimental to BCC.

11. Public Health Legislations

Learning objectives:

At the end of this course, the student should be able to:-

i. Explain public health legislations and need for the same.
ii. Know in detail each public health law – when, why, implementation, impact, issues etc.
iii. Enforcement of various public health laws.
iv. Judiciary mechanism for ensuring proper implementation of public health laws.
v. Scope for integrated approach for implementation of public health laws.

12. International Health

Learning Objectives:

At the end of this course, the student should be able to:-

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i. Understand the need and scope for international health measures.
ii. Enlist and understand functioning of various UN agencies (including WHO) playing key role in international health.
iii. Enlist and understand functioning of bilateral vs multilateral international donor agencies.
iv. Provide advice to international travelers and vaccination requirements,
v. Understand International health control measures e.g. quarantine, airport management etc.
vi. Understand the management of international ports from health perspectives.

13. Occupational Health

Learning Objectives:

At the end of this course, the student should be able to:-

i. Understand the concept of occupational health and its importance, Occupational environment and work dynamics.
ii. Know different types of occupational exposures at various settings.
iii. Enlist various occupational hazards and their relative magnitude.
iv. Understand measurement of exposure levels to harmful influences during occupation.
v. Understand preventive and control measures against various occupational hazards – global, national and local level measures.
vi. Understand individual and community responses towards preventing exposure to occupational hazards.
vii. Understand and advise occupational safety measures.
viii. Understand legislative measures to prevent exposures to occupational hazards.
ix. Advise compensation provisions to persons exposed to various occupational hazards.
x. Understand occupational health problems amongst people in unorganized sector
xi. Understand and advise social security and welfare provisions for workers – ESIS, Factory's Act, Role of ILO, Ministry of Labor, DGFASLI.

14. The recent advances in Public Health & miscellaneous issues

Learning Objectives:

At the end of this course, the student should be able to:-

i. identify & enlist events at local, district, national & global levels influencing or adversely affecting health /medical issues of the population.
ii. Adopt & practise skills related to utilization of modern technology, software, IT application in the interest of health promotion & disease prevention.

15. Health Economics

Learning Objectives:

At the end of this course, the student should be able to: -

i. Describe the scope of health economics.

ii. Understand health market & its characteristics.
iii. Understand & apply economic evaluation techniques.
iv. Assess the mechanism of Funding Health Care services, especially health insurance.
v. Advise on alocation of resources appropriately in their work area.

TEACHING AND LEARNING METHODS

Teaching methodology

The following is a rough guideline to various teaching/learning activities that may be employed:

- **Journal Club :** Critical appreciation and discussion of research articles in indexed journals
- **Seminar**
- **Lecture/Discussion :** Lectures on newer topics by faculty
- **Case presentation :** Communicable disease case presentation (focus on epidemiology, control, prevention) or Family case (focus on health needs assessment, SWOT analysis of family, social determinants and social empowerment, community management, role of primary health care and mobilizing resources for empowerment of the family). PG students will present the cases in presence faculty and discuss various modalities of management.
- **Public Health Management training** in Immunization clinics, Disease Surveillance Units, General Preventive OPD, hands-on training in management of national health programs at urban health centre and rural health centre along with orientation in health administrative system.
- The PG student shall be required to participate in the teaching and training programme of Undergraduate students and interns.
- The PG student must have attended Mandatory training in Research Methodology during his tenure.
- A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- Special Seminars / Workshops: conducted by External Faculty on cross-cutting subjects directly or indirectly concerned with Health. eg. Critical appreciation of National Developmental Budget, delivered by prominent Economist.
- **Log Book:** Postgraduate students shall maintain a log book of the work carried out by them and the training programme undergone during the period of training including details of work experience during their postings, including programs implemented under supervision and those performed independently. The log book shall be checked and assessed periodically by the faculty members imparting the training.
- Department should encourage e-learning activities.
- **Postings are given below:**

Recommended schedule for three years training:

Orientation Training/Field postings
for students of MD Community Medicine

No.	Field Posting and work	Duration
01	Posting at Sub-centers & PHCs Under & at RHTC and UHTC attached to Dept of Community Medicine as per MCI norm	Total period of ONE year during the 3 year period of PG course. Posting at RHTC should be residential.
02	Posting in the teaching hospital for exposure to clinical departments namely Pediatrics, OBGY & General medicine to acquire clinical skills for diagnosis and management of Communicable and Non-Communicable Diseases	Total - One month General Medicine-2 wks Pediatrics -1 wk Ob. & Gy. -1 wk Time of posting shall be at the discretion of local feasibility
03	Work attachment to gain hands- on skills based, training in public health department & orientation in Health Administration and Management of various National Health Programmes and aspects of public health management at the offices of the DHO/DHS/THO/DTO/DMO/CDPO/MOH of Local Civic Body or district health authorities.	Total - One month Place & time of 2 postings of 2 wks each shall be at discretion of local feasibility.
04	Short duration posting in various camps, melas, public health emergencies, investigation of epidemics, implementation of NHP, linen dept of hospital, Hospital kitchen, Hospital record section, central drug store, Medical Supdt. Office, blood bank, casualty dept., CCL, Hospital waste management, ART-VCTC, Matron Office (HRD), HMIS etc.	Total - one month Minimum of four postings of 1wk duration each shall be done subject to local feasibility.
05	Visits to various institutions of Public Health Importance	Subject to local feasibility

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., during the training may be as follows:

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

Quarterly assessment during the MD training should be based on:

1. Journal based / recent advances learning

2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., at the end of training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The examination shall be in three parts:

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. **Theory Examination:**

The Post Graduate examination shall be in three parts: -

1. **Thesis:** It should be submitted to the University by each post graduate student at least 6 months before the theory and clinical/practical examination. The thesis shall be examined by a minimum of three examiners, one internal and two external examiners, appointed by the university and who shall not be the examiners for theory and practical. A post graduate student shall be allowed to appear for the theory and practical/clinical examination only after the acceptance of the thesis by two examiners.

2. **Theory**:

   The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student 's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period**.**

   There shall be four theory papers as follows:

   Paper I : Conceptual (and applied) understanding of Public Health, Community Medicine, Communicable and Non- Communicable diseases, emerging and re-emerging diseases, Applied Epidemiology, Health research, Bio-statistics.

Paper II: Nutrition, Environmental Health, Primary Health Care system, Panchayat Raj system, National health Programs, RCH, Demography and Family Welfare, Health Care Administration, Health Management and Public Health Leadership.

Paper III: Social & Behavioral sciences- applied aspects, Scientific communications & Medical writing, Research Methodology, Public Health Legislations, International Health & Global Diseases surveillance.

Paper IV: Health Policy planning, Medical Education technology, Information Technology, Integration of alternative Health system including AYUSH, Occupational Health, Recent advances in Public Health & Miscellaneous issues, Health Economics.

Practical/Clinical and oral examination:

The practical examination should be conducted over two days, not more than 8 post graduate students per batch, per day as follows :

1. **One long Family case from the community**:

   Socio-economic, demographic, cultural and holistic history taking, of the family to understand the various risk factors affecting health and quality of life, assessment of social support system, assessment of present morbidity and its implications, evolve interventions for medical relief and social empowerment and role of family, community and primary health care system in resolving family issues. This shall be conducted preferably in the community setting.

2. **One long Case (30 minutes), 2 short cases (20 minutes each) – Cases with Communicable Diseases**

   Students will elaborate on clinico-epidemiological case history to assess the epidemiological factors, precipitating factors, probable source of infection and evolve measures for diagnosis, treatment, management with reference to the case as well as major public health concerns, i.e. Control, prevention of the diagnosed disease and interventions in case of eminent outbreak / epidemic situations. Short cases may be assessed without presentation of detailed history, beginning with Differential Diagnosis in the given time.

3. **Epidemiology and Statistics problem-solving exercises (5):**
   (Epidemiological – 3, Statistical – 2)

4. **Public Health Spots (5) :** including interpretation of analytical reports of water, food, environmental assessment and public health micro-biology

5. **Viva-voce Examination**

   Oral/ Viva-Voce Examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject.

Recommended reading:

A. Books (latest edition)

1. *Public Health and Preventive Medicine* (Maxcy-Rosenau-Last Public Health and Preventive Medicine) by Robert B. Wallace
2. *Basic Epidemiology*. R Bonita, R Beaglehole, T Kjellstrom. World Health Organization Geneva.
3. *Epidemiology,* by Leon Gordis.
4. *Oxford Textbook of Public Health.* Holland W, Detel R, Know G.
5. *Practical Epidemiology*, by D.J.P Barker
6. *Park's Textbook of Preventive and Social Medicine*, by K.Park
7. *Principles of Medical Statistics,* by A. Bradford Hill
8. *Interpretation and Uses of Medical Statistics,* by Leslie E Daly, Geoffrey J Bourke, James MC Gilvray.
9. *Epidemiology, Principles and Methods*, by B. MacMahon, D. Trichopoulos
10. *Hunter's Diseases of Occupations*, by Donald Hunter, PAB Raffle, PH Adams, Peter J. Baxter, WR Lee.
11. *Epidemiology and Management for Health Care,*, by Sathe PV and Doke PP.
12. *Vaccines*, by Stanley A. Plotkin.
13. All reports and documents related to all National Programmes from the Ministry of Health and Family Welfare.

B. Journals

03-05 international Journals and 02 national (all indexed) journals

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Annexure I

Postgraduate Students Appraisal Form

Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____

_____

_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

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COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN DERMATOLOGY, VENEREOLOGY & LEPROSY

Preamble:

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

A post graduate specialist having undergone the required training should be able to recognize the health needs of community, should be competent to handle effectively the medical problems and aware of recent advances pertaining to the discipline. The PG student should acquire basic skills in teaching medical/para-medical students. The student should be able to counsel patients and relatives in infectious diseases like HIV/AIDS, STDs, cutaneous tuberculosis, leprosy and any event of serious illness or death.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC OBJECTIVES

At the end of 3 years of post graduate training in Dermatology, Venereology & Leprosy:

- Student should have knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology and Pharmacology) as applied to dermatology. The student should acquire in-depth knowledge of his subject including recent advances. The student should be fully conversant with the bedside procedures (diagnostic and therapeutic) and having knowledge of latest diagnostics and therapeutics available.
- Student should have acquired practical and procedural skills related to the subject.
- Critically evaluate, initiate investigation and clinically manage cases in Dermatology, Venereology and Leprosy with the help of relevant investigations.

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- Should plan and advise measures for the prevention and rehabilitation of patients with various dermatological conditions.
- Able to ensure the implementation of National Health Programmes, particularly in sexually transmitted diseases (STD) and leprosy.
- Acquire training skills in research methodology, professionalism, attitude and communication skills, as below:
    - Student must know basic concepts of research methodology, plan a research project, consult library and online resources, has basic knowledge of statistics and can evaluate published studies.
    - Should be able to practice the specialty of dermatology ethically.
    - Recognize the health needs of patients and carry out professional obligations in keeping with principles of National Health Policy and professional ethics.
- Teaching skills in the subject
    - Student should learn the basic methodology of teaching and develop competence in teaching medical/paramedical students.
- Should have acquired Problem Solving skills

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. Cognitive domain

At the end of the course, the student should have acquired following theoretical competencies:

- Describe structure, functions and development of human skin.
- Describe ultrastructural aspects of epidermis, epidermal appendages, dermo-epidermal junction, dermis, and sub-cutis.
- Describe basic pathologic patterns and reactions of skin.
- Demonstrate the knowledge of common laboratory stains and procedures used in the histopathologic diagnosis of skin diseases and special techniques such as immunofluorescence, immunoperoxidase and other related techniques.
- Describe the basics of cutaneous bacteriology, mycology, virology, parasitology and host resistance.
- Describe papulosqamous and vesiculobullous disorders.
- Describe disorders of epidermal appendages and related disorders.
- Describe inflammatory and neoplastic disorders of dermis.
- Describe skin lesions in nutritional, metabolic and heritable disorders.

- Describe pharmacokinetics and principles of topical and systemic therapy.
- Describe drug reaction, its diagnosis and management.
- Describe cutaneous manifestations of systemic disorders.
- Describe anatomy of male and female genitalia, epidemiological transmission, clinical aspects and management of STDs and HIV.
- Describe clinical features, reactions, treatment and rehabilitation in leprosy.
- Describe etiology, pathophysiology, principles of diagnosis and management of common problems in dermatology including emergencies in adults and children.
- Describe indications and methods for fluid and electrolyte replacement therapy including blood transfusion in dermatological conditions.
- Describe common dermatological malignancies in the country and their management including prevention.
- Should be expert in evaluation of ECG, chest X-ray (CXR), biochemical, haematology and immunology reports related to dermatology.
- Acquire knowledge of common laboratory stains and procedures used in the histopathologic diagnosis of skin diseases and special techniques such as immuno-fluorescence, immuno-peroxidase and other related techniques.
- Acquire knowledge of the basics of laser operation and precautions which needs to be taken.
- Demonstrate competence in basic concepts of research methodology and interpretation of data in medical literature/publications.
- Skilled as a self-directed learner, recognize continuing educational needs; use appropriate learning resources and critically analyze relevant published literature in order to practice evidence-based dermatology;
- Should also have a broad idea how to approach an uncommon dermatological disease.

B. Affective Domain

At the end of the course, the student should have acquired the following attitudinal competencies:

- Demonstrate self-awareness and personal development in routine conduct.
- **Behavior and Emotional Stability:** Dependable, disciplined, dedicated, stable in emergency situations and shows positive approach.
- **Motivation and Initiative:** Is innovative, enterprising,does not shirk duties or leave any work pending and motivates team members.
- **Honesty and Integrity:** Is truthful, admits mistakes, does not cook up information, has ethical conduct and exhibits good moral values.
- **Interpersonal Skills and Leadership Quality:** Has compassionate attitude towards patients and attendants, gets on well with colleagues and paramedical staff, is respectful to seniors, has good communication skills.

- Should be able to maintain confidentiality with regards to history, physical examination and management of patients.
- Identify social, economic, environmental, biological and emotional determinants of patients, and institute diagnostic, therapeutic, rehabilitative, preventive and promotive measures to provide holistic care to patients at individual and community level against skin, venereal disease and leprosy.
- Recognize the emotional and behavioral characteristics of patients and keep these fundamental attributes in focus while dealing with them.
- Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities.
- Demonstrate communication skills of a high order in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities.
- Organize and supervise the desired managerial and leadership skills.
- Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
- Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.

C. Psychomotor Domain

A student at the end of training of 3 years of MD programme, must acquire the following practical skills:

- General medical skills as learnt in MBBS to be maintained:
    - Should be able to provide basic life support (BLS).
    - Should be expert in blood pressure measurement, intravenous access, blood sampling, fluid electrolytes therapy, plerual and cerebrospinal; fluid (CSF) fluid examination.
    - Should be able to provide basic and advanced life-saving support services in emergency situations.
    - Should be able to undertake complete monitoring of the patient and identify social, economic, environmental and emotional determinants in a given case and take them into account for planning therapeutic measures.
- Recognize conditions that may be outside the area of his specialty/competence and refer them to the proper specialist.

Dermatology, Venereology and Leprosy, HIV/AIDS Skills

The student should:

- Acquire skills in history taking, physical examination, diagnosis and management of patients in dermatology, venereology and leprosy.
- Be able to identify, classify and differentiate cutaneous findings in dermatological terms in a systematic way.
- Be able to perform systemic examination (chest, cardiac, abdomen, neurological, genitals, oral, eye and gynaecological examination) relevant to dermatologic condition.
- Be competent to manage dermatologic emergencies like angioedema, toxic epidernmal necrolysis (TEN), Stevens-Johnson syndrome (SJS), pemphigus, drug reaction and necrotic erythema nodosum leprosum (ENL).
- Be able to plan and deliver comprehensive treatment for diseases using principles of rational drug therapy.
- Be able to plan and advice measures for the prevention of infectious disease.
- Be able to plan rehabilitation of patient suffering from chronic illness and disability and those with special needs like leprosy.
- Demonstrate skills in documentation of case details and of morbidity/mortality data relevant to the assigned situation.

Laboratory Skills

The student:

- Should be able to perform common laboratory procedures like potassium hydroxide (KOH) mount, Gram stain, Giemsa stain, acid fast bacilli (AFB) stain, Woods lamp examination, stains,culture media etc. related to the cutaneous diagnosis independently.
- Should be able to order relevant investigations and interpret them to reach to a diagnosis.
- Should be familiar with other recent investigations.

Dermatopathology - Student should be competent enough to:

- To interpret histopathology of common skin diseases.
- To diagnose common skin diseases by examining slides under microscope.

Surgery in dermatology

At the end of training following skills should be performed independently by the student:

1. Should able to give incisions, take stitches and sutures.
2. Should be trained in taking skin biopsy and nail biopsy.
3. Should be able to perform chemical peels, manual dermabrasion, skin punch grafting and wound dressing independently.

4. Should be able to perform cryosurgery, nail surgery and acne surgery.
5. Able to perform chemical cauterization, cryotherapy, patch and photopatch test, slit smears and tissue smears.

Venereology

1. Should be competent in the clinical approach to the patient of STDs and HIV/AIDS.
2. Should be able to interpret the histopathological diagnosis including laboratory aids related with venereology.
3. Able to perform dark ground illumination, gram stain, Bubo aspiration and tissue smear.
4. Able to manage the patient according to syndromic approach for treatment of STDs.

Leprosy

The student should be:

1. Able to diagnose and approach the case of leprosy.
2. Perform AFB smear.
3. Able to manage cases of lepra reaction.
4. Identify, judge and decide when to refer the patients at appropriate level for surgery or rehabilitation.Should able to manage pediatric cases with skin diseases.

Syllabus

Course contents

Topics related to allied basic sciences

- The structure, functions and development of human skin.
- Ultrastructural aspects of epidermis, epidermal appendages, dermo-epidermal junction, dermis, and sub-cutis.
- Immunology, molecular biology and genetics in relation to the skin.
- Epidermal cell kinetics and keratinization.
- Lipids of epidermis and sebaceous glands.
- Percutaneous absorption.
- Skin as an organ of protection and thermoregulation.
- Biology of eccrine and apocrine sweat glands.
- Biology of melanocytes and melanin formation.
- Biology of hair follicles, sebaceous glands and nails.
- Epidermal proteins.
- Dermal connective tissue: collagen, elastin, reticulin, basement membrane and ground substance.
- Metabolism of carbohydrates, proteins, fats and steroids by the skin.
- Cutaneous vasculature and vascular reactions.

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- Mechanism of cutaneous wound healing.
- Cellular and molecular biology of cutaneous inflammation and arachidonic acid metabolism.
- Immunologic aspects of epidermis.
- Human leukocyte antigen (HLA) system.
- Immunoglobulins.
- Cytokines and chemokines.
- Lymphocytes, neutrophils, eosinophils, basophils and mast cells.
- Complement system.
- Hypersensitivity and allergy.
- Cutaneous carcinogenesis (chemical, viral and radiation).
- Basics of cutaneous bacteriology, mycology, virology, parasitology and host resistance.
- Common laboratory procedures, stains,culture media etc. related to the cutaneous diagnosis.
- Basic pathologic patterns and reactions of skin.
- Common laboratory stains and procedures used in the histopathologic diagnosis of skin diseases and special techniques such as immunofluorescence, immunoperoxidase and other related techniques**.**

Clinical dermatology

- Epidemiology of cutaneous disease.
- Psychologic aspects of skin disease and psycho-cutaneous disorders.
- Pathophysiology and clinical aspects of pruritus.

Papulosquamous diseases

- Psoriasis, pityriasis rubra pilaris, pityriasis rosea.
- Parapsoriasis, lichen planus, lichen niditus.
- Palmo-plantar keratodermas, Darier’s disease, porokeratosis.
- Ichthyoses and ichthyosiform dermatoses.
- Kyrle’s disease and other perforating disorders.

Vesiculo - bullous disorders

- Erythema multiforme, Stevens-Johnson syndrome, Toxic epidermal necrolysis.
- Bullous pemphigoid, Pemphigus.
- Chronic bullous disease of childhood.
- Herpes gestationis (pemphigoid gestationis).
- Hereditary epidermolysis bullosa.
- Epidermolysis bullosa acquisita.
- Dermatitis herpetiformis.
- Familial benign pemphigus.

- Subcorneal pustular dermatoses.
- Pustular eruptions of palms and soles.

Disorders of epidermal appendages and related disorders

- Disorders of hair and nails.
- Disorders of sebaceous glands.
- Rosacea, Perioral dermatitis, acne.
- Disorders of eccrine and apocrine sweat glands.
- Follicular syndromes with inflammation and atrophy.

Epidermal and appendageal tumours

- Precancerous lesions, squamous cell carcinoma and basal cell carcinoma
- Keratoacanthoma, benign epithelial tumours, appendageal tumours
- Merkel cell carcinoma, Paget's disease

Disorders of melanocytes

- Disorders of pigmentation, albinism, benign neoplasia and hyperplasias of melanocytes, dysplastic melanocytic nevi, cutaneous malignant melanoma.

Inflammatory and neoplastic disorders of the dermis

- Acute febrile neutrophilic dermatosis (Sweet's syndrome)
- Erythema elevatum diutinum
- Cutaneous eosinophilic diseases
- Granuloma faciale
- Pyoderma grangrenosum
- Erythema annulare centrifugum and other figurate erythemas
- Granuloma annulare
- Malignant atrophic papulosis (Dego's Disease)
- Neoplasms, pseudoneoplasms and hyperplasias of the dermis
- Vascular anomalies
- Kaposi's Sarcoma
- Anetoderma and other atrophic disorders of the skin
- Ainhum and pseudoainhum
- Neoplasias and hyperplasias of neural and muscular origin
- Elastosis perforans serpiginosa and reactive perforating collagenosis

Lmphomas, pseudolymphomas and related conditions

Disorders of subcutaneous tissue

- Panniculitis

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- Lipodystrophy
- Neoplasms of the subcutaneous fat

Disorders of the mucocutaneous integument

- Biology and disorders of the oral mucosa
- Disorders of the anogenitalia of males and females

Cutaneous changes in disorders of altered reactivity

- Genetic immunodeficiency diseases
- Urticaria and Angioedema
- Disorders associated with complement abnormalities
- Graft-versus-host Disease
- Muco-cutaneous manifestations in immunosuppressed host other than HIV-infection
- Contact dermatitis
- Auto-sensitization dermatitis
- Atopic dermatitis (atopic eczema)
- Nummular eczematous dermatitis
- Seborrhoeic dermatitis
- Vesicular palmoplantar eczema

Skin changes due to mechanical and physical factors

- Occupational skin disease
- Radiobiology of the skin
- Skin problems in amputee
- Sports dermatology
- Skin problems in war field
- Decubitus ulcers

Photomedicine, photobiology and photo immunology in relation to skin

- Acute and chronic effects of ultraviolet radiation and sun light on the skin
- Narrow-band ultraviolet B (NBUVB) therapy, phototherapy, photochemotherapy

Disorders due to drugs and chemical agents

- Cutaneous reactions to drugs
- Mucocutaneous complications of anti-neoplastic therapy
- Cutaneous manifestations of drug abuse

Dermatology and the ages of man

- Neonatal dermatological problems
- Pediatric and adolescent dermatological problems

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- Ageing of skin
- Geriatric dermatological problems

Skin lesions in nutritional metabolic and heritable disorders

- Cutaneous changes in nutritional disease
- Acrodermatitis enteropathica and other zinc deficiency disorders
- Cutaneous changes in errors of amino acid metabolism: Tyrosinemia II, phenylketonuria, arginine succinic aciduria, and alkaptonuria
- Amyloidosis of the skin
- The porphyrias
- Xanthomatosis and lipoprotein disorders
- Fobry's Disease; galactosidase - a deficiency (Angiokeratoma corporis diffusum universale)
- Lipid proteinosis
- Cutaneous mineralisation and ossification
- Heritable disorders of connective tissue with skin changes
- Heritable disease with increased sensitivity to cellular injury
- Basal cell Naevus syndrome

Skin manifestations of hematologic disorders

- Skin changes in hematological disease
- Langerhans cell and other cutaneous histiocytoses
- The Mastocytosis syndrome

Skin manifestations of systemic disease

- The skin and disorders of the alimentary tract
- The hepatobiliary system and the skin
- Cutaneous changes in renal disorders, cardiovascular, pulmonary disorders and endocrinal disorders
- Skin changes and diseases in pregnancy
- Skin changes in the flushing disorders and the carcinoid syndrome

Skin manifestations of rheumatologic disease

- Lupus Erythematosus
- Dermatomyositis
- Scleroderma
- Systemic Necrotizing Arteritis
- Cutaneous Necrotising venulitis
- Cryoglobulinemia and Cryofibrinogenemia
- Relapsing Polychondritis
- Rheumatoid Arthritis, Rheumatic Fever and Gout

- Sjogren's syndrome
- Raynaud's phenomenon
- Reiter's syndrome
- Multicentric Reticulohisticytosis

Cutaneous manifestations of disease in other organ systems

- Sarcoidosis of the skin
- Cutaneous manifestations of Internal Malignancy
- Acanthosis Nigricans
- Scleredema
- Papular Mucinosis
- Neurocutaneous disease
- Tuberous Sclerosis Complex
- The Neurofibromatosis
- Ataxia Telangiectasia
- Behcet's disease

Bacterial diseases with cutaneous involvement

- General considerations of bacterial diseases
- Pyodermas: Staphylococcus aureus, Streptococcus, and others
- Staphylococcal Scalded-Skin syndrome
- Soft Tissue Infections: Erysipelas, Cellulitis, Septicemia and Gangrenous Cellulitis
- Gram-Negative Coccal and bacillary infections
- Bartonellosis
- Miscellaneous bacterial infections with cutaneous manifestations
- Tuberculosis and other myopacterial infections
- Actinomycosis, Necardiosis, and Actinomycetoma
- Lyme Borreliosis
- Kawasaki Disease

Fungal diseases with cutaneous involvement

- Superficial fungal infection: Dermatophytosis, Tinea Nigra, Piedra
- Yeast Infections: Candidiasis, Pitryiasis (Tinea) Versicolor
- Deep Fungal Infections

Viral and ricketisial disease

- Viral Diseases: general consideration
- Rubella (German Measles)
- Measles
- Hand, Foot and Mouth Disease
- Herpangina

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- Erythema Infectiosum and Parvovirus B 19 infection
- Herpes simplex
- Varicella and Herpes Zoster
- Cytomegalovirus Infection
- Epstein - Barr Virus Infections
- Human Herpes virus 6 & 7 infections and Exanthem subitum (Roseola Infantum or Sixth Disease)
- Smallpox and Complications of small pox vaccination
- Contagious Pustular Dermatitis, Contagious Ecthyma: Orf virus infection
- Milluscum Contagiosum
- Miller's Nodules
- Warts
- Human Retroviral Disease: Human T-Lymphotropic Virusviruses

Therapeutics

Topical therapy

- Pharmacokinetics principles intopical applications of drugs.
- Principles of topical therapy.

Topical agents

- Glucocorticoids, Acne therapies, Analgesics, Anesthetics, Anti-inflammatory, Anti hair loss, Anti-microbial, Anti-parasitic, Anti-perspirants, Anti-pruritic, Anti-viral, Astringents, Bleaching agents, Keratolytics, Psoriasis therapies, Wart therapies, Topical Retinoids, Topical Antibiotics, Topical Anti-fungal Agents, Sun-protective Agents, Keratolytic Agents, Topical Cytotoxic Agents, Cosmetics and Skin care in practice.

Systemic therapy

- Systemic glucocorticoids, Sulfones, Aminoquinolines, Cytotoxic and Antimetabolic Agents, Oral Retinoids, Antihistamines, Antibiotics, Antiviral Drugs, Oral Antifungal Agents, Immunosuppressive and Immunomodulatory drugs, Thalidomide, photo-chemotherapy and photo-therpay, electric cautery, cryotherapy, electrolysis, tattooing, intra-lesional injections etc.

Surgery in dermatology

- Dermatologic Surgery: Introduction and Approach
- Skin Resurfacing: Chemical Peels
- Skin Resurfacing: Dermabrasion
- Skin Resurfacing: Laser
- Skin punch grafting
- Wound Dressings
- Cryosurgery

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- Nail Surgery

Venereology

- Clinical approach to the patient of sexually transmitted disease
- Anatomy of male and female genitalia
- Epidemiological aspects of STDs
- Viral STDs including HIV, Herpes, Human Papilloma virus (HPV), Molluscum contagiosum, Espirito Santo virus (ESV) etc.
- Bacterial STD's: Syphilis, Gonorrhoea, Chancroid, Donovanosis
- Chlamydial infections: Lymphogranuloma venereum, urethritis, cervicits, nongonococcal urethritis (NGU), non-specific vaginitis etc.
- Fungal: Candidiasis
- Protozoal: Trichomoniasis
- Ectoparasitic: Scabies, Pediculosis infestations.
- Syndromic management of STDs
- HIV/AIDS - Epidemiology, transmission, patient load, High risk groups, cutaneous manifestations of HIV, treatment of opportunistic infections, antiretroviral therapy, management of STDs in HIV positive cases
- STDs in reproduction health and Pediatrics
- STDs and HIV
- Prevention, counselling and education of different STDs including HIV
- National Control Programmes of STDs and HIV infection
- Medico-legal, social aspects of STDs including psychological and behavioural abnormalities in STD patients

Leprosy

- Approach to the patient with leprosy
- Epidemiological aspects
- Structure, biochemistry, microbiology of Mycobacterium leprae
- Animal models
- Pathogenesis
- Classification
- Immunology and molecular biological aspects
- Histopathology and diagnosis including laboratory aids
- Clinical features
- Reactions
- Systemic involvement (Ocular, bone, mucosa, testes and endocrine etc.)
- Pregnancy and leprosy
- HIV infection and leprosy

TEACHING AND LEARNING METHODS

A post graduate student pursuing the course should work in the institution as a full time student. No candidate should be permitted to run a clinic/laboratory/nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance. Every student shall attend teaching and learning activities during each year as prescribed by the department and should not be absent from work without valid reasons**.**

Teaching methodology:

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below.

1. **Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.
   a) **Didactic Lectures**: Few topics are suggested as examples:
      1) Bio-statistics
      2) Use of library
      3) Research Methodology
      4) Medical code of Conduct and Medical Ethics
      5) National Health and Disease Control Programmes
      6) Communication Skills

   These topics may preferably be taken up in the first few weeks of the first year.
   b) **Integrated Lectures:** Some of the topics may be taken up by multidisciplinary teams eg. Jaundice, Diabetes mellitus, Thyroid etc.

2. **Journal Club & Subject seminars:** Both are recommended to be held once a week. All PG students are expected to attend and actively participate in discussion and enter relevant details in the Log Book. Further, every post graduate student must make a presentation from the allotted journal(s), selected articles at least four times a year. The presentations would be evaluated and would carry weightage for internal assessment.
3. **Student Symposium**: Recommended as an optional multi-disciplinary programme. The evaluation may be similar to that described for subject seminar.
4. **Ward Rounds:** Ward rounds may be service or teaching rounds.
   a) **Service Rounds:** Post graduate students and Interns should be responsible for everyday care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.
   b) **Teaching Rounds:** Every unit should have 'grand rounds' for teaching purpose. A diary (log book) should be maintained for day to day activities by the students.

   Entries of (a) and (b) should be made in the Log book. Log books shall be checked and assessed periodically by the faculty members imparting the training.

5. **Clinical Case Presentations:** Minimum of 5 cases to be presented by every post graduate student each year. They should be assessed using check lists and entries made in the log book

6. **Clinico-Pathological Conference (CPC):** Recommended once a month for all post graduate students. Presentation is to be done by rotation. If cases are not available, it could be supplemented by published CPCs.

7. **Inter-Departmental Meetings:** Strongly recommended particularly with Departments of Pathology and Radio-Diagnosis at least once a week. These meetings should be attended by post graduate students and relevant entries must be made in the Log Book.

Pathology: A dozen interesting cases may be chosen and presented by the post graduate students and discussed. The staff of Pathology department would then show the slides and present final diagnosis. In these sessions, the advances in immuno-histochemical techniques can be discussed.

Radiodiagnosis: Interesting cases and imaging modalities should be discussed.

8. Teaching Skills: The post graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

9. The post graduate students should undertake audit, use information technology tools and carry out research, both basic and clinical, with the aim of publishing the work and presenting the same at various scientific fora.

10. Continuing Medical Education Programmes (CME): At least two CME programmes should be attended by each student during the MD programme.

11. Conferences: The student should attend courses, conferences and seminars relevant to the speciality.

12. A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

13. Department should encourage e-learning activities.

14. Rotation:

C**linical Postings**

A major tenure of posting should be in the Department of Dermatology. It should include care of in-patients, out-patients, special clinics like STD clinic, leprosy clinic, vitiligo clinic and maintenance of case records for both in- and out-patients.

A short posting for 2-4 weeks in the Department of Medicine is to be arranged for exposure to Emergency Medicine and Resuscitation.

15. Clinical meetings:

There should be intra - and inter- departmental meetings for discussing uncommon / interesting medical problems. Each student must be asked to present a specified number of cases for clinical discussion, perform procedures/tests/operations/present seminars/review articles from various journals in inter-unit/interdepartmental teaching sessions. These should be entered in a Log Book; log books should be checked and assessed periodically by the faculty members imparting the training.

16. Thesis writing:

Thesis writing is compulsory. All MD students are required to carry out work on a selected research project under the guidance of a recognized post graduate teacher, the result of which shall be written up and submitted in the form of a Thesis.

During the training programme, patient safety is of paramount importance, therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of surgical skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, i.e., during the training may be as follows:

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

Quarterly assessment during the MD training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs

SUMMATIVE ASSESSMENT, i.e., at the end of training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The examination shall be in three parts:

1. Thesis

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory Examination:

There shall be four papers each of three hours duration. Each paper shall consist of two long essay questions, three short essay questions and four short notes. These are:

Paper – I	**Basic Science as applied to Dermatology, STDs and Leprosy**
Paper – II	**Dermatology**
Paper – III	**STD & Leprosy**
Paper – IV	**Recent advances in field of Dermatology, Applied Sciences pertaining to skin /VD & internal medicine and skin**

3. Clinical / Practical and viva voce Examination

Practical examination should be taken to assess competence and skills of techniques and procedures and should consist of two long cases, two short cases and 10 spots.

During oral/viva voce examination, student should be evaluated for Interpretation of data, instruments, clinical problems, radiological and biochemical investigations, slides, drugs, X-rays etc.

Recommended Reading:

Books (latest edition)

- Sexually Transmitted Diseases - Sharma V K
- IADVL Text book of Dermatology - R G Walia
- IAL Textbook of Leprosy - H Kar
- Bolognia “Textbook of Dermatology”
- Text Book of Dermatology, Wilkinson/Ebling/Rook, 4 Volumes, Oxford
- Text Book of Dermatology, Samuel L. Moschelia M.D. Harry J. Hurllay M.D., 2 Volumes
- Histopathology of the Skin, Walter - F. Lever- Gundula Schaumburg Lever
- Atlas of Dermatology, 2 Volumes, Bhalani Publishing House, Dadar, Mumbai.
- Diseases of the skin, I Iarry L Arnold Richard 13-Dom William D. James, Andrews
- Differential Diagnosis in Dermtology, Satish S. Savant, Radha Atalshah, Deepak Gore, Richard Ashan, Barbara Lepdard

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- Leprosy, Dharmendra, 2 Volumes, Samant and Company, Mumbai.
- Recent Advances in Dermatology, Champion, R.H. Pye, R.J. 8th Volumes.
- Venereal Diseases, Amborse King Claude Nicol Philip Rodin, EL.BS English Language Book Society/ Baillere Tindal, East Sussex.
- Sexually Transmitted Diseases, King K Holmes, McGraw-Hill Health profession
- Hand Book of leprosy, Jopling W.H, William Hethgunnah Medical Book Ltd., London.
- Dermatology in General Medicine, Thomas B. Fitzpatrick, McGraw Hill Book Company.
- Fundamentals of Pathology of skin, Mysore Venkataram

Journals

Three international and two national journals (all indexed)

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Annexure I

Postgraduate Students Appraisal Form
Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD

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GUIDELINES FOR COMPETENCY BASED POSTGRADUTE TRAINING PROGRAMME FOR MD IN FORENSIC MEDICINE

Preamble:

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

This programme is meant to standardize and strengthen Forensic Medicine teaching at the post graduate level throughout the country so that it will benefit the judiciary and the legal system of the country in providing justice which will ultimately benefit the community at large. It will also help in achieving uniformity in undergraduate teaching.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies".

SUBJECT SPECIFIC LEARNING OBJECTIVES

The **Goal** of MD Forensic Medicine is to train a doctor to become a competent medico-legal expert, teacher and researcher in the subject who:

1. is aware of medico legal aspects in various settings
2. *is aware of contemporary advances and developments* in the field of Forensic Medicine.
3. has *acquired the competencies* pertaining to the subject of Forensic Medicine that are required to be practiced at all levels of health system.
4. is oriented to the *principles of research methodology*.
5. has acquired *skills in educating* and imparting training to medical, paramedical and allied professionals.

A post graduate student, upon successfully qualifying in the M.D (Forensic Medicine) examination, should be able to:

1. Become an expert in Forensic Medicine.
2. Identify and define medico-legal problems as they emerge in the community and work to resolve such problems by planning, implementing, evaluating and modulating Medico-legal services.
3. Undertake medico-legal responsibilities and discharge medico-legal duties in required settings.

4. Keep abreast with all recent developments and emerging trends in Forensic Medicine, Medical Ethics and the law.
5. Deal with general principles and practical problems related to forensic, clinical, emergency, environmental, medico-legal and occupational aspects of toxicology.
7. Deal with medico-legal aspects of Psychiatry, mental health and drug addiction.
8. Impart education in Forensic Medicine and Toxicology to under-graduate and post-graduate students with the help of modern teaching aids.
9. Assess the students' knowledge and skills in the subject of Forensic Medicine
10. Oriented to research methodology and conduct of research in the subject

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. Cognitive domain

1. Describe the legal and medico-legal system in India.
2. Acquire knowledge on the philosophy and guiding principles of Forensic Medicine course.
3. Describe the programme goals and objectives of the Forensic Medicine course.
4. Acquire knowledge on conduct of medico-legal autopsy independently with required physical assistance, prepare report and derive inferences.
5. Outline the principles and objectives of postmortem examination.
6. Describe the formalities and procedures of medico-legal autopsies in accordance with existing conventions and the law.
7. Identify the role of anatomy, physiology, biochemistry, microbiology, pathology, blood bank, psychiatry, radiology, forensic science laboratory as well as other disciplines of medical science to logically arrive at a conclusion in medico-legal autopsies and examination of medico-legal cases.
8. Describe the principles of the techniques used in toxicological laboratory namely TLC (Thin Layer Chromatography), GLC (Gas Liquid Chromatography), AAS (Atomic Absorption Spectrophotometry), HPLC (High Performance Liquid Chromatography) and Breath Alcohol Analyzer.
9. Describe relevant legal/court procedures applicable to medico-legal/medical practice.
10. Describe the general forensic principles of ballistics, serology, analytical toxicology and photography.
11. Interpret, analyze and review medico-legal reports prepared by other medical officers at the time of need.
11. Describe role of DNA profile and its application in medico-legal practice.
12. Describe the law/s relating to poisons, drugs, cosmetics, narcotic drugs and psychotropic substances.

13. Describe the legal and ethical aspects of Forensic Procedures including Narco-analysis, Brain mapping and Polygraph etc.
14. Describe the medico-legal aspects of Psychiatry, addiction and mental health.

B. Affective domain

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the clinician or other colleagues to provide the best possible opinion.
2. Should be able to follow ethical principles in dealings with patients, police personnel, relatives and other health personnel and to respect their rights.
3. Follow medical etiquettes in dealing with each other.
4. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

At the end of the course, the student should acquire following skills and be able to:

1. Perform medico-legal autopsy independently with required physical assistance, prepare report and derive inferences.
2. Perform medico-legal examination of users of alcohol, drugs and poisons and prepare report.
3. Perform medico-legal examination in cases of sexual offences and prepare report.
4. Interpret histo-pathological, microbiological, radiological, chemical analysis, DNA profile and other investigative reports for medico-legal purposes.
5. Perform medico-legal examination of bones, clothing, wet specimens and weapons.
6. Depose as an expert witness in a court of Law on medico-legal matters.
7. Examine, identify, prepare reports and initiate management on medico-legal cases in emergency set up.
8. Identify and discharge all legal responsibilities in medico-legal matters.
9. Plan, organize and supervise medico-legal work in general/teaching/district hospitals and in any health care set up.
10. Collect, preserve and dispatch various samples and trace evidences to the concerned authorities in appropriate manner.
11. Help and Advise authorities on matters related to medical ethics and medico-legal issues.
12. Discharge duties in respect of forensic, clinical, emergency, environmental, medico-legal and occupational aspects of toxicology.
13. Plan, organize and manage toxicological laboratory services in any health care set up.
14. Provide information and consultation on all aspects of toxicology to professionals, industry, Government and the public at large.

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15. Manage medico-legal responsibilities in mass disasters involving multiple deaths like fire, traffic accident, aircraft accident, rail accident and natural calamities.
16. Do interaction with allied departments by rendering services in advanced laboratory investigations and relevant expert opinion.
17. Participate in various workshops/seminars/journal clubs/demonstration in the allied departments, to acquire various skills for collaborative research.

Time frame to acquire knowledge & skills:

First year of PG programme:

1. Orientation Programme
2. Basic autopsy skills.
3. Orientation to the applied aspects of Anatomy, Physiology, Biochemistry
4. General principles of Forensic Medicine.
5. Introduction to Medical Toxicology.
6. Assisting in scheduling of teaching sessions.
7. Participation in undergraduate teaching.
8. Posting for autopsy work, clinical forensic medicine and toxicology.
9. Participation in departmental activities
10. Participation in seminar, CME, workshop etc.
11. Orientation to organization and functioning of toxicology/research laboratory.
12. Preparation of thesis protocol.
13. Being self-updated with recent advances in the subject

Second year of PG programme:

1. Conduct of autopsy examination without supervision in routine autopsy cases
2. Conduct of autopsy examination with supervision in expert opinion cases.
3. Conduct of theory and practical sessions for undergraduates
4. Thesis and other research work
5. Clinical forensic medicine work for practical experience in medico-legal procedures and on-the-job practical training in medico-legal aspects of emergency medicine, radiology and other clinical disciplines.
6. Orientation to the applied aspects of Microbiology, Pathology, Blood Bank, Psychiatry as related to forensic sciences.
7. Posting for autopsy work, clinical forensic medicine and toxicology laboratory.
8. Attend court summons for cases conducted by themselves or where deputed to attend in cases where an expert is required to depose by Court of Law

Third year of PG programme:

1. Organize teaching sessions and thesis work.
2. Submission of thesis six months prior to examination.

3. Posting for autopsy work, clinical forensic medicine and toxicology laboratory to continue.
4. The PG trainee shall be required to conduct minimum of 100 autopsy cases and minimum of 100 clinical cases during the entire training period.
5. Attend Court summons for cases conducted by themselves or when deputed where an expert is required to depose by the Court of Law.
6. The PG trainee shall be required to attend or accompany an expert to attend a minimum of 20 court summons, of which at least 5 should pertain to clinical cases.

Syllabus

Course contents:

I. General Principles of Forensic Medicine and Toxicology

i. Identify the role of anatomy, physiology, biochemistry, microbiology, pathology, blood bank, psychiatry, radiology, forensic science laboratory as well as other disciplines of medical science to logically arrive at a conclusion in medico-legal autopsies and examination of medico-legal cases.

ii. Describe the basic principles of techniques used in toxicological laboratory namely TLC, GLC, ASS, HPLC and Breath Alcohol Analyzer.

iii. Execute the skills and knowledge expected at undergraduate level.

II. Basic Sciences and allied Subjects

A. Anatomy: Anatomy of parts and organs of the body which are important from the medico-legal aspect.

i. Describe surface and regional anatomy of head, neck, chest and abdomen.

ii. Describe gross anatomy and blood supply of heart, brain, lungs, spleen, liver and kidneys.

iii. Describe gross anatomy of male and female genitalia.

iv. Describe the comparative anatomy of male and female skeleton.

v. Perform histological examination of various tissues.

vi. Describe the development of foetus.

B. Physiology and Biochemistry: Mechanism of phenomena that are important in the body from the medico-legal viewpoint.

i. Describe mechanism of fluid and electrolyte balance, thermoregulation in newborn and adults, endocrine functions.

ii. Describe physiology of sexual behavior.

iii. Describe physiological functioning of circulatory system, digestive system, respiratory system, haemopoietic system, central nervous system and reproductive system including pregnancy.

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C. **Pathology:** Pathophysiology of vital processes and response mechanisms that modulate tissue and organ reaction to all forms of injury and have a bearing on antemortem and postmortem appearance in medico-legal cases, assessment of the duration of injuries and correlate trauma and disease.

i. Describe pathology of inflammation and repair, immunity and hypersensitivity, Thrombosis and embolism, electric and ionizing radiation injuries, genetic factors in disease, deficiency disorders and malnutrition.

ii. Describe pathology of myocardial infarction, congenital heart diseases, tuberculosis of lungs, cirrhosis of liver, diseases of glomeruli and tubules and interstitial; tissues of Kidney, tumours, endocrine disorders, venereal diseases, spontaneous intracranial hemorrhages.

iii. Describe the pathology of sudden death.

iv. Describe local and systemic response to trauma and patho-physiology of shock.

v. Describe pathology of common infections and infestations of medico-legal significance.

D. Dentistry: Adequate knowledge of dentistry for solution of medico-legal problems like, injuries, age determination and identification

E. Radiology: Adequate knowledge of radiological procedures for solution of medico-legal problems.

F. Fundamentals of Forensic Medicine:

i. Describe the general forensic principle of ballistics, serology, analytical toxicology and photography.

ii. Interpret the scene of crime.

iii. Describe role of DNA profile and its application in medico-legal practice.

iv. Examine bloodstains for blood grouping, nuclear sexing, HLA typing, seminal stains and hair for medico-legal purpose.

v. Describe ethical aspects of Forensic Procedures including Narco-analysis, Brain mapping and Polygraph

III. Medical Ethics and Law (Medical Jurisprudence)

i. Describe the history of Forensic Medicine.

ii. Describe the legal and medico-legal system in India.

iii. Describe medical ethics and the law in relation to medical practice, declarations, oath, etiquette, Medical Council of India, disciplinary control, rights and duties of a registered medical practitioner's professional misconduct, consent, confidentiality, medical negligence (including all related issues) and Consumer Protection Act.

iv. Describe medical ethics and law in relation to organ transplantation, biomedical human research and experimentation, human rights, cloning, genetic engineering, human genome, citizen's charter and International codes of medical ethics.

v. Describe the ethics and law in relation to artificial insemination, abortion, antenatal sex, foetus, genetics and euthanasia.

vi. Interpret the ethics and law applicable to the human (clinical trials) and animal experimentation.

vii. Describe ethics in relation to elderly, women and children.

viii. Describe medical ethics and law in relation to nursing and other medical services/practices.

ix. Understanding about bio-ethics

IV. Clinical Forensic Medicine

i. Examine, assess legal implications and prepare report or certificate in cases of physical assault, suspected drunkenness, sexual offences, consummation of marriage and disputed paternity.

ii. Collect, preserve and dispatch the specimen/material to the concerned authority and interpret the clinical and laboratory findings which are reported.

iii. Examine injured person, prepare medico-legal report and initiate management.

iv. Determine the age and establish identity of an individual for medico-legal purpose.

v. Examine a person and assess disability in industrial accidents and diseases.

vi. Perform examination and interpret findings for medico-legal purposes in cases pertaining to pregnancy, delivery, artificial insemination, abortion, sterilization, Impotence, AIDS and infectious disease.

vii. Describe normal and abnormal sexual behavior and its medico-legal implications.

viii. Examine and assess the medical fitness of a person for insurance, government service, sickness and fitness on recovery from illness.

ix. Examine medico-legal problems related to clinical disciplines of medicine and allied subjects, Pediatrics, Surgery and allied subjects, ENT, Ophthalmology, Obstetrics and Gynecology, Dermatology and Anesthesiology.

x. Examine medico-legal problems related to children, women and elderly.

xi. Identify the cases of torture and violation of human rights and issues thereto

V. Forensic Pathology

i. Apply the principles involved in methods of identification of human remains by race, age, sex, religion, complexion, stature, hair, teeth, anthropometry, dactylography, foot prints, hairs, tattoos, poroscopy and superimposition techniques.

ii. Perform medico-legal postmortem and be able to exhume, collect, preserve and dispatch specimens or trace evidence to the appropriate authority.

iii. Diagnose and describe the pathology of wounds, mechanical and regional injuries, ballistics and wound ballistics, electrical injuries, lightening, neglect and starvation, thermal injuries, deaths associated with sexual offences, pregnancy, delivery, abortion, child abuse, dysbarism and barotraumas.

iv. Describe patho-physiology of shock and neurogenic shock.

v. Describe patho-physiology of asphyxia, classification, medico-legal aspects and postmortem findings of different types of asphyxial deaths.

vi. Diagnose and classify death, identify the signs of death, postmortem changes, interpret autopsy findings, artifacts and results of the other relevant investigations to logically conclude the cause, manner (suicidal, homicidal and accidental) and time of death.

vii. Manage medico-legal responsibilities in mass disasters involving multiple deaths like fire, traffic accident, aircraft accident, rail accident and natural calamities.

viii. Demonstrate postmortem findings in infant death and to differentiate amongst live birth, still birth and dead born.

ix. Perform postmortem examination in cases of death in custody, torture and violation of human rights.

x. Perform postmortem examination in cases of death due to alleged medical negligence as in operative and anesthetic deaths.

VI. Toxicology

i. Describe the law relating to poisons, drugs, cosmetics, narcotic drugs and
   a. psychotropic substances.

ii. Examine and diagnose poisoning cases and apply principles of general management and organ system approach for the management of poisoning cases.

iii. Describe the basic principles of pharmacokinetics and pharmacodynamics of poisonous substances.

iv. Describe the toxic hazards of occupation, industry, environment and the principles of predictive toxicology.

v. Collect, preserve and dispatch material/s for analysis, interpret the laboratory findings and perform the Medico-legal formalities in a case of poisoning.

vi. Demonstrate the methods of identification and analysis of common poisons

vii. Describe the signs, symptoms, diagnosis and management of common acute and chronic poisoning due to:
   a. Corrosives
   b. Nonmetallic substances
   c. Insecticides and weed killers
   d. Metallic substances
   e. Vegetable and organic irritants
   f. Somniferous compounds
   g. Inebriant substances
   h. Deliriant substances
   i. Food Contamination/adulteration.
   j. Substances causing spinal and cardiac toxicity
   k. Substances causing asphyxia (Asphyxiants)
   l. Household toxins
   m. Toxic envenomation

n. Biological and chemical warfare
o. Environmental intoxicants
P. Occupational intoxicants

VII. Forensic Psychiatry

i. Explain the common terminologies of forensic importance in Psychiatry.
ii. Describe the medico-legal aspects of Psychiatry and mental health.
iii. Describe medico-legal aspects of drug addiction.
iv. Describe role of Psychiatry in criminal investigation, punishment and trial.
v. Describe the civil and criminal responsibilities of a mentally ill person.
vi. Describe the role of Psychology in criminal investigation, punishment and trial

TEACHING AND LEARNING METHODS

Teaching methodology

1. L**ectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

   The course shall be of three years, organized in six units (0-5). This modular pattern is a guideline for the department, to organize training. Training programme can be modified depending upon the work load and academic assignments of the department.
2. **Journal Club & Subject seminars:**
   Both are recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. Further, every PG trainee must make a presentation from the allotted journal(s), selected articles and a total of 12 seminar presentations in three years. The presentations would be evaluated and would carry weightage for internal assessment.
3. **Case Presentations:** Minimum of 5 cases to be presented by every PG trainee each year. They should be assessed using check lists and entries made in the log book
4. **Clinico-Pathological correlation \ Conference:** Recommended once a month for all post graduate students. Presentation is to be done by rotation. If cases are not available, it could be supplemented by published CPCs.
5. **Inter-Departmental Meetings:** These meetings should be attended by post graduate students and relevant entries must be made in the Log Book.
6. **Teaching Skills:** The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
7. Undertake audit, use information technology tools and carry out research, both basic and clinical, with the aim of publishing his work and presenting his work at various scientific fora.

8. **Continuing Medical Education Programmes (CME):** At least two CME programmes should be attended by each student in 3 years.

9. **Conferences:** The student to attend courses, conferences and seminars relevant to the speciality.

10. A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

11. **Rotation:**

Other than the Department of Forensic Medicine, student may be posted for training in the following clinical disciplines for a given period of time on rotational basis:

	Place of posting	First year	Second year	Third year
01	Trauma & Emergency/ Casualty / Emergency medicine department	1 month	15 days	15 day
02	Radiology	7 days	5 days	3 days
03	Psychiatry	5 days	3 days	2 days
04	Forensic science lab	7 days	15 days	Not required
05	Histopathology	7 days	5 days	3 days

12. Department should encourage e-learning activities.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., during the training

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Quarterly assessment during the MD training should be based on following educational activities:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**

5. External and Outreach Activities / CMEs

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The Postgraduate examination shall be in three parts:

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The examination shall be in three parts:

1. Thesis

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and practical examination. A PG trainee shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory:

The examinations shall be organized on the basis of 'Grading'or 'Marking system' to evaluate and to certify PG trainee's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D. shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

There shall be four papers each of three hours duration. These are:

2. **Theory Examination**: There shall be four theory papers.

Paper 1: Basic of Forensic Medicine, basic sciences and allied subjects.

Paper II: Clinical Forensic Medicine and medical jurisprudence.

Paper III: Forensic pathology and toxicology.

Paper IV: recent advances in Forensic Medicine, Forensic Psychiatry and Medical Toxicology, applied aspects of clinical disciplines and forensic sciences

3. **Practical Examination:**

Practical examination would be spread over two days and should be as follows:

Day 1

- **Clinical Cases** - (any 4) Age estimation, injury report, examination of an insane person to evaluate criminal/civil responsibility, examination of an intoxicated person, examination of a suspected case of poisoning (acute/chronic), disputed paternity case and sexual offences (accused and victim).

- Spots - (10) Histopathology slides, photographs, exhibit material, X-rays, mounted specimens, bones, poisons and weapons, charts etc.
- Toxicology Exercises - (02) Identification and details of common poisons or chemical tests etc.
- Laboratory Tests - (01) Identification of biological stains (Semen, Blood, Body fluids), Histopathology slides of medico legal relevance, gram and acid fast staining etc.

Day 2

- Postmortem Examination.
- Thesis/Seminar Presentation - For assessment of research/teaching ability
- Discussion on a case for expert opinion
- Grand Viva Voce.

Recommended Reading

Books (latest edition)

1. Subramanyam BV. Modi's Medical Jurisprudence and Toxicology. Butterworths India, New Delhi.
2. Nundy A. Principles of Forensic Medicine, New Central Book Agency Calcutta.
3. Lyon's Medical Jurisprudence for India. Delhi Law House, Delhi.
4. Reddy KSN. The Essentials of Forensic Medicine and Toxicology, K. Saguna Devi Publishers, Hyderabad.
5. Parikh CK. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology, CBS Publishers and Distributors, New Delhi.
6. Bernard Knight. Forensic Pathology. Arnold Publishers London.
7. + Di Maio VJ, Di Maio D. Forensic Pathology. CRC Press New York.
8. Camps FE. Gradwohl's legal Medicine. Bristol: John Wright and Sons Ltd.
9. American College of Legal Medicine Textbook Committee. Legal Medicine Mosby Publishers, USA.
10. Di Maio VJM. Gunshot Wounds, CRC Press USA.
11. Gordon I, Shapiro HA, Berson SD. Forensic Medicine – A Guide to Principle. Churchill Livingstone New York.
12. Mant AK. Taylor's Principles and Practice of Medical Jurisprudence, Churchill Livingstone, New York.
13. Parikh CK. Medicolegal Postmortems in India. Medical Publications, Bombay.
14. Gresham GA, Turner AF. Postmortem Procedurs An illustrated Text Book. Wolfe Medical Publications.
15. Ludwing J. Current Methods of Autopsy Practice. WB Saunders Company, London.
16. Gordon I, Turner R. Medical Jurisprudence E and S Livingstone Ltd. London.

17. Spitz WU, Fisher RS. Medico-legal Investigation of Death. Charles Thomas Publishers.
18. Schroeder O.C. Dental Jurisprudence. PSG Publishing Company, Littleton, Massachussetts.
19. Stark MM. A Physicians Guide to Clinical Forensic Medicine. Humana Press Totowa, New Jersey.
20. Olshakar JS, Jackson JS. Jackson MC, Smock WS. Forensic Emergency Medicine. Lippincott William and Wilkins, Philadelphia.
21. Norah Rudin, Keith Inman. An introduction to Forensic DNA Analysis. CRC Press, London.
22. Robertson J, Ross AM, Burgoyne LA. DNA in Forensic Science - Theory, Technique and Application. Ellis Horwood, UK
23. Curry AS. Method of Forensic Science Vol. I-III. Inter-science Publishers London.
24. Clement JG, Ranson DL. Craniofacial Identification in Forensic Medicine. Arnold Publishers, London.
25. Sellier GK, Kneubuechl BP. Wound Ballistics and the scientific background. Elsevier, Amsterdam.
26. Bernard Knight. Simpson's Forensic Medicine. Arnold Publishers London.
27. Bernard Knight. Legal aspects of Medical Practice. Churchill Livingstone New York.
28. Gunn and Taylor. Forensic Psychiatry Clinical, Legal and Ethical issues. Butterworth Heinemann
29. G Gustafson. Forensic Odontology. Staples Press.
30. Gonzalez TA. Legal Medicine, Pathology and Toxicology- Appleton Century-Crofts Inc. New York.
31. Hirsch CS, Morris RC, Moritz AR. Handbbok of Legal Medicine. CV Mosby Company London.
32. Lincoln PJ, Thomas J. Forensic DNA Profiling Protocols. Methods in Molecular Biology, Vol. 98, Humana Press, Totowa, New Jersey.
33. Lee HC, Gaensslen RE. DNA and other polymorphism in Forensic Science. Yearbook Medical Publishers, London.
34. Bergaus G, Brinkmann B, Rittner C. Staak M. (Eds.). DNA Technology and its Forensic Application. Springer- Verlag. Berlin
35. Beveridge A. Forensic Investigation of Explosions. Taylor and Francis USA.
36. Jay Dix. Colour Atlas of Forensic Pathology. CRC Press New York.
37. Bernard Knight. (ed.) The Estimation of Time since Death in the early Post Mortem Period. Arnold Publishers London.
38. Mant AK. Modern Trends in Forensic Medicine 1-3. Butterworth, London.
39. Luntz and Luntz. Handbook for Dental Identification. JB Lippincott. Toronto.
40. Buttler JM. Forensic DNA Typing. Academic Press New York.
41. Mason JK. Forensic Medicine- an illustrated reference. Chapmann and Hall, London.

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42. Mason JK. Paediatric Forensic Medicine and Pathology. Chapmann and Hall, London.
43. Patnaik VP. MKR Krishnan's handbook of Forensic Medicine. Paras Publishing.
44. Lundquist Frank. Methods of Forensic science, vol. II, Interscience publishers.
45. Mehta HS. Medical, Law and Ethics in India. The Bombay Samachar Pvt. Ltd.
46. Gaur's firearms, Forensic Ballistics, Forensic Chemistry and Criminal Jurisprudence. Law Publishers (India) Pvt. Ltd. Allahabad.
47. Tedeschi Eckert. Forensic Medicine Vol. I -IV, WB Saunders Company.
48. Polson, Gee, Knight. The Essentials of Forensic Medicine. Pergomann Press, UK.
49. Redsicker DR. Forensic Photography, CRC Press USA.
50. Krogmann. Human skeleton in Forensic Medicine.
51. Abdullah Fateh. Handbook of Forensic Pathology
52. Simpson K. Taylor's Principle and Practice of Medical Jurisprudence. Vol. I-II.
53. Krishan Vij. Textbook of Forensic Medicine and Toxicology, Churchill Livingstone.
54. Pillay VV. Textbook of Forensic Medicine and Toxicology, Paras Publishing, Hyderabad.
55. Mukherjee JB. Textbook of Forensic Medicine and Toxicology, Arnold's Publishers, London.
56. Henry J, Wiseman H. Management of Poisoning. Published by WHO, UNEP and ILO.
57. Flanagan RJ et al. Basic Analytical Toxicology. Published by WHO, UNEP and ILO.
58. Guidelines for Poison Control. Published by WHO, UNEP and ILO
59. Genetics in Medicine – J. S. Thompson and M.W. Thompson.
60. Research – How to plan, speak and write about it – C. Hawkins and M. Sorgi.

Journals

03-05 international Journals and 02 national (all indexed) journals

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Annexure 1

Postgraduate Students Appraisal Form

Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications Yes/ No

Remarks* _____

_____

_____

_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD

Medical Council Of India

NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/09 **Date: 01-08-22**

National Medical Commission

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR M.D. IN GENERAL MEDICINE

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN GENERAL MEDICINE

Preamble:

The purpose of post graduate (PG) education in General Medicine is to create specialists who would provide appropriate health care to the community and advance the cause of science through research, training and teaching the medical fraternity.

The competency-based training programme aims to produce a postgraduate doctor who after required training should be able to deal effectively with the medical needs of the community. The postgraduate specialist is also expected to know the principles of research methodology and be able to update himself with advances and practice evidence-based medicine. They should be trained to work in synchrony with faculty in super-speciality courses of Medicine and to follow a holistic approach to medical care which would lead to the development of good quality teachers. This document has been prepared by subject-content specialists of the National Medical Commission. The Expert Group of the National Medical Commission had attempted to render uniformity without compromise to the purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies.

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SUBJECT SPECIFIC OBJECTIVES

Postgraduate training should enable the student to:

- Practice internal medicine with competence, with the help of scientific knowledge in an evidence based fashion.
- Conduct clinical examination and relevant investigations, diagnose medical conditions and refer early where indicated.
- Plan and deliver comprehensive treatment using the principles of rational drug therapy.
- Plan and advise measures for the prevention and rehabilitation of patients.

- Manage emergencies efficiently by providing Basic Life Support (BLS) and Advanced Life Support (ALS).
- Recognize conditions that may be outside of scope of general medicine and refer to an appropriate specialist.
- Exercise empathy and a caring attitude and maintain professional integrity, honesty and high ethical standards.
- Document case details including epidemiological data.
- Play the assigned role in the implementation of National Health Programs.
- Demonstrate competence in basic concepts of research methodology and clinical epidemiology; and preventive aspects of various disease states.
- Become a motivated 'teacher' - defined as one keen to share knowledge and skills with a colleague or a junior or any learner.
- Continue to evince keen interest in continuing education and use appropriate learning resources.
- Practice the medico-legal responsibilities.
- Undertake audit related to patient care, morbidity and mortality, use information technology tools and carry out research - both basic and clinical, with the aim of publishing the work and presenting the work at scientific forums.
- Participate in public health emergencies (arising in the community).
- Estimate the financial burden of care and practice health economics and rational approach to investigations.
- Communicate about the illness with patient's/relatives at all stages of care.

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SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. Predominant in Cognitive Domain:

1. Describe clinical features of diseases of various aetiology affecting all systems in the adult and geriatric population.

2. Apply the basic sciences knowledge in understanding and managing common diseases.
3. Describe the investigations to be undertaken at various levels like OPD, Ward, ICU etc. and choose them appropriately depending on the clinical features and epidemiologic principles.
4. Describe the pharmaco-therapeutics of various diseases and complications.
5. Describe and discuss the health issues related to environmental and ecological factors.
6. Describe and discuss the methods and mechanisms of rehabilitation following diseases.
7. Describe and discuss the issues related to palliative and terminal care.
8. Incorporate the national and international guidelines related to various diseases in day to day practice and teaching.
9. Describe and discuss the social and economic aspects of illnesses, outbreaks and epidemics.
10. Analyse the observations of disease patterns in patients and community and make suggestions for improvement in management and prevention.
11. Describe and discuss the National Health Programs.
12. Analyse and critique the publications related to various aspects of illnesses and evidence based medicine.
13. Describe and discuss the various levels of prevention in communicable and non - communicable diseases.
14. Describe and discuss various legislations related to organ transplant, brain death, informed consent, human rights etc.
15. Be updated on recent advances in internal medicine.

B. Affective Domain:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient, relatives, paramedical and medical colleagues to provide the best possible comprehensive care.

2. Always adopt ethical principles and maintain professional etiquette in dealing with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.

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3. Develop communication skills to interact with patients, relatives, peers and paramedical staff, with special emphasis on breaking bad news empathetically.

4. Should demonstrate equity and equality when dealing with individuals of special groups (differently abled and LGBTQIA+).

C. Predominant in Psychomotor domain:

The post graduate student, at the end of the course should be able to perform the following skills, independently (PI) or under supervision (PS):

Clinical Assessment Skills

- Elicit a detailed clinical history (PI)
- Perform a thorough physical examination of all the systems (PI)

Procedural skills

- Pleural tap (PI)
- Lumbar puncture (PI)
- Arterial puncture for ABG (PI)
- Bone marrow aspiration and biopsy (PI)
- Abdominal paracentesis - diagnostic (PI)
- Aspiration of liver abscess (PI)

DESIRABLE

- Ultrasound abdomen at point of care (PI)
- Fine needle aspiration cytology (FNAC) from palpable lumps (PI)
- Pericardiocentesis (PS)
- Joint fluid aspiration (PI)
- Liver biopsy (PI)
- Kidney biopsy (PS)
- Cardiac-TMT (PS)
    - Holter monitoring (PS)
    - Echocardiography (point of care) (PS)
    - Doppler studies (PS)

Respiratory management

- Non-invasive and mechanical ventilation (PI)

Critically ill person

- Monitoring a sick person (PI)

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- Endotracheal intubation (PI)
- Cardio-pulmonary resuscitation(PI)
- Central vein cannulation and CVP monitoring (PI)
- Using a defibrillator (PI)
- Hemodialysis (PS)
- Certification of Brain death (PI)

Interpretation Skills

Interpretation of results of the following investigations, considering clinical data (history & examination findings).

- Treadmill testing (PI)
- ABG analysis (PI)
- Ultrasonography (PI)
- CT scan chest and abdomen (PI)
- CT scan head and spine (PI)
- MRI- Brain and spine (PI)
- Barium studies- desirable (PI)
- Pulmonary function tests (PI)
- Immunological investigations (PI)
- Nerve Conduction studies /EMG (PI)
- EEG (PI)
- Evoked Potential interpretation (PI)

Communication skills (PI)

While eliciting clinical history and performing physical examination, emphasize on:

- Communicating health and disease,
- Pre-test and post-test counseling for HIV,
- Pedagogy: teaching students, other health functionaries: lectures, bedside clinics, discussions,
- Health education: prevention of common medical problems, promoting healthy life-style, immunization, periodic health screening, counseling skills in risk factors for

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common malignancies, cardiovascular disease, AIDS etc.

- Dietary counseling in health and disease,
- Linking patients with community resources,
- Providing referral,
- Genetic counseling,
- Communicating bad news to the patient and relatives.

Others

- ***Demonstration of the following:*** **(PI)**
  - professionalism
  - ethical behavior (humane and professional care to patients)
- ***Utilization of information technology***
  - Medline search, Internet access, computer usage
- ***Research methodology***
  - designing a study
  - interpretation and presentation of scientific data
- ***Self-directed learning***
  - identifying key information sources
  - literature searches
  - information management
- ***Therapeutic decision-making***
  - managing multiple problems simultaneously
  - assessing risks, benefits and costs of treatment options
  - involving patients in decision-making
  - selecting specific drugs within classes
  - rational use of drugs

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Syllabus

Course contents:

A: Cognitive domain:

Basic Sciences

1. Basics of human anatomy as relevant to clinical practice:

- Surface anatomy of various viscera

- Neuro-anatomy
- Important structures/organ's location in different anatomical locations in the body
- Histology of organs
- Blood supply, nerve supply to various organs

2. Applied physiology of various organ systems:
    - Basic functioning of various organ-system, control of vital functions.
    - pathophysiological alteration in diseased states.
    - interpretation of symptoms and signs in relation to pathophysiology.
    - Physiology of temperature, sleep regulation.

3. Applied biochemical basis of various diseases including fluid and electrolyte disorders:
    - Acid - base disorders, disorders of carbohydrate, fat, protein, calcium, phosphorous and iron metabolism.
    - Interpretation and clinical application of various biochemical tests.

4. Applied pathology of different diseases.
    - Common pathological changes in various organs associated with diseases and their correlation with clinical signs.
    - Understanding of various pathogenic processes and possible therapeutic interventions, and
    - Preventive measures at various levels to reverse or arrest the progression of diseases.

5. Knowledge about various microorganisms, their special characteristics important for their pathogenetic potential or of diagnostic help:
    - Important organisms associated with tropical diseases, their growth pattern/life-cycles,
    - Levels of therapeutic interventions possible in preventing and/or eradicating the organisms,
    - Antimicrobial resistance,
    - Antibiotic stewardship,
    - Hospital infection control,
    - Biomedical waste management,
    - Vaccinology.

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6. Knowledge about pharmacokinetics and pharmaco-dynamics of the drugs used for the management of common problems in a normal person and in patients with diseases of kidneys/liver/systemic disorders which may need alteration in doses due to abnormal metabolism/excretion of the drugs:

    - pharmacokinetics and pharmaco-dynamics of drugs: principles and methodology
    - Rational use of available drugs.
    - Principles of drug therapy,
    - Adverse drug reactions,
    - Drug interaction,
    - Pharmacovigilance,
    - Drug abuse and addiction,
    - Drug development,
    - Pharmacoeconomics,
    - Pharmacogenomics.

7. Research methodology, study designs, clinical epidemiology and biostatistics relevant to medical sciences.

8. National Health Programmes:

    - investigation of community outbreak,
    - public health policy,
    - health promotion,
    - prevention of communicable and non-communicable diseases.
    - International health regulations,
    - Travel medicine.

9. Knowledge about various poisons with specific reference to different geographical and clinical settings - their diagnosis and management.

    - Knowledge about snake bite, other bites and stings,
    - medicolegal aspects.

Systemic Medicine

10. Preventive and environmental issues, including principles of preventive health care, immunization and occupational, environmental medicine and bioterrorism,

    - Health tourism,

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- Rehabilitation,
- Drowning,
- Heat and altitude related disorders.

11. Geriatric Medicine:

- Physiology and biology of aging and various organ changes in elderly.
- Principles of geriatric medicine and uniqueness of geriatric presentation.
- Physical examination of geriatric patient.
- drug metabolism, laboratory tests in elderly.
- Management of unique problems related to elderly such as nutrition, falls, gait disorders, neuro- psychiatric problems etc.
- Mental health disorders,
- Elderly neglect and abuse,
- Social and family support and rehabilitation of elderly.
- Assessment of functional and cognitive aspects, counseling and communication with elderly.
- Appropriate medication and avoidance of poly-pharmacy.

12. Genetics:

- Overview of the paradigm of genetic contribution to health and disease
- Principles of Human Genetics
- Genetic basis of medical disorders
- Single gene and chromosomal disorders
- Genetic counseling
- Prevention of genetic disorders
- Genetic analysis
- Gene therapy

13. Immunology:

- Innate and adaptive immune systems
- Mechanisms of immune mediated cell injury
- HLA system, primary and secondary immune-deficiency,
- Allergic disorders: urticaria, angioedema, anaphylaxis and other allergic disorders.
- Transplantation immunology, immunocomplex disorders, organ specific and multisystem immune disorders, monoclonal antibodies.

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14. Cardio-vascular diseases:

- Approach to the patient with possible cardio-vascular diseases
- Investigative cardiology
- Heart failure
- Arrhythmias
- Hypertension
- Coronary artery disease
- Valvular heart disease
- Infective endocarditis
- Diseases of the myocardium and pericardium
- Diseases of the aorta and peripheral vascular system
- Congenital heart diseases
- Pulmonary arterial hypertension
- Cor pulmonale

15. Respiratory system:

- Approach to the patient with respiratory diseases
- Investigative pulmonology
- Disorders of ventilation
- Asthma
- Chronic Obstructive Pulmonary Disease (COPD)
- Bronchiectasis
- Occupational lung diseases
- Interstitial lung diseases
- Hypersensitivity Pneumonitis
- Pneumonia and suppurative lung diseases
- Pulmonary embolism
- Cystic fibrosis
- Obstructive sleep apnoea syndrome and diseases of the chest wall, pleura and mediastinum
- Pulmonary manifestations of systemic diseases

16. Nephrology:

- Approach to the patient with renal diseases
- Acute kidney injury

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- Chronic kidney disease
- Glomerular diseases
- Nephrotic syndrome
- Reno vascular hypertension
- Cystic Diseases of the kidney
- Tubulo-interstitial diseases
- Nephrolithiasis
- Urinary tract infection and pyelonephritis
- Diabetes and the kidney
- Obstructive uropathy and treatment of irreversible renal failure
- Dialysis
- Renal involvement in systemic diseases

17. Gastro-intestinal diseases:

- Approach to the patient with gastrointestinal diseases
- Gastrointestinal endoscopy
- Motility disorders
- Diseases of the esophagus
- Acid peptic disease
- Functional gastrointestinal disorders
- Diarrhea
- Malabsorption syndromes
- Irritable bowel syndrome
- Inflammatory bowel diseases
- Mesenteric vascular insufficiency
- Diverticular disease
- Acute intestinal obstruction
- Peritonitis
- Diseases of the rectum and anus

18. Diseases of the liver and gall bladder:

- Approach to the patient with liver disease
- Interpretation of liver function tests
- Hyperbilirubinemia
- Acute viral hepatitis
- Drug induced /toxic hepatitis

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- Chronic hepatitis
- Alcoholic and non-alcoholic steatohepatitis
- Cirrhosis and its sequelae/ complications
- Portal hypertension
- Budd Chiari syndrome
- Hepatic failure and liver transplantation
- Diseases of the gall bladder and bile ducts
- Disease of pancreas including pancreatitis

19. Haematologic diseases:

- Hematopoiesis
- Anemias
- Leucopenia and leukocytosis
- Myelo-proliferative disorders
- Bone marrow failure syndromes
- Plasma cell disorders
- Disorders of hemostasis and haemopoietic stem cell transplantation
- Platelet Disorders
- Hypercoagulable conditions
- Blood components and transfusion medicine

20. Oncology:

- Epidemiology
- Biology and genetics of cancer
- Approach to patient with cancer
- Early detection or prevention of cancer
- Infection in cancer patients
- Oncological emergencies
- Paraneoplastic syndromes and endocrine manifestations of tumours
- Metastatic cancer of unknown primary site
- Hematological malignancies
- Cancers of various organ systems and cancer chemotherapy
- Rehabilitation and palliative care in cancer patients.

21. Metabolic diseases - inborn errors of metabolism and disorders of metabolism:

- Hemochromatosis

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- Wilson's disease
- Porphyrias
- Other inborn errors of metabolism.

22. Nutritional diseases:

- Nutritional assessment, Anthropometry
- Enteral and parenteral nutrition
- Obesity and eating disorders.
- Malnutrition
- Vitamin and trace element deficiencies and excess.

23. Endocrine diseases:

- Approach to patients with endocrine disorders
- Disorders of Pituitary
- Disorders of thyroid gland
- Disorders of adrenal cortex
- Pheochromocytoma
- Multiple endocrine neoplasia
- Autoimmune polyendocrine syndromes
- Reproductive endocrinology including menopause and postmenopausal hormone therapy
- Diabetes mellitus
- Hypoglycemia
- Metabolic Syndrome
- Dyslipidemia
- Disorders of parathyroid gland
- Disorders of bone and mineral metabolism in health and disease
- Osteoporosis

24. Rheumatic diseases:

- Approach to the patient with rheumatic diseases
- Osteoarthritis
- Rheumatoid arthritis
- Spondyloarthropathies
- Systemic lupus erythematosus (SLE)
- Sarcoidosis

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- Sjogren's syndrome
- Systemic sclerosis
- Anti-phospholipid antibody syndrome
- Bechet's disease
- Vasculitis syndromes
- Acute rheumatic fever
- Inflammatory myopathies
- Arthritis associated with systemic diseases
- Gout and crystal associated arthritis
- Relapsing polychondritis
- IgG4 related disease
- Polymyalgia rheumatica
- Fibromyalgia
- Amyloidosis

25. Infectious diseases:

- Basic consideration in Infectious Diseases
- Clinical syndromes
- Community acquired clinical syndromes
- Nosocomial infections
- Infections in immunocompromised
- Bacterial diseases - General consideration, diseases caused by gram - positive bacteria, diseases caused by gram - negative bacteria, miscellaneous bacterial infections, Atypical bacterial infections - Mycobacterial diseases, Spirochetal diseases, Rickettsial disease, Mycoplasma and Chlamydia.
- Viral diseases - DNA viruses, RNA viruses, HIV infection, Emerging viral diseases - Coronavirus, Nipha virus, H1N1 virus, Hantavirus.
- Fungal infections,
- Protozoal infections,
- Helminthic infections.

26. Neurology

- Approach to the patient with neurologic diseases,
- Diagnostic neurology,
- Localization of neurological disease/s,

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- Headache,
- Seizure disorders and epilepsy,
- Coma,
- Disorders of sleep,
- Cerebrovascular diseases,
- Cranial neuropathy,
- Dementias and neurodegenerative diseases,
- Brain abscess,
- Demyelinating diseases,
- Parkinson's disease and other movement disorders,
- Motor neuron diseases,
- Ataxic and gait disorders,
- Meningitis and encephalitis,
- Prion diseases,
- Peripheral neuropathies,
- Muscle diseases,
- Diseases of spinal cord
- Diseases of neuromuscular transmission,
- Autonomic disorders and their management.

27. Psychiatric disorders

Common psychiatric disorders in adult & geriatric population:

- Mood (affective) disorders,
- Anxiety disorders,
- Schizophrenia,
- Organic mental disorders,
- Eating disorders,
- Sexual disorders,
- Personality disorder and suicide and self-harm,
- Autistic disorders,
- Functional and psychosomatic disorder,
- Somatoform disorder,
- Dissociative/ conversion disorder.
- Substance use disorders.

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28. Dermatology:

- Structure and functions of skin.
- Infections of skin.
- Papulo-squamous and inflammatory skin rashes.
- Photo-dermatology.
- Erythroderma.
- Cutaneous manifestations of systematic diseases.
- Bullous diseases.
- Drug induced rashes.
- Disorders of hair and nails.
- Principles of topical therapy.

29. Critical care medicine

- Approach to patient with critical illness.
- Acute respiratory distress syndrome.
- Mechanical ventilatory support.
- Approach to patient with shock.
- Sepsis and septic shock.
- Cardiogenic shock and pulmonary edema.
- Cardiovascular collapse and cardiac arrest.
- Cardiopulmonary resuscitation.

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30. Miscellaneous

- Medical illnesses in pregnancy
- Peri-operative evaluations

B: Psychomotor domain: Detailed guidelines on this section are given under Subject specific competencies.

TEACHING AND LEARNING METHODS

General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skills oriented. Learning in the program, essentially autonomous and self-directed,

and emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the postgraduate (PG) courses shall work as full-time (junior) residents during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a log book for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real time.

Teaching-Learning methods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinical meetings, seminars, small group discussion, bed-side teaching, case-based learning, simulation-based teaching, self-directed learning, integrated learning, interdepartmental meetings and any other collaborative activity with the allied departments. Methods with exposure to the applied aspects of the subject relevant to basic/clinical sciences should also be used. **The suggested examples of teaching-learning methods are given below but are not limited to these. The frequency of various below mentioned teaching-learning methods can vary based on the subject's requirements, competencies, work load and overall working schedule in the concerned subject.**

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Self Directed Learning (SDL) is an extension of the role of lifelong learner envisaged in the goals of the Indian Medical Graduate. All postgraduate students are expected to learn through Problem Based Learning, SDL, Project Based learning etc. Various forms of self-learning including those mediated through IT - enhanced methodologies must be adopted. Specific hours need not be ear-marked, but these should be integrated into day to day practice.

Post graduates in all specialities are expected to learn through work-based discussions and experiential learning. Beyond documentations in logbook, they should demonstrate competency related to patient care, interpretation and communication skills during the routine work in wards, OPD, ICUs, district residency postings etc. They should be involved in teaching of Undergraduate (MBBS) students also.

A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures per year in the concerned PG department is suggested. Topics are to be selected as per subject

requirements. All postgraduate trainees will be required to attend these lectures. Lectures can cover topics such as:

1. Subject related important topics as per specialty requirement
2. Recent advances
3. Research methodology and biostatistics
4. **Salient features of** Undergraduate/Postgraduate medical curriculum
5. Teaching and assessment methodology.

Topic numbers 3, 4, 5 can be done during research methodology/biostatistics and medical education workshops in the institute.

B. Journal club: Minimum of once in 1-2 weeks is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once every 1-2 weeks is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive evidence-based review of the topic. The student should be graded by the faculty and peers.

D. Student Symposium: Minimum of once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by the faculty and peers.

E. Laboratory work / Bedside clinics: Minimum - once every 1-2 weeks.

Laboratory work/Clinics/bedside teaching should be coordinated and guided by faculty from the department. Various methods like DOAP (Demonstrate, Observe, Assist, Perform), simulations in skills lab, and case-based discussions etc. are to be used. Faculty from the department should participate in moderating the teaching-learning sessions during clinical rounds.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main Department and other department/s on topics of current/common interest or clinical cases.

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G. (a). Rotational clinical / community / institutional postings

Depending on local institutional policy and the subject specialty needs, postgraduate trainees may be posted in relevant departments/ units/ institutions. The aim would be to acquire more in-depth knowledge as applicable to the concerned specialty. Postings would be rotated between various units/departments and details to be included in the specialty-based Guidelines. Few examples are listed below:

- Broad specialty departments
- Emergency/Casualty department
- Super specialty departments e.g. Cardiology / Endocrinology / Nephrology / Medical Oncology etc.
- Laboratory-based specialty units/departments e.g. Biochemistry/Microbiology/ Infection control unit/Laboratory Medicine etc.

G. (b). Posting under "District Residency Programme" (DRP):

All postgraduate students pursuing MS/MS in broad specialties in all Medical Colleges/Institutions shall undergo a compulsory rotation of three months in District Hospitals/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th or 5th semester of the Postgraduate programme and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident".

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Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists / clinicians in different hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

H. Teaching research skills

Writing a thesis should be used for inculcating research knowledge and skills. All postgraduate students shall conduct a research project of sufficient depth to be presented to the University as a postgraduate thesis under the supervision of an eligible faculty member of the department as guide and one or more co-guides who may be from the same or other departments.

In addition to the thesis project, every postgraduate trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be reinforced.

I. Training in teaching skills

MEU/DOME should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on the teaching skills of the student.

J. Log book

During the training period, the postgraduate student should maintain a Log Book indicating the duration of the postings/work done in Wards, OPDs, Casualty and other areas of posting. This should indicate the procedures assisted and performed and the teaching sessions attended. The log book entries must be done in real time. The log book is thus a record of various activities by the student like: (1) Participation & performance, (2) attendance, (3) participation in sessions, (4) completion of pre-determined activities, and (5) acquisition of selected competencies.

The purpose of the Log Book is to:

a) help maintain a record of the work done during training,
b) enable Faculty/Consultants to have direct information about the work done and intervene, if necessary,
c) provide feedback and assess the progress of learning with experience gained periodically.
d) Documentation of acquisition required competencies

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The Log Book should be used in the internal assessment of the student; should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce completed log book in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate from the Head of Department regarding the clinical competence and skillful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in log book particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and at least two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty are referred to the MCI Logbook Guidelines uploaded on the Website.

K. **Course in Research Methodology**: All postgraduate students shall complete an online course in Research Methodology within six months of the commencement of the batch and generate the online certificate on successful completion of the course.

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Other aspects

- The Postgraduate trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The Postgraduate trainees should undergo training in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS).
- The Postgraduate trainees must undergo training in information technology and use of computers.

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learnt initially on the models, later to be performed under supervision followed by independent performance. For this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., assessment to improve learning

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

The Internal Assessment should be conducted in theory and practical/clinical examination, should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

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Quarterly assessment during the MD training should be based on:

- Case presentation, case work up, case handling/management : once a week
- Laboratory performance : twice a week
- Journal club : once a week
- Seminar : once a fortnight
- Case discussions : once a fortnight/month
- Interdepartmental case or seminar : once a month

Note: These sessions may be organized and recorded as an institutional activity for all postgraduates.

- Attendance at Scientific meetings, CME programmes (at least 02 each)

The student to be assessed periodically as per categories listed in appropriate (non-clinical/clinical) postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

Essential pre-requisites for appearing for examination include:

1. **Log book** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.

2. At least **two presentations** at national level conference. One research paper should be published / accepted in an indexed journal**. (It is suggested that the local or University Review committee assess the work sent for publication).**

The summative examination would be carried out as per the Rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination**.**

The postgraduate examination shall be in three parts**:**

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners**.**

2. **Theory examination**

   The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training, as given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ M.S shall be held at the end of 3rd academic year.

   There shall be four theory papers (as per PG Regulations).

   Paper I: Basic sciences as applied to the subject

   Paper II: Therapeutics & Tropical Medicine

   Paper III: Sytstemic Medicine of all organ systems

   Paper IV: Recent advances in the subject.

3. **Practical/clinical and Oral/viva voce examination**

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Practical examination

Practical examination should be spread over **two** days and include various major components of the syllabus focusing mainly on the psychomotor domain.

Oral/Viva voce examination on defined areas should be conducted by each examiner separately. Oral examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject focusing on psychomotor and affective domain.

The final clinical examination in broad specialty clinical subjects should include:

- Cases pertaining to major systems (eg. one long case and three short cases)
- Stations for clinical, procedural and communication skills
- Log Book Records and reports of day-to-day observation during the training
- It is emphasized that Oral/viva voce examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject.

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Recommended Reading:

Text Books (latest edition)

1. API Text book of Medicine
2. Davidson's Principles and Practice of M
3. Harrison's Principles & Practice of Medicine
4. Oxford Text book of Medicine
5. Kumar & Clark: Book of Clinical Medicine
6. Cecil: Text Book of Medicine
7. Current medical diagnosis and treatment
8. Washington manual of medical therapeutics
9. Krishnadas. K.V: Text Book of Medicine

Journals

03-05 international Journals and 02 national (all indexed) journals.

Annexure 1

Student appraisal form for MD in General Medicine											
	Element	**Less than Satisfactory**			**Satisfactory**			**More than satisfactory**			**Comments**
		1	2	3	4	5	6	7	8	9	
1	**Scholastic Aptitude and Learning**										
1.1	Has Knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g Posters, publications etc)										
1.4	Documentation of acquisition of competence										
	(eg Log book)										
1.5	Performance in work based assessments										
1.6	Self- directed Learning										
2	**Care of the patient**										
2.1	Ability to provide patient care appropriate to level of training										
2.2	Ability to work with other members of the health care team										
2.3	Ability to communicate appropriately and empathetically with patients families and care givers										
2.4	Ability to do procedures appropriate for the level of training and assigned role										
2.5	Ability to record and document work accurately and appropriate for level of training										

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2.6	Participation and contribution to health care quality improvement										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethical appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment been discussed with the trainee?	Yes	No								
	If not explain										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

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Postgraduate Medical Education Board

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PHARMACOLOGY

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PHARMACOLOGY

Preamble

The purpose of the postgraduate (PG) education is to create specialists who would provide high quality education, health care and advance the cause of science through research and training.

Pharmacology consists of both experimental and clinical sciences. The experimental component is essential in understanding the drug action in diseases as well as for the research in drug discovery and development. Clinical application of pharmacology concepts is essential for rational prescribing practices, rational therapeutics, clinical trials, rational use of drugs including antimicrobials, pharmacovigilance and pharmacology consults.

The job prospects for a medical pharmacologist have evolved over time along with a congruent rise in the demand for trained pharmacologists in India, both in academics as well in other areas such as pharmacovigilance centres, regulatory bodies, national research institutes, pharmaceutical industry and as scientific writers or science managers. Hence, a PG student in Pharmacology should be competent to meet the growing challenges in job requirements at all levels in various fields and organizations.

Considering the emerging trends in pharmacology & therapeutics, clinical applications of the subject, its role in national programs, evolving integrated course schedules while broadening the subject scope and number of students seeking to join the PG degree in pharmacology, there is huge demand to standardize and update PG curricular components including competencies, teaching learning methods and assessment methods in the MD pharmacology course in India. This requires integration of pharmacology with other sciences including basic, para-clinical and clinical disciplines.

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A pragmatic approach to postgraduate pharmacology teaching in India is a key step towards addressing the aforesaid challenges and facilitating a fresh curriculum design. The purpose of this document is to provide teachers and learners comprehensive guidelines to achieve the defined competencies through various teaching-learning and assessment strategies. This document was prepared by various subject and education experts of the national Medical Commission. The subject Expert Group has attempted to render uniformity without compromising the purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies".

SUBJECT SPECIFIC LEARNING OBJECTIVES (GOALS)

At the end of the MD training programme in Pharmacology, the student should meet the following goals:

1. **Acquisition of knowledge**

The student should be able to clearly explain concepts and principles of pharmacology and therapeutics, drug development processes, the drugs and cosmetics act, rational use of drugs, antimicrobial resistance, pharmacovigilance, pharmacy, health economics, clinical trial processes and relevant national programs.

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2. **Acquisition of Skills**

The student should be able to develop and apply skills in pharmacology-based services (e.g. rational prescribing), in self-directed learning for evolving educational needs and scientific information, in conduct of research and in managerial assignments in the department/institution.

3. **Teaching and training**

The student should be able to effectively teach and assess undergraduate medical students (MBBS) and allied health science courses (Dentistry, Nursing, Physiotherapy) so that they become competent healthcare professionals and are able to contribute to training of undergraduates (UG) and postgraduates.

4. **Research**

The student should be able to conduct a research project (in both basic and clinical pharmacology) from the planning to the publication stage and be able to pursue academic interests and continue life-long learning to become a more experienced teacher & mentor in all the above areas and to eventually be able to guide postgraduates in their thesis, research work and all other academic activities.

5. **Professionalism, Ethics and Communication skills**

The student should be able to learn and apply principles of professionalism, ethics and effective communication in conduct of research, pharmacology-based services, educational activities and day to day work.

SUBJECT SPECIFIC COMPETENCIES

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The competencies will have a judicious mix of all domains of learning and usually are predominant in one domain. The postgraduate student during the training program should acquire the following competencies to achieve the defined five goals:

A. Predominant in Cognitive domain

The MD Pharmacology student after training in the course should be able to:

General Pharmacology:

1. Demonstrate an understanding of the basic principles of Pharmacology including molecular pharmacology.
2. Demonstrate an awareness of the historical journey and contributions of scientists in the drug development process.
3. Describe the process of new drug development including preclinical and clinical phases.
4. Describe principles of pharmacokinetics of drugs and apply these to prescribe medicines for individualization of pharmacological therapy, including use of medicines in special categories (Pediatrics, Geriatrics, Pregnancy and Pathological states).

5. Explain the principles of pharmacodynamics and apply these in different therapeutic situations.
6. Describe mechanisms of drug-drug interactions and their clinical importance.
7. Describe the principles of pharmacogenomics and its clinical significance.
8. Describe pharmacological principles underlying the effects of drugs used in diagnosis, prevention and treatment of common systemic diseases in man.
9. Demonstrate an understanding of the factors that modify drug action.
10. Define Therapeutic Drug Monitoring (TDM), describe the methods of TDM and importance in therapeutic decision making.
11. Describe the principles and importance of Pharmacoeconomics in healthcare delivery. Describe the methods in pharmacoeconomic studies and the economic considerations in the use of medicines in individuals and in the community.
12. Describe the principles, methods and importance of pharmacoepidemiology, including drug utilization studies.
13. Define pharmacovigilance. Describe the importance of pharmacovigilance in ensuring patient safety and the various methods/procedures in pharmacovigilance.
14. Describe the role of Essential Medicines in rational therapeutics. Describe principles for selecting Essential Medicines for a defined healthcare delivery system.
15. Demonstrate an understanding of principles of rational prescribing.
16. Demonstrate an understanding of prescription analysis and be able to conduct prescription analysis in a healthcare facility.
17. Demonstrate an understanding of antimicrobial resistance, antibiogram, antimicrobial stewardship program and strategies for containment of antimicrobial resistance.

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Systemic Pharmacology:

1. Apply and integrate knowledge of pathophysiology of diseases and pharmacological principles underlying the effects of drugs, for the purpose of diagnosis, prevention and treatment of common systemic diseases in man including disorders of:
    a. Synaptic & neuroeffector junctional sites of the autonomic nervous system
    b. Neuromuscular junction

c. Central nervous system
d. Cardiovascular system
e. Endocrine system
f. Gastrointestinal system
g. Respiratory system
h. Renovascular system
i. Hematological system
j. Immunological system
k. Autacoids

(Note: The above is only an indicative list).

2. Describe the mechanism of action, pharmacological effects and therapeutic status of drugs used for prevention and management of microbial and parasitic infections/infestations and neoplastic disorders.
3. Describe the pathophysiological basis and management of common poisonings.
4. Demonstrate an awareness about the recent advances in pharmacology and therapeutics.
5. Demonstrate an understanding of the special considerations in pharmacokinetics, mechanism of action, pharmacological effects and therapeutic status of drugs used for dermatological and ocular disorders.

Research:

1. Demonstrate an understanding of the importance and ethical considerations of biomedical research in animals and man.
2. Describe the principles and methods of biomedical research in animals and man.
3. Describe the current principles of Good Clinical Practice (GCP) and Good Laboratory Practice (GLP) guidelines, as applicable.
4. Demonstrate an understanding of the different tools and methods for literature search.
5. Describe and apply the principles of biostatistics in the evaluation and interpretation of efficacy and safety studies of drugs in man. Apply and interpret the various statistical tools in biomedical research.
6. Demonstrate an understanding of the principles of Good Publication practices as applicable to publication of research studies.

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7. Describe different methods of drug assays - biological, chemical, immune-assay including knowledge of analytical techniques like HPLC, TLC etc. and their applications in therapeutics.
8. Describe the methods for screening/evaluation of **a**nalgesics, antipyretics, anticonvulsants, anti-inflammatory drugs, antidepressants, antianxiety and antipsychotics, sedatives, muscle relaxants, antihypertensives, hypocholesterolemic agents, antiarrhythmic drugs, diuretics, adrenergic blocking drugs, drugs affecting learning and memory in animals and man. *(Note: This is only an indicative list).*
9. Describe the regulatory and ethical issues involved in drug development and research.

Teaching and Assessment:

1. Demonstrate an awareness about the salient features of Undergraduate Medical Education Curriculum in India.
2. Demonstrate an awareness about Postgraduate Medical Education Curriculum and Guidelines in India.
3. Describe the principles of teaching-learning technology and apply these to conduct classroom lectures, self-directed learning (SDL) sessions, Case-Based Learning (CBL), case discussions, integrated teaching, small group discussions, seminars, journal club and research presentations.
4. Describe the principles of assessment of learning and be able to use the different methods for assessment of undergraduate students in pharmacology.
5. Demonstrate knowledge about the utility of computer assisted learning and be able to use them efficiently to promote learning of pharmacology.

Note: *The list mentioned above is indicative. A postgraduate student is expected to be knowledgeable about all aspects of the subject and be updated about the contemporary advances and research in the subject.*

B. Predominant in Affective Domain

The students after training in the MD (Pharmacology) course should be able to:

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1. Effectively explain to patients, the effects, appropriate use and adverse effects of drugs, including drug interactions and the need for medication adherence.
2. Communicate effectively with students, peers, staff, faculty and other members of the health care team about rational use of medicines and improving spontaneous reporting of adverse drug reactions, with pharmacological reasoning
3. Demonstrate respect in interactions with peers, patients and other healthcare professionals.
4. Demonstrate professionalism, ethical behavior and integrity in one's work.
5. Demonstrate ability to generate awareness about the use of generic drugs in various conditions.
6. Acquire skills for self-directed learning to keep up with advances in the subject and to improve the skills and expertise towards continuous professional development.

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C. Predominant in Psychomotor Domain

a. Mandatory

i. The students after training in the MD (Pharmacology) course should be able to *perform the following procedures independently* or as a part of a team and/or interpret the results:

1. Predict, report, monitor and participate in the management and causality assessment of adverse drug reactions associated with use of drugs, as per national program.
2. Demonstrate skills for writing rational prescriptions and prescription analysis.
3. Demonstrate proper use of equipment following the SOPs e.g. organ bath, analgesiometer, physiograph, convulsiometer, plethysmograph, equipment for testing/measuring learning and memory, affective disorders, muscle relaxants, blood pressure, ECG, respiration and pain.
4. Prepare drug solutions of appropriate strength and volume.
5. Determine EC_{50}, ED_{50}, pD2 and pA_2 values of drugs.
6. Demonstrate presentation skills in a classroom setting as well as in academic meetings at local and national levels.
7. Provide critical appraisal of a research paper.

8. Perform experiments to demonstrate and interpret the dose response curve and effect of agonists (in the presence or absence of an antagonist) on simulations.
9. Perform the following:
    - Design protocol for evaluation of a given drug for various phases of clinical trials.
    - Prepare Informed Consent Form and Participant Information Sheet for clinical trials/research.
    - Administer Informed Consent Form
    - Evaluate promotional drug literature
    - Prepare "Package insert"
    - Calculate and interpret pharmacokinetic parameters of a drug from a given data
    - Demonstrate skills to prepare material for teaching-learning and assessment.

ii. The students after training in the MD (Pharmacology) course should be able to ***do/perform following procedures under supervision***:

10. Test and predict efficacy of drugs following appropriate guidelines and regulations e.g. drugs affecting memory and psychomotor functions (e.g. critical flicker fusion tests in human volunteers), pain, cardiovascular functions, respiratory functions etc.
11. Observe and understand basic principles of working of important contemporary drug analytical techniques, interpret the observations about the drug levels and their therapeutic applications.
12. Demonstrate skills for contributing to antibiotic stewardship program of the institute to manage antimicrobial resistance.
13. Demonstrate Standard Operating Procedures (SOPs) for various methods and techniques used in pharmacology including SOPs in clinical trials and research.
14. Administer drugs by various routes (subcutaneous, intravenous, intraperitoneal) in simulations and hybrid models.
15. Demonstrate acquisition of writing skills for scientific publications and research projects for funding agencies and approval by Ethics Committee.
16. Demonstrate scientific writing skills.

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b. Desirable: The students after training in the MD (Pharmacology) course should be able to:

17. Collect blood samples and oral gavage from experimental animals.
18. Administer drugs by various routes (subcutaneous, intravenous, intraperitoneal) in experimental animals.
19. Perform *in vivo* and *in vitro* animal experiments or simulated experiments, interpret the observations and relate these to potential clinical applications of the experimental drug:

    e.g. - effect of mydriatics and miotics on rabbit eye,

    - effect of anti-epileptic drugs using appropriate animal models of epilepsy,
    - effect of analgesics using appropriate animal models of analgesia, and
    - effect of drugs on learning, memory and motor coordination and effect of local anesthetics.

    These are examples, but the list is not limited to this only.
20. Perform experiments to demonstrate and interpret the dose response curve and effect of agonists (in the presence or absence of an antagonist) on various biological tissues.

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Animal Experiments: All animal experiments must be compliant with the Regulations of Government of India, notified from time to time. Amphibian/Dog/Cat experiments should be conducted by computer assisted simulation models/facilities. Other experiments can be performed, but as permissible by existing 'Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA)' guidelines and other Government regulations.

SYLLABUS

The course contents should cover the following broad topics:

1. History of Pharmacology and medicine
2. Basic and molecular pharmacology
3. Drug receptors and Pharmacodynamics
4. Pharmacokinetics (Absorption, Distribution, Biotransformation, Excretion & kinetic parameters)

5. Therapeutic Drug Monitoring
6. Drugs acting on synaptic and neuroeffector junctional sites
7. Autonomic pharmacology
8. Drugs acting on central nervous system
9. Drugs modifying renal functions
10. Drugs acting on cardiovascular system and hemostatic mechanisms
11. Reproductive Pharmacology
12. Agents affecting calcium homeostasis
13. Autacoids and related pharmacological agents (analgesics) and drugs used in Rheumatoid arthritis and Gout
14. Drugs acting on Gastrointestinal system
15. Pharmacology of drugs affecting the respiratory system
16. Chemotherapy- General principles and various antimicrobials
17. Chemotherapy of neoplastic disease
18. Drugs used in Autoimmune disorder and Graft versus Host Disease
19. Dermatological pharmacology
20. Ocular pharmacology
21. Use of drugs in special population
22. Immunomodulators - immunosuppressants and immunostimulants
23. Pharmacology of drugs used in endocrine disorders
24. Drug delivery systems
25. Heavy metal poisoning
26. Non-metallic toxicants - air pollutants, pesticides etc.
27. Research methodology and biostatistics
28. Pharmacogenomics, pharmacovigilance, pharmacoeconomics and pharmacoepidemiology
29. Over the counter drugs, essential medicines, P-drug, commonly used Over-The-Counter (OTC) drugs, generic drugs, drugs banned in India
30. Principles of rational use of drugs and rational prescribing
31. Dietary supplements and herbal medicines
32. Pathophysiological basis and management of common poisonings
33. National programmes for infectious and vector borne diseases including the regimes.
34. Professionalism & ethics

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35. Clinical pharmacology

- Functioning of the Drugs and Therapeutics Committee.
- Hospital formulary development.
- Drug information services.
- Medication error detection and mitigation advice.
- Antimicrobial resistance and antibiotic stewardship.
- Prescription auditing
- Drug counseling - explain to patients, the effects and adverse effects of drugs, including the need for medication adherence
- Emergency drugs used in crash cart/ resuscitation

36. Drug development research and Regulations

- Principles of Good Clinical Practice (GCP) and Good Laboratory Practice (GLP) guidelines, and Good publication practices
- Recent regulatory guidelines for drugs/research and clinical trials
- Drug development and research and ethical issues involved in it
- Research protocol development, research study conduct, experimental observations, analysis of data using currently available statistical software
- Emergency use authorization for drugs eg., vaccine development

37. Pharmacometrics - methods of drug evaluation.

38. General screening and evaluation of:

- analgesics, antipyretics, anticonvulsants, anti-inflammatory drugs, antidepressants, antianxiety and antipsychotics, sedatives, muscle relaxants, antihypertensives, hypocholesterolemic agents, anti-arrhythmic drugs, diuretics, adrenergic blocking drugs, local anaesthetics, antifertility agents, antidiabetics, drugs used in peptic ulcer diseases and drugs affecting learning and memory in animals and man.

39. Experimentation

- Bioassay methods
- Animal experiments: Ethical considerations, ethical approval, applicable Regulatory Guidelines, humane animal research (principles of 3Rs) and alternatives to animal experimentation. General and statistical considerations

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- Anesthetics used in laboratory animals
- Principles of EC50, ED50, pD2 and pA2 values of drugs
- Describe methods of bioassay for estimation of:
  Acetylcholine, skeletal neuromuscular junction blockers, adrenaline, noradrenaline, histamine, 5 HT, hormones, insulin, vasopressin/oxytocin, estrogen, progestins, ACTH
- Competitive antagonism - pA2 values
- Immunoassays: Concept, types of bioassays and their application/s
- Animal experiments: Ethical consideration, Ethics Committee and ethical approval
- Regulatory Guidelines and alternatives to animal experimentation.

40. Biochemical Pharmacology

- Basic principles and applications of simple analytical methods
- Principles of quantitative estimation of drugs, endogenous compounds and poisons using Colorimetry, Spectrophotometry, flame photometry, High Performance Liquid Chromatography (HPLC) and enzyme-linked immunosorbent assay (ELISA).

41. Education

- Salient features of Undergraduate Medical Education Curriculum in India.
- Postgraduate Medical Education Curriculum and Guidelines in India.
- Principles of teaching - learning methods and technology
- Principles of assessment of learners

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TEACHING AND LEARNING METHODS

General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skills oriented. Learning in the program, essentially autonomous and self-directed, and emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the postgraduate courses shall work as full-time (junior) residents during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a log book for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real time.

Teaching-Learning methods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinical meetings, seminars, small group discussions, bed-side teaching, case-based learning, simulation-based teaching, self-directed learning, integrated learning, interdepartmental meetings and any other collaborative activity with the allied departments. Methods with exposure to the applied aspects of the subject relevant to basic/clinical sciences should also be used.

The suggested examples of teaching-learning methods are given below but are not limited to these. The frequency of various below mentioned teaching-learning methods can vary based on the subject's requirements, competencies, work load and overall working schedule of the department.

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A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures per year in the concerned PG department is suggested. Topics to be selected as per subject requirements. All postgraduate trainees will be required to attend these lectures. Lectures can cover topics such as:

1. Subject related important topics
2. Recent advances
3. Research methodology and biostatistics
4. Salient features of Undergraduate/postgraduate medical curriculum
5. Teaching and assessment methodology
6. Toxicity studies
7. Screening for pharmacological activity of drugs
8. Technical and ethical issues in clinical research and practice
9. Good laboratory practice
10. Good manufacturing practice
11. Health economics

No 3, 4, 5 can be done in the course of research/biostatistics and medical education workshops in the institute.

B. Journal club: Minimum of once in 1-2 weeks is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once every 1-2 weeks is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive evidence-based review of the topic. The student should be graded by the faculty and peers.

D. Student Symposium: Minimum once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students during moderation. It should aim at complete evidence-based review of the topic. All participating postgraduates should be graded by the faculty and peers.

E. Laboratory work / Bedside clinics: Minimum - once every 1-2 weeks.

Laboratory work/clinics/bedside teaching should be coordinated and guided by faculty from the department. Various methods like DOAP (Demonstrate, Observe, Assist, Perform), simulations in skill lab, and case-based discussions etc. are to be used. Faculty from the department should participate in moderating the teaching-learning sessions during clinical rounds.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the Department of Pharmacology and another department or departments on topics of current/common interest or clinical cases.

G. a. Rotational clinical / community / institutional postings

Depending on local institutional policy and the subject specialty needs, postgraduate trainees may be posted in relevant departments/ units/ institutions. The aim would be to acquire more in-depth knowledge as applicable to the concerned specialty. Postings would be rotated between various units/departments.

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The postings schedule with duration is given below:

- Medicine -2 weeks
- Anesthesia -2 weeks
- Dermatology -1 week
- Medical oncology -2 weeks (if available)
- Microbiology/ Infection control unit or dept -2 weeks
- Biochemistry -2 weeks
- Hospital Pharmacy -1 week (if available)
- Clinical trial unit/Research unit/ Pharmaceutical industry -2-8 weeks (as per availability)
- Medical Education Unit (MEU) or Department of Medical Education (DOME) -1 week (optional)

G b. Posting under "District Residency Programme" (DRP):

All postgraduate students pursuing MD in Pharmacology in all Medical Colleges/Institutions shall undergo a compulsory rotation of three months in District Hospitals/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th or 5th semester of the Postgraduate programme and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident".

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Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists / clinicians in different

hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

H. Teaching research skills

Writing a thesis should be used for inculcating research knowledge and skills. All postgraduate students shall conduct a research project of sufficient depth to be presented to the University as a postgraduate thesis under the supervision of an eligible faculty member of the department as guide and one or more co-guides who may be from the same or other departments.

In addition to the thesis project, every postgraduate trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be reinforced.

I. Training in teaching skills

Medical Education Unit (MEU)/ Department of Medical education (DOME) should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on teaching skills to the student.

J. Log book

During the training period, the postgraduate student should maintain a Log Book indicating the duration of the postings/work done in Wards, OPDs, Casualty and other areas of posting. This should indicate the procedures assisted and performed and the teaching sessions attended. The log book entries must be done in real time. The log book is thus a record of various activities by the student like: (1) Overall participation & performance, (2) attendance, (3) participation in sessions, (4) record of completion of pre-determined activities, and (5) acquisition of selected competencies.

The purpose of the Log Book is to:

a) help maintain a record of the work done during training,
b) enable Faculty/Consultants to have direct information about the work done and intervene, if necessary,

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c) provide feedback and assess the progress of learning with experience gained periodically.

The Log Book should be used in the internal assessment of the student, should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce completed log book in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate from the Head of Department regarding the clinical competence and skillful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in log book particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and at least two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty are referred to the MCI Logbook Guidelines uploaded on the Website.

K. Course in Research Methodology: All postgraduate students shall complete an online course in Research Methodology within six months of the commencement of the batch and generate the online certificate on successful completion of the course.

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L. Other aspects

- The postgraduate trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The postgraduate trainees must undergo compulsory training in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS).
- The postgraduate trainees must undergo training in information technology and use of computers.

- The postgraduate trainees should preferably undergo training in Good Clinical Practice (GCP)

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learnt initially on the models, later to be performed under supervision followed by independent performance. For this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, i. e., assessment to improve learning

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

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General Principles

The Internal Assessment should be conducted in theory and practical/clinical examination, should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should include quarterly assessment.

Quarterly assessment during the MD training should be based on:

- Case presentation, case work up, case handling/management : once a week
- Laboratory performance : twice a week
- Journal club : once a week
- Seminar : once a fortnight
- Case discussions : once a fortnight/month
- Interdepartmental case or seminar : once a month

Note: These sessions may be organized and recorded as an institutional activity for all postgraduates.

- Attendance at Scientific meetings, CME programmes (at least 02 each)

Important instructions:

- The feedback should be given to students timely and frequently so that they get a chance to improve.
- All teachers of the Department should be involved in assessment.
- The records and Log book shall be checked and assessed periodically by the faculty members imparting the training.

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, i.e., assessment at the end of training

Essential pre-requisites for appearing for examination include:

1. **Log book** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.

2. At least **two presentations** at national level conference. One research paper should be published / accepted in an indexed journal**. (It is suggested that the local or University Review committee assess the work sent for publication).**

The summative examination would be carried out as per the Rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination**.**

The postgraduate examination shall be in three parts**:**

1. Thesis

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners**.**

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2. Theory examination

The examinations shall be organized on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training, as given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ M.S shall be held at the end of 3rd academic year.

There shall be four theory papers (as per PG Regulations).

Paper I: Basic sciences as applied to Pharmacology

Paper II: Systemic Pharmacology

Paper III: Clinical Pharmacology, Experimentation, Research, Biostatistics and Education

Paper IV: Recent advances in the Pharmacology

3. Practical/clinical and Oral/viva voce examination

Practical examination

Practical examination should be spread over **two** days and include various major components of the syllabus focusing mainly on the psychomotor domain.

Oral/Viva voce examination on defined areas should be conducted by each examiner separately. Oral examination shall be comprehensive enough to test the postgraduate student's overall knowledge of the subject focusing on psychomotor and affective domain.

Practical Examination Exercises:

a) long exercises:

- Protocol design for a given scenario
- Case audit for a given case
- Perform experiments or simulated experiments (as per PG Regulations) The exercises should be observed, response of student noted and assessed. The question related to these exercises can be asked

b) short exercises:

- Interpretation of results of a previous tracing - Table exercise

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- Demonstration of effects of drugs/interpretation of results in human
- Demonstration of effects of drugs/interpretation of results in small, animals - optional (as per Regulations notified)

  The exercises should be observed and assessed.

c) OSPE exercises: Objective Structured Practical Examination (OSPE)

OSPE should have 10-15 stations. Stations should be mixture of observed (observer present) and unobserved stations (without an observer). Few examples are given below:

- Various drug delivery systems
- Calculating pharmacokinetic parameters
- Pharmaceutical calculations
- Statistical exercise
- Pharmacoeconomics
- Critical appraisal of a published paper
- Abstract writing of a published paper
- Evaluation of drug promotional literature.
- Adverse Drug Reaction (ADR) reporting and causality assessment
- Assessment of preclinical toxicity data
- Analysis of rational and irrational formulations
- Selecting a P-drug and writing rational prescriptions
- Analytical instruments - use and interpretation
- Identifying ethics related dilemmas / mistakes in clinical trial documents

d) Assessment of teaching/presentation skills

- e.g., presentation of a UG lecture, making Question paper, Learning Objectives
- Discussion on dissertation

Recommended Readings

Books:

1. Brunton LL, Hilal-Dandan R, Knollmann BC. Goodman and Gilman's The Pharmacological Basis of Therapeutics, 13th edition, Mc Graw Hill Education, 2018.

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2. Katzung BG. Basic & Clinical Pharmacology, 14th edition, McGraw Hill Education, 2018.
3. Papadakis MA, Mcphee SJ. Current Medical Diagnosis & Treatment. 60th edition New York. McGraw Hill Education.2021.
4. Ritter M, Flower R, Henderson G, Loke YK, MacEwan D, Rang HP. Pharmacology. Elsevier, 9th edition, 2020.
5. Tripathi KD. Essentials of Medical Pharmacology, 8th edition. Jaypee Brothers Medical Publishers Private Ltd: New Delhi 2019.
6. M. N. Ghosh. Fundamentals of Experimental Pharmacology. 7th Edition. Hilton & Company, 2019.
7. Badyal D. Practical Manual of Pharmacology. Jaypee Brothers Medical Publishers; 3rd edition 2020.
8. Vogel HJ. Drug Discovery and Evaluation: Pharmacological Assays Springer; 3rd edition, 2007.
9. Sharma S, Velpandian T. Illustrated Reviews Pharmacology. Wolter Kluver, South Asian Edition, 2019.
10. Medhi B, Prakash A. Practical Manual of Experimental & Clinical Pharmacology. Jaypee Brothers Medical Publishers, 2nd edition, 2017.
11. Alldredge BK, Corelli RL, Ernst ME, Guglielmo Jr. BJ, Jacobson PA, Kradjan WA, Williams BA. Koda-Kimble and Young's Applied Therapeutics Lippincott Williams and Wilkins, 10th edition, 2012.
12. Cheston B Cunha, Burke A Cunha. Antibiotic essentials. Jaypee Brothers Medical Publishers 17th edition, 2021.

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Websites:

1. National Guidelines on national programs e.g. https://cdsco.gov.in/opencms/opencms/en/Home
2. MOHFW Website https://www.mohfw.gov.in/
3. WHO Website https://www.who.int/

Journals:

03-05 international Journals and 02 national (all indexed).

Annexure I

Student appraisal form for MD in Pharmacology											
	Elements	**Less than Satisfactory**			**Satisfactory**			**More than satisfactory**			**Comments**
		1	2	3	4	5	6	7	8	9	
1	**Scholastic aptitude and learning**										
1.1	Has knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g., Posters, publications etc)										
1.4	Documentation of acquisition of competence (e.g., Log book)										
1.5	Performance in work-based assessments										
1.6	Self-directed Learning										
2	**Work related to training**										
2.1	Practical skills that are appropriate for the level of training										
2.2	Respect for processes and procedures in the work space										
2.3	Ability to work with other members of the team										
2.4	Participation and compliance with the quality improvement process at the work environment										

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2.5	Ability to record and document work accurately and appropriate for level of training										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethically appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment pattern been discussed with the trainee?	Yes	No								
	If not explain										
	Name and Signature of the assesse										
	Name and Signature of the assessor Date										

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NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/21 **Date: 07-11-2022**

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN MICROBIOLOGY

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN MICROBIOLOGY

Preamble

The aim of postgraduate education in Microbiology is to impart requisite clinical, diagnostic, teaching and research skills with appropriate attitude and communication competencies required in the field of Medical Microbiology.

Currently the postgraduate students of Microbiology are trained in the laboratory with minimal exposure to patient care, but with technological advances and automation in diagnostic microbiology and increasing threat of infections due to emerging & reemerging microbes, drug resistance and widening host range, a microbiologist needs to develop clinical expertise in addition to technical expertise and be available more at the bedside to develop partnership with clinician in diagnosis and management of infectious disease cases. To fulfill these expectations, the program of MD Microbiology needs to shift focus to clinical aspects of microbiology, where a student is trained in the clinical setting and is able to contribute in the clinical management along with diagnosis, prevention and control of infectious disease.

This document provides guidelines to standardize Microbiology teaching at the postgraduate level throughout the country and fulfill the expectations as a microbiologist. The new curriculum guide has given more emphasis on training in patient care setting with integration of concepts of microbiology in various clinical specialties through dedicated postings, ward rounds, case discussion etc. This document has been prepared by subject-content specialists for the National Medical Commission. The Expert Group of the National Medical Commission had attempted to render uniformity without compromise to the purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

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SUBJECT SPECIFIC OBJECTIVES (GOALS)

A postgraduate student upon successfully qualifying in the MD Microbiology examination should be able to:

1. Demonstrate competence in clinical aspects as a Microbiologist to improve patient care.
2. Demonstrate application of microbiology in different clinical settings to address diagnostic and therapeutic problems along with preventive measures.
3. Play an important role in hospital infection control by actively participating in activities of the Hospital Infection Control Committee as a team member.
4. Demonstrate competence in recording, advising and guiding use of antimicrobials judiciously for infectious diseases in routine and in special clinical situations and population.
5. Demonstrate competence in developing guideline for antibiotic usage, including formulation of antibiotic policy in hospital.
6. Demonstrate communication skills required for safe & effective laboratory practice and teaching of microbiology
7. Demonstrate skills in conducting collaborative research in the field of Clinical Microbiology and allied sciences which has significant bearing on human health and patient care.
8. Demonstrate ability to plan, execute and evaluate teaching and training assignments efficiently and effectively in Microbiology for undergraduate students as per Competency Based Medical Education (CBME).
9. Identify public health epidemiology, global health patterns of infectious diseases and effectively participate in community outreach and public health programs for investigation, prevention and control of infectious diseases.
10. Demonstrate ability to work as a member of the rapid response team and contribute to investigations of outbreaks of infectious diseases in the hospital and outbreak/epidemic/pandemic in the community.
11. Demonstrate self-directed learning skills and keep updated with recent advances in the field of clinical microbiology.

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12. Demonstrate administrative and organizational skills to establish good clinical microbiological services in a hospital and in the community in the field of clinical microbiology
13. Demonstrate effective leadership and teamwork skills while working with other members of the health care team in hospital, laboratory and community settings.
14. Demonstrate attributes of professional behavior and uphold the prestige of the discipline amongst the fraternity of doctors.

Postgraduate training

The postgraduate training should include the following components for a holistic approach-

1. Clinical Microbiology including Antimicrobial Resistance (AMR)
2. Laboratory skills in diagnostic Microbiology
3. Infection Prevention and Control Skills
4. Teaching and learning Skills
5. Research Skills
6. Attitude, Ethics and Communication skills

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The postgraduate student should develop and demonstrate competence in the above components as follows:

1. Clinical Microbiology including Antimicrobial Resistance (AMR)

i. Should be able to elicit relevant history for optimum clinico-microbiological correlation with laboratory results.

ii. Should be able to perform basic physical examination and assess the patients with any suspected infection including community acquired/ tropical infection/ sepsis/ imported infection/ hospital acquired infections and emerging and re-emerging infections.

iii. Should be able to formulate and critique diagnostic algorithms and patient care plans.

iv. Should be able to choose, interpret and communicate the results of appropriate microbiological investigation in a suspected infection.

v. Should be able to suggest optimal antimicrobial therapy, based on results of antimicrobial susceptibility tests and other investigations.

vi. Should be able to advocate antibiotic stewardship for prevention and control of AMR (detailed competencies under AMR are given in Annexure I),

vii. Should be able to educate patients/ relatives/ community on various aspects of antimicrobial use, antimicrobial drug resistance, prevention and control of infections.

2. Laboratory skills in diagnostic Microbiology

i. Should be able to demonstrate acquisition of pre-analytical, analytical and post-analytical laboratory skills to ensure quality of test results.

ii. Should be able to perform tests pertaining to basic, diagnostic, clinical and applied Microbiology.

3. Infection Prevention and Control

i. Should be able to demonstrate knowledge, skills & attitude required to detect, prevent and control health care associated infections of all types.

ii. Should be able to set up and manage Central Sterile Services Department (CSSD) and prepare effective sterilization and disinfection policy for the hospital.

iii. Should be able to demonstrate knowledge and skills about management of biomedical waste in health care setting as per recent guidelines and educate staff about risks, preventive measures and the management of occupational exposure to infectious agents.

4. Teaching and Learning Skills

i. The Medical Education Department/Unit of the institution should be able to sensitize the postgraduate students in basic concepts of medical education technologies like domains of learning, teaching skills, teaching - learning methods, lesson planning, learning resource material, assessment techniques etc.

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ii. Should be able to demonstrate good teaching skills while conducting teaching/training sessions like tutorials, demonstrations and practical for undergraduate students, laboratory technicians etc. and participate actively in the planning and conduct of assessment of students learning at various stages of formative / summative assessment.

iii. Should be able to learn by integrating with concerned subspecialty.

5. Research Skills

i. Should be able to plan, design and conduct meaningful scientific research in microbiology in collaboration with allied subjects.

ii. Should acquire expertise to write research protocol, thesis and present a research paper in the scientific forum.

iii. Should follow guidelines on ethical conduct in research.

iv. Should acquire proficiency and demonstrate ability to use biostatistics, data management.

v. Should be able to critically appraise a scientific article and have knowledge of evidence-based practice.

vi. Should acquire expertise in writing proposals for research grants and know the various sources of research funding.

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6. Communication and attitudinal skills

i. Should demonstrate the right kind of attitude, communication and ethics while dealing with clinical material and reports.

ii. Should be able to work as an effective team member and leader.

SUBJECT SPECIFIC COMPETENCIES

The competencies will have a judicious mix of all domains of learning and may show predominance in one domain. The Post-Graduate student during the training

programme should acquire the following predominant domain specific competencies to achieve the defined goals:

A) Predominant in Cognitive Domain (Knowledge):

At the end of the course, the student should have acquired knowledge in the following competencies:

Paper I: General Microbiology (GM) & Immunology (IG)

General Microbiology (GM):

i. Describe important historical events and developments in microbiology
ii. Describe nomenclature, classification, morphology, growth requirements, pathogenesis and laboratory diagnosis of different bacteria, viruses, parasites and fungi.
iii. Explain the importance of normal flora microbes, including Microbiome in health and disease.
iv. Explain the factors influencing and significance of microbial environment in health care setup.
v. Describe the epidemiology of common infectious diseases, host-parasite relationship and their significance.
vi. Describe various types of microscopes and microscopic techniques used in diagnostic microbiology.
vii. Explain various methods of isolation, identification and preservation of microbes in laboratory.
viii. Explain the type, mechanism of action and applications of microbial toxins, other virulence factors & microbial products like Bacteriocins.
ix. Explain the concept & application of various biosafety and biosecurity issues in laboratory and patient care including physical, biological containment and standard precautions.
x. Discuss the various methods of sterilization and disinfection and apply them in the laboratory and in patient care.

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xi. Explain the basic principles of bacterial genetics and applications of molecular techniques in medical microbiology.

xii. Explain the concept of microbiological surveillance including patient screening methods, organism typing and genome sequencing methodologies.

xiii. Explain the concept and application of quality assurance, quality control and accreditation in diagnostic microbiology.

xiv. Describe the significance and causes/reasons regarding emerging infectious diseases with strategies for their identification and control.

xv. Explain the concept and application of molecular biology techniques in the laboratory diagnosis of infectious diseases.

xvi. Explain the concept and use of information technology (LIS, WHO NET etc.) in microbiology laboratory effectively.

xvii. Describe the principles & implementation of animal and human ethics involved in diagnostics and research in Microbiology

xviii. Explain the principles and application of recent technological advances, automation, and application of Artificial Intelligence, nanotechnology, biosensors, bioinformatics, etc. in diagnosis & research in Microbiology.

xix. Explain the importance and methods of testing microbiology of air, water and food in patient care both in community/ hospital setting.

xx. Explain in detail about types & mechanism of action of Antimicrobial agents, their pharmacokinetics & pharmacodynamics, along with mechanism of drug resistance.

xxi. Describe types and applications of Bacteriophages in diagnostic and therapeutic of infections

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Immunology (IG)

i. Describe the structure and function of the immune system, immunological mechanisms in health and response of the host immune system to infections. (Innate and acquired immunity, Cells involved in immune response, Antigens , Immunoglobulins, Mucosal immunity, Cell mediated immunity, Cytokines, MHC complex, Immune tolerance etc)

ii. Explain the complement system and describe its role in health and disease.

iii. Describe the mechanism/s in immunological disorders (hypersensitivity, autoimmune disorders and immunodeficiency states) and discuss the laboratory methods used in their diagnosis including measurement of immunological parameters

iv. Describe the types & principles of antigen and antibody reactions and immunological techniques used in diagnostic microbiology as well as in research.

v. Describe the immunological mechanisms of transplantation and tumor immunity**.**

vi. Describe the mechanism/s and significance of immune-potentiation and immune-modulation.

vii. Describe various types, techniques and advances in the development and applications of vaccines including UIP and immunotherapy and reverse vaccinology.

viii. Explain the role of animals in immunology.

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PAPER II Clinical / Systemic Microbiology –I (CM –I)

i. Discuss in depth about the etiological agents, source, transmission, host-parasite interaction, clinical manifestations, laboratory diagnosis, treatment, prevention, epidemiology, national, international guidelines in the situations/ scenario given below:

- **Infections of various organs and systems of the human body**

Microbiological basis of infective syndromes of various organs and systems of human body viz. CVS and blood, Respiratory Tract Infections, Urinary Tract Infections, Central Nervous System infections, Reproductive Tract Infections, Gastrointestinal Tract infections, Hepatobiliary System, Skin and Soft tissue infections, Musculoskeletal system, infections of Eye, Ear and Nose etc)

PAPER III: Clinical / Systemic Microbiology – II (CM-II)

i. Discuss in depth about the etiological agents, source, transmission, host-parasite interaction, clinical manifestations, laboratory diagnosis, treatment, prevention, epidemiology, national, international guidelines in the situations/ scenario given below:

- **Infectious diseases as per the source/risk**

- **Opportunistic Infections** in special and high risk host
- **Infections in special situations/ scenario**.

Microbiological basis of infective syndromes as per the source/risk e.g. Blood borne, sexually transmitted infections congenital, vector borne, food, air & water borne, zoonotic, laboratory acquired, occupational infections etc. Opportunistic Infections in special and high risk host eg Pregnancy, neonates, geriatrics, diabetics, immunocompromised host due to any reason, patients with Implants/Devices, dialysis etc, Infections in special situations/ scenario -Tropical, Travel related, Emerging/ Remerging Infectious diseases seen commonly, agents of bioterrorism etc.

ii. Elicit relevant history, interpret laboratory results with clinic-microbiological correlation and develop diagnostic and treatment algorithms.

Following organisms (bacteria, fungi, virus and parasites) must be covered under clinical/systemic microbiology and the list must be updated to include newly identified microbes from time to time-

Bacteria:

1. Gram positive cocci of medical importance including *Staphylococcus, Micrococcus, Streptococcus, anaerobic cocci* etc.
2. Gram negative cocci of medical importance *including Neisseria, Branhamella, Moraxella* etc.
3. Gram positive bacilli of medical importance including *Lactobacillus, Coryneform organisms, Bacillus and aerobic bacilli, Actinomyces, Nocardia, Actinobacillus and other actinomycetales, Erysipelothrix, Listeria, Clostridium* and other spore bearing anaerobic bacilli etc.
4. Gram negative bacilli of medical importance including *Enterobacteriaceae, Vibrios, Aeromonas, Plesiomonas, Haemophilus, Bordetella, Brucella, Gardnerella, Pseudomonas and other non-fermenters, Pasteurella, Francisella, Bacteroides, Fusobacterium, Leptotrichia and other anaerobic gram negative bacilli* etc.

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5. *Helicobacter, Campylobacter, Calymmatobacterium, Streptobacillus, Spirillum* and miscellaneous bacteria
6. *Mycobacteria*
7. *Spirochaetes*
8. *Chlamydia*
9. *Mycoplasmatales; Mycoplasma, Ureaplasma, Acholeplasma and other Mycoplasmas.*
10. *Rickettsiae, Coxiella, Bartonella* etc.
11. Any newly emerging bacteria

Fungi:

1. Yeasts and yeast like fungi of medical importance including *Candida, Cryptococcus, Malassezia, Trichosporon, Geotrichum, Saccharomyces* etc.
2. Mycelial fungi of medical importance including *Dermatophytes, Aspergillus, Zygomycetes, Pseudallescheria, Fusarium, Piedra, other dematiaceous hyphomycetes and other hyalohyphomycetes* etc.
3. Dimorphic fungi including *Histoplasma, Blastomyces, Coccidioides, Paracoccidioides, Sporothrix, Talaromyces marneffei* etc.
4. Fungi causing Mycetoma, Chromoblatomycosis, Occulomycosis Otomycosis, Phaeohyphomycosis etc
5. *Pythium insidiosum*
6. *Prototheca*
7. *Pneumocystis jirovecii*
8. *Lacazia loboi (Loboa loboi)*
9. Laboratory contaminant fungi
10. Fungi causing Mycetism and mycotoxicosis
11. Any newly emerging fungi

Virus:

1. DNA viruses of medical importance including Pox viruses, Herpes viruses, Adeno viruses, Hepadna virus, Papova and Parvo viruses etc.

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2. RNA viruses of medical importance including Picorna viruses, Toga viruses, Flavi viruses, Orthomyxo viruses, Paramyxo viruses, Reo viruses, Rhabdo viruses, Arena viruses, Bunya viruses, Retro viruses, Filo viruses, Human immunodeficiency virus, Arbo viruses, Corona viruses, Calci viruses etc.
3. Oncogenic viruses
4. Bacteriophages
5. Slow viruses including prions
6. Unclassified viruses
7. Viriods
8. Any newly emerging virus

Parasite:

1. Protozoan parasites of medical importance including *Entamoeba, Free living amoebae, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocystis, Cryptosporidium, Cyclospora Isospora, Babesia, Balantidium,* etc.

2. Helminths of medical importance including those belonging to Cestoda (*Diphyllobothrium, Taenia, Echinococcus, Hymenolepis, Dipylidium, Multiceps* etc.), Trematoda (*Schistosomes, Fasciola, Fasciolopsis, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis* etc.) and Nematoda (*Ascaris lumbrecoides, Ancylostoma duodenale, Enterobius vermicularis, Trichuris trichiura, Filariasis* etc.)

3. *Rhinosporidium seeberi*

4. Entomology: common arthropods and other vectors viz. mosquito, sand fly, ticks, mite, cyclops, louse, myasis etc.

5. Neglected tropical parasitic diseases

6. Any newly emerging parasite

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Paper IV: Applied Microbiology (AM) & Recent Advances:

Student should be able to apply knowledge & comprehension about following applied aspects:

i. **Prophylaxis** - Basic Principles and applications of general, immune as well as chemo- prophylaxis of infections in various clinical situations / scenarios.

ii. **Vaccinology**: types of vaccines, principles, methods of preparation of vaccines and administration of vaccines.

iii. **Health care associated Infections** - types, pathogenesis, diagnosis, prevention, control and surveillance of health care associated infections.

iv. Biomedical waste and its management.

v. **Role of microbes in non-communicable diseases** - infectious agents in origin and progression of non-communicable diseases like cancer, diabetes, musculoskeletal disorder and influence of these microbes on mental health.

vi. **Antimicrobial Resistance Detection and Prevention:** classification, mechanism of action, detection and reporting drug resistance to antimicrobials (antibacterial, antiviral, antifungal, antimycobacterial and antiparasitic agents).

vii. Investigation of an infectious disease outbreak in hospital and outbreak/epidemic/pandemic in community.

viii. Information technology (computers) in microbiology.

ix. Automation in Microbiology.

x. Molecular techniques in the laboratory diagnosis of infectious diseases.

xi. Statistical analysis of microbiological data and research methodology.

xii. Animal and human ethics involved in microbiological work.

xiii. Laboratory safety and management.

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B. Predominant in Affective Domain

i. Communicate effectively & empathically with patients and their relatives during sample collection, history taking, counseling and reporting results.

ii. Acquire Consent taking and counseling skills and demonstrate these to undergraduates.

iii. Communicate effectively with peers, and consultants for better clinical correlation of laboratory findings as well as research.

iv. Demonstrate effective communication and attitudinal skill while teaching undergraduate students.

v. Function as an effective team member and leader with good conflict management skills.

vi. Adopt ethical principles, particularly maintenance of confidentiality when dealing with laboratory reports.

vii. Demonstrate ability to recognize and manage ethical and professional conflicts and abide by prescribed ethical and legal codes of conduct and practice.

viii. Demonstrate altruistic professional behavior with respect, discipline, responsibility, accountability, punctuality and integrity at all times while dealing with patients and their relatives.

C. Psychomotor Domain: (Skills)

C1. The postgraduate student should be able to *perform the following and/or interpret the results independently or as a part of a team*:

➢ Laboratory skills:

- Collect, transport and store appropriate specimens for microbiological investigations.
- Receive and process clinical specimens after appropriate preparation of samples for the appropriate investigation (centrifugation, extraction, mincing concentration etc.)
- Processing of samples by various methods like:
  - Macroscopic/gross examination of samples.
  - Choose the most appropriate microscopic method for demonstration of pathogens.
  - Prepare, examine, and demonstrate microbes in direct smears for diagnosis of infectious disease/s.
  - Isolate and identify pathogenic microbe from clinical specimens (by conventional & automated methods).
  - Perform, interpret & record antimicrobial susceptibility testing of the isolate.
  - Perform rapid, conventional and automated serological techniques for diagnosis of infectious diseases and immunological diseases.
- Maintain records and ensure quality control in microbiology.

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- Maintain and preserve microbial cultures.
- Operate and maintain instruments used in the laboratory for sterilization and disinfection and patient care with quality control.
- Operate and maintain common laboratory equipment like microscopes, water bath, centrifuge, incubator, automated culture system, micro-centrifuge, ELISA washer and reader etc.
- Perform and assess significance of microbial contamination of food, water and air.
- Biosafety measures - biosafety cabinets, chemical material safety data sheet (MSDS), fire safety, needle stick injury management.

Organisms (Bacteria, Fungi, Virus and Parasites) based Laboratory skills:

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- **Direct microscopic methods for demonstration of infectious agents:**
  a. Wet mount examination for - looking for cells and organisms (bacteria, fungi, parasite)
     i. Saline mount stool sample - parasitic morphology
     ii. Iodine mount-parasitic morphology
     iii. KOH for fungi
     iv. Negative staining
  b. Staining methods
     i. Preparation of stains & quality check
     ii. Preparation of peripheral blood smears from various samples
     iii. Staining techniques - simple, differential, special staining methods - capsule, spore, flagella etc.
     iv. Gram Staining
     v. Acid Fast staining (with modifications).
     vi. Leishman & Giemsa for demonstration of intracellular pathogen bacteria, parasite, fungi etc.
     vii. Albert staining.
  c. Fluorescent staining
     i. Auramine staining - Mycobacterium tuberculosis.

ii. QBC – for malaria.
iii. Calcoflor white staining for fungus

d. Isolation of pathogens
    i. Preparation of glass wares
    ii. Sterilization procedures
    iii. Media preparation-required for isolation & identification
    iv. Quality check of all media - functional as well as sterility check and maintenance of the record
    v. Inoculation methods of various samples – surface, streak, stab etc depending on sample
    vi. Incubation methods - aerobic, anaerobic, microaerophilic, capnophilic depending on the pathogens.

e. Identification of pathogen
    i. Colony characters – various characters to be noted in different media.
    ii. Staining to identify – Gram's / Alberts / Acid Fast/ Lactophenol cotton blue depending on pathogen.
    iii. Motility by hanging drop preparation and other methods.
    iv. Biochemical reactions - phenotypic-enzymatic, oxidative fermentative, sugar fermentation, other special tests helping to identify up to species level.
    v. Serotyping.

f. Antibiotic Susceptibility Testing
    i. Selection of antibiotic disks as per CLSI/EUCAST based on the probable identification of organism - bacteria, fungi.
    ii. Detection of drug resistant strains - MRSA, VISA, VRE, ESBL, MBL, CRE etc.
    iii. Broth microdilution methods for bacteria and fungi.

- **Immunological tests**
    i. i. Collection, preparation and storage of samples
    ii. ii. Perform Rapid tests / /Latex agglutination/ ICT/ELISA etc

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- **Molecular tests**
    i. PCR/RTPCR – all steps till interpretation
    ii. CBNAAT
- **Biomedical waste management skills.**
- **Quality control skills in all areas.**

➢ Clinical Microbiology Skills

(Infectious Disease Case Based Skill)

i. Demonstrate ability to take and interpret the history of infectious disease case.
ii. Be able to clinically examine the case and diagnose.
iii. Take decision for choice of samples to be collected for diagnosis
iv. Suggest optimum choice of antimicrobial agent to be prescribed with reasons.

➢ Infection Prevention and Control Skills-

i. Hand hygiene skills
ii. Donning and doffing of PPE
iii. Transmission based precautions in patient care
iv. Segregation and disposal of biomedical waste in laboratory and hospital
v. Handling of sharps
vi. Post-exposure prophylaxis when exposed to blood and body fluids
vii. Spillage management
viii. Sterilization policy of environment and devices in the hospital as per the latest guidelines.
ix. Calculation of HAI infection rates.
x. Plan & conduct HAI surveillance & infection control audits

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C 2. Should be able to **perform under supervision** and/or interpret the results of *the following desirable procedures independently or as a part of a team*:

- Demonstration of microbe by:

i. IF – autoimmune diseases
ii. IF – antigen demonstration in fungi/viral infection /cellular changes

- Isolation & Identification using newer automated systems for bacterial identification, -Mycobacterial culture and Mycobacterial susceptibility
- Immunological test
    i. Nephelometry/ turbidometry method for quantitative CRP/ASO/RA test
    ii. Chemi-Luminiscence Immuno Assay
- Perform molecular & newer diagnostic tests for diagnosis of infectious disease.

C 3. Should observe the following procedures independently or as a part of a team and/or interpret the results of* : (optional)

- Demonstration of microbes by Electron microscope
- Viral culture & identification of growth of viruses
- Immunological test
    iii. Quantiferon
    iv. Flowcytometry
- Molecular -
    i. Genome Sequencing methods
    ii. Molecular typing.

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Note: If any of the above facilities are not available in the institute effort to collaborate and post the students in nearby laboratory to acquire the skills shall be made.

TEACHING AND LEARNING METHODS

General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skills oriented. Learning in the program, essentially autonomous and self-directed, and

emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the postgraduate (PG) courses shall work as full-time (junior) residents during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a logbook for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real time.

Teaching-Learning methods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinical meetings, seminars, small group discussion, bed-side teaching, case-based learning, simulation-based teaching, self-directed learning, integrated learning, interdepartmental meetings and any other collaborative activity with the allied departments. Methods with exposure to the applied aspects of the subject relevant to basic/clinical sciences should also be used. **The suggested examples of teaching-learning methods are given below but are not limited to these. The frequency of various below mentioned teaching-learning methods can vary based on the subject's requirements, competencies, work load and overall working schedule in the concerned subject.**

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A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures per year in the concerned PG department is suggested. Topics to be selected as per requirements of the subject. All postgraduate trainees will be required to attend these lectures. Lectures can cover topics such as:

1. Subject related important topics as per specialty requirement
2. Recent advances
3. Research methodology and biostatistics
4. Salient features of Postgraduate medical curriculum
5. Teaching and assessment methodology.

Topic numbers 3, 4 & 5 can be done during research methodology/biostatistics and medical education workshops in the institute.

B. Journal club: Minimum of once in 1-2 weeks is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once every 1-2 weeks is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive evidence-based review of the topic. The student should be graded by the faculty and peers.

D. Student Symposium: Minimum of once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by the faculty and peers.

E. Laboratory work / Bedside clinics: Minimum- once every 1-2 weeks.

Laboratory work/Clinics/bedside teaching should be coordinated and guided by faculty from the department. Various methods like DOAP (Demonstrate, Observe, Assist, Perform), simulations in skill lab, and case-based discussions etc. are to be used. Faculty from the department where a student is posted should participate in moderating the teaching-learning sessions during clinical rounds.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main Department and other department/s on topics of current/common interest or clinical cases.

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G. a. Rotational clinical / community / institutional postings (As per Table I)

Depending on local institutional policy and the subject specialty needs, postgraduate trainees may be posted in relevant departments/ units/ institutions. The aim would be to acquire more in-depth knowledge as applicable to the concerned specialty. Postings would be rotated between various units/departments and details to be included in the specialty-based Guidelines. Few examples are listed below:

- Broad specialty departments
- Emergency/Casualty department
- Super specialty departments e.g. Cardiology / Endocrinology / Nephrology / Medical Oncology etc.
- Laboratory-based specialty units/departments e.g. Biochemistry / Microbiology/ Infection control unit/Laboratory Medicine etc.
- Medical Education Unit (MEU) or Department of Medical Education (DOME)

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Clinical / Practical Training Schedule in Microbiology

The three-year training programme in microbiology is arranged in the form of rotational postings to different sections/laboratories/departments/disciplines for specified periods. Providing a suitable learning environment to develop clinical insight and achieve the outcomes of a medical microbiologist must be the driving force while planning posting schedules, which may be modified depending on needs, feasibility and exigencies. Student must be posted for various duration in different sections of Microbiology (like Bacteriology, Serology, Virology, Parasitology, Immunology, Mycobacteriology, Mycology and Hospital infection control), patient care areas in hospital (like emergency, OPDs, critical care areas, surgical and medical wards etc) as well as in community outreach programs, so that they can learn specific requirements of each section and participate in patient care and prevention of infectious diseases in the hospital as well as community. These postings are meant to provide hands-on training and develop required skills in clinical and laboratory medicine of microbiology.

Table 1. Following is the suggested plan of Rotation for Postgraduate students Postings to Diagnostic Laboratories/Hospital/ Community-

Sr no	Schedule of Rotation	Duration	Suggested Specific Learning Objectives
1	Microbiology laboratory i. Different sections of Bacteriology ii. Media preparation iii. Mycobacteriology iv. Serology/Immunology v. Mycology vi. Virology vii. Parasitology viii. Molecular lab **ix.** Hospital Infection Control including BMW management	Distributed in various section depending upon training & departmental needs	• As per the specific objectives in each section, a student is expected to acquire skills from basic to the most recent ones in diagnostic microbiology.
2	Sample Collection area	**Two weeks**	• To learn pre-analytical parameters & procedures at sample collection area.

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			• To communicate effectively with patients at sample collection area. • Learn to demonstrate respect, empathy & confidentiality when dealing with patients, samples and reports. • Demonstrate leadership skills in managing the functioning of the lab (staff management, preparing duty roster)
3	Clinical Pathology i. Hematology ii. Histopathology iii. Blood Bank	**Two weeks**	• Basic knowledge of clinical pathology (as applied to Microbiology) • Inflammation and repair • Intercellular substances and reaction • Pathological changes in the body in bacterial, viral, mycotic and parasitic infections **Clinical Pathology skills**: • Peripheral smear examination • CBC interpretation • Urine examination • Pathological investigations and their significance in infectious disease diagnosis.

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			Blood Bank skills: • Transfusion transmitted infection Blood grouping • Screening of blood & blood donors • Counseling skills **Histopathology skills:** • Various stains and staining techniques used in histopathological examination of infectious agents • Identification of pathogen and/or pathological changes in tissue sections in infectious diseases.
4	Clinical Biochemistry	**One week**	• Basic understanding of biochemistry as applied to immunological/ molecular methods for study of microbial diseases and pathogenesis of infections. • Significance of biochemical markers/profile in diagnosis, prognosis and monitoring of infective syndromes like sepsis
5	ICTC /PPTCT/ART	**Two weeks**	• HIV counseling skills • HIV Testing strategies • HIV Surveillance strategies • Treatment regimens in HIV positive

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			case, management of drug resistance, and prophylaxis PEP, prevention & management of opportunistic infection
6	Tuberculosis and RNTCP	**Two weeks**	• Diagnosis of Pulmonary and extra pulmonary TB • Fluorescent Microscopy for TB • Molecular diagnosis • National tuberculosis Elimination Program • Treatment regimens in susceptible and drug resistant TB cases
7	District hospital postings (mandatory) 3rd or 4th semester for 3 months	**Three months***	• Identify types of infections seen in community • Identify lacuna in KAP in community that promote development of infections • Choice of antimicrobials and treatment plan for infections in community • Infection control in community • Should contribute to strengthen the services of the district health system, the diagnostic laboratory services. • Participate in public health programs & research activities

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8	**Clinical locations –** i. Medicine & allied (General Medicine, Respiratory Disease, Skin & Venereal Disease) ii. Pediatrics iii. Surgery & allied (General Surgery, Orthopedic) iv. Obstetric and Gynecology	**Two months** Posting to be done for morning half of the day	**Depending on the area of posting-** • History taking and physical examination skills • Sample collection and transportation skills • Identification of common infections and make a differential diagnosis • Choose the appropriate laboratory investigations required for confirmation of diagnosis • Interpret the laboratory results and correlate them clinically. • Learn common treatment plan, particularly choice of antimicrobials and identify factors that influence choice of antimicrobials. • Acquire reasoning and critical thinking required in decision making when dealing with an infectious disease case • Infection control practices
9	**Critical care units-** i. Medical ICU	**Three weeks** **(in morn**ing half day)	• All above in a critical setting along with • Availability and choice of specialized investigations necessary for optimum

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	ii. Surgical ICU iii. Neonatal/Pediatric ICU		management of a critical patient with ID. Significance and adherence to antibiotic policy and antibiotic stewardship program Infection control in ICU
10	Institutional Super specialty wing if available Dialysis, Oncology, Cardiology etc	**One week** (morning half day)	• To study infections seen in special situations along with their management & prevention approach
	Total duration of posting outside microbiology laboratory	**33 weeks**	

***Posting under "District Residency Programme"**

Depending upon the objectives to be achieved, feasibility and availability of resources, the rotational postings can be within the hospital or outside the hospital.

During the clinical posting, opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with clinicians in different hospital setting must be scheduled.

The PG student must be tagged along with the resident of the clinical department for bedside case discussion, under the guidance of an assigned faculty. A minimum of five case histories shall be recorded by a student during course of study. The case history must be representative of different type of Infectious Disease (ID) cases likely to be encountered eg., those caused by different microbes in community and hospital setting, HAI, infections in critical care/ ward

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setting, infection in different age groups, infections in special host like Immunocompromised host, traveler, specific occupations etc.

The process of recording case histories can begin in first half of 2nd year of PG program, after students have learnt about various infective syndromes. The severity and complexity of cases must progress gradually, with simple community-based infection to begin with. At least one fourth of the cases recorded must have been discussed with the ID specialist or a clinician and their feedback/remarks documented in log book/ portfolio with their signatures.

Documentation of students learning at the end of each posting is required.

Emergency duty

The student should also be posted for managing emergency laboratory services in Microbiology. He/she should deal with all emergency investigations in Microbiology.

G b. *Posting under "District Residency Programme" (DRP):

All postgraduate students pursuing MD/MS in broad specialties in all Medical Colleges/Institutions shall undergo a compulsory rotation of three months in District Hospitals/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th or 5th semester of the Postgraduate programme and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident".

Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.}

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Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists / clinicians in different hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

H. Teaching research skills

Writing a thesis should be used for inculcating research knowledge and skills. All postgraduate students shall conduct a research project of sufficient depth to be presented to the University as a postgraduate thesis under the supervision of an eligible faculty member of the department as guide and one or more co-guides who may be from the same or other departments.

In addition to the thesis project, every postgraduate trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be reinforced.

I. Training in teaching & learning skills

MEU/DOME should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on the teaching skills of the student.

J. Log book

During the training period, the postgraduate student should maintain a Log Book indicating the duration of the postings/work done in Wards, OPDs, Casualty and other areas of posting. This should indicate the procedures assisted and performed and the teaching sessions attended. The log book entries must be done in real time. The logbook is thus a record of various activities by the student like: (1) Overall participation & performance, (2) attendance, (3) participation in sessions, (4) record of completion of pre-determined activities, and (5) acquisition of selected competencies.

The purpose of the Log Book is to:

a) Help maintain a record of the work done during training.

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b) Enable Faculty/Consultants to have direct information about the work done and intervene, if necessary.

c) Provide feedback and assess the progress of learning with experience gained periodically.

The Log Book should be used in the internal assessment of the student, should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce completed log book in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate from the Head of Department regarding the clinical competence and skillful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in logbook particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and at least two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty shall refer to the MCI Logbook Guidelines uploaded on the Website.

K. **Course in Research Methodology**: All postgraduate students shall complete an online course in Research Methodology within six months of the commencement of the batch and generate the online certificate on successful completion of the course.

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Other aspects

- The Postgraduate trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The Postgraduate trainees should undergo training in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS).
- The Postgraduate trainees must undergo training in information technology and use of computers.

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learnt initially on the models, later to be performed under supervision followed by independent performance. For this purpose, provision of skills laboratories in medical colleges is mandatory.

Skills & performance

The student should be given graded responsibility to enable learning by apprenticeship. The faculty throughout the year should assess competence of the student in skills. Feedback must be given and area of improvement/remarks should be mentioned for the skill and student should be re-assessed for the skills which are not acquired. To go to the next level, it should be mandatory for the student to acquire lower level skills satisfactorily, i.e only on satisfactory completion of assisted/performed with assistance skills should the student be permitted to perform the skill independently.

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ASSESSMENT

I. FORMATIVE ASSESSMENT, ie., assessment to improve learning

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

The Internal Assessment should be conducted in theory and practical/clinical examination, should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. At least five clinical cases shall be assessed through discussion of case histories recorded by the students while posted

in clinical setting and recorded along with feedback (preferably by ID specialist if available /clinician).

Quarterly assessment during the MD training should be based on:

- Case presentation, case work up, case handling/management
- Journal club- Paper presentation & discussion
- Seminar/Lecture/ group discussion
- Case based /Laboratory or Skill based discussions
- Interdepartmental case or seminars, clinical microbiology round/ grand round/ seminar-discussion

Note: These sessions may be organized and recorded as an institutional activity for all postgraduates.

- Attendance at Scientific meetings, CME programmes

The student is to be assessed periodically as per categories listed in the postgraduate student appraisal form (Annexure I1).

II. SUMMATIVE ASSESSMENT, i.e., assessment at the end of training

Essential pre-requisites for appearing for examination include:

1. **Log book** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.

2. At least **two presentations** at national level conference. One research paper should be published / accepted in an indexed journal**. (It is suggested that the local or University Review committee assess the work sent for publication).**

The summative examination would be carried out as per the Rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination**.**

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The postgraduate examination shall be in three parts**:**

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A postgraduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners**.**

2. **Theory examination**

   The examinations shall be organized on the basis of 'Grading 'or 'Marking system' to evaluate and to certify postgraduate student's level of knowledge, skill and competence at the end of the training, as given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. Obtaining a minimum of **50% marks in 'Theory' as well as 'Practical' separately** shall be mandatory for passing examination as a whole. The examination for M.D shall be held at the end of 3rd academic year.

There shall be four theory papers (as per PG Regulations).

Paper I- General Microbiology and Immunology (GM & IG).

Paper II– Clinical / Systemic Microbiology (CM I).

Paper III– Clinical / Systemic Microbiology (CM II).

Paper IV- Recent Advances & Applied Microbiology (AM).

Universities shall prepare a blueprint for assessment of competencies and ensure 60-70% weightage is given to higher levels in Blooms taxonomy (application and above) in theory with more number of clinical scenario based questions. In **Paper II/III (CM – II/III) –distribution of Clinical Scenarios testing the ability of a student to deal with infections caused by**

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various etiological agents is suggested to be 40-50% Bacterial, 20-30% Viral, 10-20 % each for Mycobacterial, Parasitic & Fungal pathogens.

3. Practical/Clinical and Oral/Viva Voce examination

Practical examination

Practical examination should be spread over two days and include various major components of the syllabus focusing mainly on the psychomotor & affective domain.

Type of Exercises for Practical Examination should include cases (actual or paper based depending on the feasibility) of infectious diseases for workup and evaluation of clinical microbiology competence along with exercises to test ability to perform bacteriology, virology, parasitology, mycology, mycobacteriology, immunology, serology with microscopic examination and antimicrobial susceptibility report,.

Oral/Viva voce examination: The simultaneous viva-voce on the clinical case & lab based practical exercise should be taken along with main viva by each examiner separately. Oral examination shall be comprehensive enough to test the postgraduate student's overall ability to apply knowledge of the subject to hospital/community/research areas focusing on psychomotor and affective domain skills.

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Table 2. Suggested Day wise distribution of practical exercises:

Ex. No	Day -1	Ex. No	Day-2
1	Clinical Microbiology exercise (Give a real clinical case /paper based scenario addressing commonly seen cases in bacteriology/mycobacteriology/vir	1 cont	Clinical Microbiology exercise - Conclusion

	ology/mycology/parasitology/HAI /AMR/out break /national project based etc of infectious diseases to the PG for workup and evaluation with respect to case history, basic physical examination, required investigations, interpretation of diagnostic test results, and therapeutic management decisions including prescription of antibiotics,, along with IG practices)		
2	Long Exercise- Bacteriology (Mixed culture given with a clinical history representing any specimen collected from respective systemic infection)	**2 cont**	Long Exercise - Bacteriology conclusion
3	Short Exercise – Bacteriology (Identification of a pure culture)	**3 cont**	Short Exercise - Bacteriology conclusion
4	Serology Exercise (In a clinical case, choice of test & technique with interpretation of test results)	**4 cont**	Serology cont. if required
5	Virology techniques (In a clinical case, choice of test & technique with interpretation of test results. Viral serology/ Molecular	**5 cont**	Virology cont. if required

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	techniques depending upon availability)		
6	Mycology (Identification of fungi in a clinical case)	**6 cont**	Mycology cont. if required
7	Parasitology (In a clinical case, choice of test & technique with interpretation of test results Stool examination, Examination of Peripheral blood smear etc)	**9**	Pedagogy (10-15minutes)
8	Slides (Slides including histopathology for microscopic identification & discussion	**10**	Log book, Dissertation Viva, Grand-Viva

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Recommended Reading

Books (latest edition)

1. Forbes B, Sahm D, Weissfeld A. *Bailey and Scott's Diagnostic Microbiology*, Mosby, St. Louis.

2. Koneman EW, Allen SD, Janda WM, Schreckenberger PC, Winn WC. *Color Atlas and Textbook of Diagnostic Microbiology*, J.B. Lippincott, Philadelphia.

3. Murray PR, Baron EJ, Pfaller MA, Tenover FC, Yolken RH. *Manual of Clinical Microbiology*, American Society for Microbiology.

4. Garcia LS, Bruckner DA. *Diagnostic Medical Parasitology*, American Society for Microbiology.

5. Mackie & Mccartney Practical Medical Microbiology by J.G. Collee, A.G. Fraser

6. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases: by John E. Bennett, Raphael Dolin, Martin J. Blaser

7. Manson's Tropical Diseases by Jeremy Farrar; Peter J. Hotez; Thomas Junghanss; Gagandeep Kang; David Lalloo; Nicholas J. Wh

8. Harrison's Infectious Diseases, by Dennis L. Kasper; Anthony S. Fauci

9. Hunter's Tropical Medicine and emerging infectious disease by Edward T. Ryan, David R. Hill, Timothy P. Endy

10. Clinical Immunology Principles and Practices by Robert Rich

11. Anaerobic Bacteriology, Clinical and Laboratory practice by A. Trevorwillis

12. Topley & Wilson, Principles of Bacteriology, Virology and Immunity by M.T. Parker and L.H. Collier

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13. Topley and Wilson's Microbiology and Microbial infection by Brian W. J. Mahy, Graham Selby Wilson, and William Whiteman Carlton Topley

14. Text book of Medical Mycology by Jagadish Chandra

15. Atlas of Fungal infection by Carol A. Kauffman

16. Bennett and Brachman's Hospital Infection, 6th edition, William R Jarvis.

Journals

03-05 international Journals and 02 national (all indexed) journals.

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Annexure I

Following are the competencies to be achieved under Antimicrobial Resistance Detection and Prevention:

1. Demonstrate in depth knowledge of classification, mechanism of action and drug resistance of antimicrobials (antibacterials, antiviral, antifungal, antimycobacterial and antiparasitic agents).
2. Explain various phenotypic and genotypic methods used in laboratory for detection of drug resistant strains and their implications in patient care.
3. Demonstrate skills in performing antimicrobial susceptibility testing with calculations of MIC/MBC by various phenotypic and genotypic methods and interpret results as per standard guidelines (CLSI, EUCAST etc).
4. Detect and report bacterial drug resistance by identification of the commonly isolated drug resistant strains (MRSA, VRSA, VRE, CRE, MBL, AMP-C etc) and choose the most appropriate agent for therapeutic use in a specific clinical scenario.
5. Explain the implications of AST result on antimicrobial therapy to clinicians/colleagues.
6. Communicate effectively with clinicians to guide and create an antimicrobial treatment plan based on organism identification and susceptibility test.
7. Explain the concept of narrow/broad spectrum of antimicrobials, PK/PD parameters and their significance on response to antimicrobial therapy.
8. Explain significance of monitoring of antimicrobial therapy in patient care.
9. Explain the concept of empiric, syndromic and culture-based treatment strategies for treating infections.
10. Explain the need to de-escalate from empirical broad-spectrum therapy to targeted narrow-spectrum therapy.
11. Explain the importance of appropriate use of antimicrobial agents, risk of antimicrobial resistance and spread of AMR in the health care environment and the community.
12. Explain the concept of normal microbial flora, colonization, contamination and infection with its role in deciding antimicrobial therapy.

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13. Demonstrate knowledge about antimicrobial prophylaxis including peri-operative surgical prophylaxis regimens.
14. Describe the concept of first-, second- and third-line antimicrobial therapy for infections.
15. Explain the importance of restricted reporting of susceptibility data by the laboratory to control antimicrobial use.
16. Explain the concept and application of WHO tool for optimizing use of antimicrobial agents: Access, Watch and Reserve (AWaRe).
17. Explain the importance of antimicrobial formularies, consumption data and prescribing policies and processes to monitor use of antimicrobials in hospitals.
18. Effectively use information technology (LIS, WHO NET etc.) for data collection and surveillance of AMR in microbiology laboratory.
19. Explain significance of collecting local antimicrobial resistance data and its use in deciding direct empirical antimicrobial therapy.
20. Demonstrate knowledge and skills to develop antibiotic policy by using local AMR data in hospital.
21. Explain significance of adherence to antibiotic policy and antibiotic stewardship program.
22. Be a part of antimicrobial stewardship team for the institution.
23. Demonstrate knowledge about recent published guidelines that recommend antimicrobial treatment therapy in various clinical situations.
24. Effectively communicate with the patients/ relatives about the role of antimicrobial agents in their disease and advice on appropriate use.
25. Actively engage with patients, relatives and the community to advise on the role of antimicrobial agents in therapy and the threat of resistance.
26. Participate in clinical audit and quality improvement programmes relating to antimicrobial use.
27. Teach students, colleagues and other health professionals regarding antimicrobial use and resistance.

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Annexure II

Student appraisal form for MD in Microbiology

	Elements	Less than Satisfactory			Satisfactory			More than satisfactory			Comments
		1	2	3	4	5	6	7	8	9	
1	**Scholastic aptitude and learning**										
1.1	Has knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned(e.g Posters, publications etc)										
1.4	Documentation of acquisition of competence (eg Log book)										
1.5	Performance in work based assessments										
1.6	Self-directed Learning										
2	**Work related to training**										
2.1	Practical skills that are appropriate for the level of training										
2.2	Respect for processes and procedures in the work space										

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2.3	Ability to work with other members of the team										
2.4	Participation and compliance with the quality improvement process at the work environment										
2.5	Ability to record and document work accurately and appropriate for level of training										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethically appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment pattern been discussed with the trainee?	Yes	No								
	If not explain.										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

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Subject Expert Group members for preparation of REVISED Guidelines for competency based postgraduate training programme for MD in Microbiology

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PULMONARY MEDICINE

Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

Evolution of critical care medicine makes it imperative that the post graduates are trained in the basic principles of Pulmonary Medicine as applied to critical care. The person shall be abreast with the recent advances and developments in the specialty of Pulmonary Medicine. It is expected that the person will develop a spirit of enquiry and get oriented to apply recent advances and medical evidence to the practice of pulmonary medicine. He would also grasp the fundamentals of research methodology. Medical Science is dynamic with a continuous enhancement of knowledge. The process of acquiring knowledge and skills continues even after formal education. The syllabus to be covered during post graduate training in Pulmonary Medicine given below is designed to develop a sound and scientific foundation. It is intended to serve as a guide to impart basic knowledge and develop skills and does not impose any limits to expansion beyond the areas listed.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC OBJECTIVES

The primary **goal** of the MD course in Pulmonary Medicine is to produce post graduate clinicians able to provide health care in the field of pulmonary medicine. It is expected that a physician qualified in Pulmonary Medicine at the end of the course should be able to diagnose and treat pulmonary diseases, take preventive and curative steps for these diseases in the community at all levels of health care and qualify as a consultant and teacher in the subject.

Each student should obtain proficiency in the following domains during the period of training:

1. Theoretical knowledge of different aspects of Pulmonary Medicine including the status in health and disease.
2. Acquire clinical skills.
3. Acquire practical skills.
4. Management of emergencies including intensive care.
5. Preparation of thesis as per MCI guidelines.

These involve patient management in the outpatient, inpatient and emergency situations, case presentations, didactic lectures, seminars, journal reviews, clinico-patholgical conferences and mortality review meetings and working in the laboratories.

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. Cognitive domain

At the end of the MD course in Pulmonary Medicine, the students should be able to:

1. demonstrate sound knowledge of common pulmonary diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis. A comprehensive knowledge of epidemiological aspects of pulmonary diseases should be acquired.
2. demonstrate comprehensive knowledge of various modes of therapy used in treatment of pulmonary diseases.
3. describe the mode of action of commonly used drugs, their doses, side-effects / toxicity, indications and contra-indications and interactions.
4. describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of National tuberculosis Control Programme.
5. manage common pulmonary emergencies and understand the basic of intensive care in patients with pulmonary diseases.
6. practice the field of pulmonary medicine ethically and assiduously, show empathy and adopt a humane approach towards patients and their families.
7. recognize the national priorities in pulmonary medicine and play an important role in the implementation of National Health Programmes including tuberculosis.
8. demonstrate competence in medical management.
9. should inculcate good reading habits and develop ability to search medical literature and develop basic concept of medical research.

B. Affective Domain

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

At the end of the course, the student should acquire following clinical skills and be able to:

1. interview the patient, elicit relevant and correct information and describe the history in chronological order.
2. conduct clinical examination, elicit and interpret clinical findings and diagnose common pulmonary disorders and emergencies.
3. perform simple, routine investigative and office procedures required for making the bedside diagnosis, especially sputum collection and examination for etiologic organisms especially Acid Fast Bacilli (AFB), interpretation of the chest x-rays and lung function tests.
4. interpret and manage various blood gases abnormalities in various pulmonary diseases.
5. develop management plans for various pulmonary diseases.
6. assist in the performance of common procedures, like bronchoscopic examination, pleural aspiration and biopsy, pulmonary physiotherapy, endotracheal intubation and pneumo-thoracic drainage / aspiration etc.
7. recognize emergency situations in intensive care, respond to these appropriately and perform basic critical care monitoring and therapeutic procedures.
8. collect, compile, analyse, interpret, discuss and present research data.
9. teach pulmonary medicine to undergraduate and postgraduate students.

To acquire the above skills, the student should be exposed and trained in the following tests and procedures:

1. Diagnostic tests: Performance and interpretation

- Sputum and other body fluids examination with ZN stain for AFB, culture methods for pathogenic bacteria, fungi and viruses
- Newer diagnostic techniques for tuberculosis including molecular techniques
- FNAC of lung masses (blind and image-guided)
- Arterial blood gas analysis and pulse oximetry
- Imaging: Interpretation of plain radiography, ultrasound examination, Computed tomogram, PET scan, MRI
- Sputum cytology
- Simple haematological tests
- Immunological and Serological tests
- Polysomnography (full-night and split-night studies) including CPAP titration; evaluation of daytime sleepiness
- Cardiopulmonary exercise testing
- Pulmonary function tests and interpretation (Spirometry, lung volume, diffusions, body plethysmography, other lung function tests)
- Bronchoprovocation tests
- BCG vaccination
- Mantoux testing; interferon gamma release assays
- Bronchoscopy: fibreoptic/rigid, diagnostic and therapeutic
- ECG, 2D and Doppler echocardiography
- Venous Doppler ultrasound
- Skin tests for hypersensitivity
- Sputum induction and non-invasive monitoring of airway inflammation
- Medical thoracoscopy

2. Therapeutic procedures

- Fine needle aspiration and other guided procedures
- Tube thoracostomy
- Cardiopulmonary rehabilitation exercises
- Postural drainage
- Pleural biopsy, lymph node biopsy
- Administration of inhalation therapy
- Administration of oxygen therapy
- Administration of continuous positive airway pressure (CPAP)/ Bilevel Positive Airway Pressure (BiPAP)
- Monitoring and emergency procedures in intensive care

Syllabus

Course contents:

The student should acquire knowledge in the following:

I. Basic Sciences

A. Anatomy and Histology of Respiratory System

1. Development and Anatomy of Respiratory System
2. Applied embryology of lungs, mediastinum and diaphragm
3. Developmental anomalies

B. Physiology and Biochemistry

1. Assessment of pulmonary functions
2. Control of ventilation; pulmonary mechanics
3. Ventilation, pulmonary blood flow, gas exchange and transport
4. Non-respiratory metabolic functions of lung
5. Principles of electrocardiography
6. Inhalation kinetics and its implication in aerosol therapy, and sputum induction etc.
7. Acid-base and electrolyte balance
8. Physiology of sleep and its disorders
9. Pulmonary innervation and reflexes
10. Pulmonary defence mechanisms
11. Principles of exercise physiology and testing
12. Physiological changes in pregnancy, high altitude, aging
13. Physiological basis of pulmonary symptoms

C. Microbiology

1. Mycobacterium tuberculosis and other mycobacteria
2. Bacteria causing pulmonary diseases
3. Atypical organisms and respiratory tract infections
4. Anaerobes in pleuropulmonary infections
5. Laboratory diagnosis of non-tubercular infections of respiratory tract
6. Laboratory diagnosis of TB including staining, culture and drug sensitivity testing
7. Virulence and pathogenecity of mycobacteria
8. Respiratory viruses: Viral diseases of the respiratory system and diagnostic methods
9. Respiratory fungi: (i) Classification of fungal diseases of lung: candidiasis, Actinomycosis, Nacardiosis, Aspergillosis, Blastomycosis etc. (ii) Laboratory diagnostic procedures in pulmonary mycosis
10. Opportunistic infections in the immuno-ompromised individuals
11. HIV and AIDS. Virological aspects, immuno-pathogenesis, diagnosis

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12. Parasitic lung diseases

D. Pathology

1. Acute and chronic inflammation: Pathogenetic mechanisms in pulmonary diseases
2. Pathology aspects of Tuberculosis
3. Pathology aspects of Pneumonias and bronchopulmonary suppuration
4. Chronic bronchitis and emphysema, asthma, other airway diseases
5. Occupational lung diseases including Pneumoconiosis
6. Interstitial lung diseases including sarcoidosis, connective tissue diseases, pulmonary vasculitis syndromes, pulmonary eosinphilias
7. Tumours of the lung, mediastinum and pleura

E. Epidemiology

1. Epidemiological terms and their definitions
2. Epidemiological methods
3. Epidemiology of tuberculosis, pneumoconiosis, asthma, lung cancer, COPD and other pulmonary diseases
4. National Tuberculosis Control Programme and RNTCP; Epidemiological aspects of BCG
5. Epidemiological aspects of pollution-related pulmonary diseases
6. Research methodology, statistics and study designs

F. Allergy and Immunology

1. Various mechanisms of hypersensitivity reactions seen in pulmonary diseases
2. Diagnostic tests in allergic diseases of lung - *in vitro* and *in vivo* tests, bronchial provocation test
3. Immunology of tuberculosis, Sarcoidosis and other diseases with an immunological basis of pathogenesis

G. Pharmacology

1. Pharmacology of antimicrobial drugs
2. Pharmacology of antitubercular drugs
3. Pharmacology of antineoplastic and immunosuppressant drugs
4. Bronchodilator and anti-inflammatory drugs used in pulmonary diseases
5. Drugs used in viral, fungal and parasitic infections
6. Other drugs pharmacokinetics and drugs interaction of commonly used drugs in pulmonary diseases
7. Pharmacovigilance

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II. Clinical Pulmonary Medicine

Clinical pulmonary medicine covers the entire range of pulmonary diseases. All aspects of pulmonary diseases including epidemiology, aetiopathogenesis, pathology, clinical features, investigations, differential diagnosis and management are to be covered.

A. Infections

1. Tuberculosis

1. Aetiopathogenesis
2. Diagnostic methods
3. Differential diagnosis
4. Management of pulmonary tuberculosis; RNTCP, DOTS, and DOTS-Plus; International Standards of TB Care
5. Complications in tuberculosis
6. Tuberculosis in children
7. Geriatric tuberculosis
8. Pleural and pericardial effusion and empyema
9. Mycobacteria other than tuberculosis
10. Extrapulmonary tuberculosis
11. HIV and TB; interactions of antitubercular drugs with antiretrovirals
12. Diabetes mellitus and tuberculosis
13. Management of MDR and XDR tuberculosis

2. Non-tuberculous infections of the lungs

- Approach to a patient with pulmonary infection
- Community-acquired pneumonia
- Hospital-associated pneumonia, ventilator-associated pneumonia
- Unusual and atypical pneumonias including bacterial, viral, fungal and parasitic and ricketsial, anerobic
- Bronchiectasis, lung abscess and other pulmonary suppurations
- Acquired immunodeficiency syndrome and opportunistic infections in immuno-compromised host
- Principles governing use of antibiotics in pulmonary infections
- Other pneumonias and parasitic infections, Zoonosis

B. Non-infectious Lung Diseases

3. Immunological disorders

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- Immune defence mechanisms of the lung
- Sarcoidosis
- Hypersensitivity pneumonitis and lung involvement
- Eosinophilic pneumonias and tropical eosinophilia
- Pulmonary vasculitides
- Connective tissue diseases involving the respiratory system
- Interstitial lung disease of other etiologies
- Reactions of the interstitial space to injury, drugs
- Occupational and environmental pulmonary diseases

4. Other non-infectious disorders of the lungs and airways

- Aspiration and inhalational (non-occupational) diseases of the lung
- Drug induced pulmonary diseases
- Bullous lung disease
- Uncommon pulmonary diseases (metabolic, immunological, unknown etiology), pulmonary haemorrhagic syndromes
- Other pulmonary diseases of unknown etiology including PLCH, LAM, PAP, alveolar microlithiasis
- Cystic fibrosis and disorders of ciliary motility
- Obesity-related pulmonary disorders
- Upper airways obstruction syndromes
- Occupational lung diseases and pneumoconiosis
- Air-pollution induced diseases, toxic lung and other inhalational injuries
- Health hazards of smoking
- Drug-induced lung diseases

5. Pulmonary Circulatory disorders

- Pulmonary hypertension and cor pulmonale
- Pulmonary edema
- Pulmonary thromboembolic diseases and infarction
- Cardiac problems in a pulmonary patient and pulmonary complications produced by cardiac diseases

6. Obstructive diseases of the lungs

- Asthma including allergic bronchopulmonary aspergillosis, specific allergen immunotherapy and immunomodulation
- Chronic obstructive lung disease and diseases of small airways

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- Special aspects of management including Long term oxygen therapy, Inhalation therapy and Pulmonary rehabilitation

7. Tumors of the lungs

- Comprehensive knowledge of neoplastic and non-neoplastic diseases of lung including epidemiology, natural history, staging, and principles of treatment (medical, surgical, and radiation)
- Solitary pulmonary nodule

8. Diseases of the mediastinum

- Non-neoplastic disorders
- Benign and malignant (primary and secondary) neoplasms and cysts

9. Disorders of the pleura

- Pleural dynamics and effusions
- Non-neoplastic and neoplastic pleural diseases
- Pneumothorax
- Pyothorax and broncho-pleural fistula
- Fibrothorax

10. Critical Care Pulmonary Medicine

- Management of emergency problems of different pulmonary diseases
- Adult respiratory distress syndrome
- Respiratory failure in the patient with obstructive airway disease
- Respiratory failure in other pulmonary diseases
- Management of sepsis
- Respiratory and haemodynamic monitoring in acute respiratory failure
- Non-invasive and Mechanical ventilation
- Principles of critical care, diagnosis and management of complications; severity of illness scoring systems
- Ethical and end-of-life issues in critical care

11. Extrapulmonary manifestations of pulmonary diseases

12. Sleep-related pulmonary diseases

- Polysomnography
- Sleep apneas

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- Other sleep-disordered breathing syndromes

13. Miscellaneous aspects

- Diseases of the diaphragm
- Disorders of chest wall
- Obesity-related pulmonary disorders
- Oxygen therapy
- End-of-life care
- Aerospace Medicine
- Pulmonary problems related to special environments (high altitude, diving, miners)
- Assessment of quality of life using questionnaires
- Health impacts of global warming

14. Preventive Pulmonology

- Principles of smoking cessation and smoking cessation strategies
- Cardiopulmonary rehabilitation
- Preventive aspects of pulmonary diseases
- Vaccination in pulmonary diseases

III. Surgical aspects of Pulmonary Medicine

- Pre- and post-operative evaluation and management of thoracic surgical patients
- Chest trauma/trauma related lung dysfunction
- Lung transplantation

TEACHING AND LEARNING METHODS

Postgraduate teaching programme

General principles

Acquisition of practical competencies being the keystone of PG medical education, PG training should be skills oriented. Learning in PG program should be essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

Teaching methodology

This should include regular bedside case presentations and demonstrations, didactic lectures, seminars, journal clubs, clinical meetings, and combined conferences with allied

departments. The post graduate student should be given the responsibility of managing and caring for patients in a gradual manner under supervision.

Formal teaching sessions

In addition to bedside teaching rounds, at least 5-hr of formal teaching per week are necessary. The departments may select a mix of the sessions, as given under formative assessment. Further, the student should:

- Attend accredited scientific meetings (CME, symposia, and conferences).
- Attend additional sessions on resuscitation, basic sciences, biostatistics, research methodology, teaching methodology, hospital waste management, health economics, medical ethics and legal issues related to medical practice are suggested.
- There should be a training program on Research methodology for existing faculty to build capacity to guide research.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- **Log book:** During the training period, the post graduate student should maintain a Log Book indicating the duration of the postings/work done in Wards, OPDs and Casualty. This should indicate the procedures assisted and performed, and the teaching sessions attended. The Log book shall be checked and assessed periodically by the faculty members imparting the training.
- Department should encourage e-learning activities.

Thesis

All MD (Pulmonary Medicine) post graduate students should carry out work on an assigned topic under the direct guidance of a recognised post graduate teacher. A written protocol of the proposed work should be submitted before the end of the first 6 months. Subsequently, the post graduate student should carry out the proposed work for at least 1 year (not inclusive of the period for submitting the protocol and writing-up the final thesis).

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently. For this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., assessment during training

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination.

Quarterly assessment during the MD training should be based on:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The Post Graduate Examination shall be in three parts:

1. Thesis:

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

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Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory Examination:

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period**.**

There shall be four theory papers:

Paper I: General pulmonary medicine and basic sciences;
Paper II: Clinical pulmonary medicine including medical emergencies;
Paper III: Clinical pulmonary medicine including critical care medicine;
Paper IV: Recent advances in pulmonary medicine, and research methodology.

The final qualifying examination should include an assessment of clinical skills in the form of case presentations and discussions. Other rules laid down by the MCI regarding M.D. examinations shall apply here as well.

3. Practical/Clinical and Oral/viva voce Examination:

The post graduate students shall examine a minimum of one long and two short cases.

Oral/viva voce Examination

The oral examination shall be thorough and shall aim at assessing the knowledge and competence of the post graduate student on the subject, investigative procedures, therapeutic technique and other aspects of the specialty which form a part of the examination.

Recommended reading:

Books (latest edition)

1. Harrison's Principles of Internal Medicine ed. Petersdorf (McGraw Hill)
2. Cecil Text book of Medicine ed. Wyngaarden
3. Crofton & Douglas Respiratory diseases ed. Seaton et al (Oxford)
4. Pulmonary diseases & disorders by Fishman (McGraw Hill)
5. Textbook on Pulmonary disease by Fraser & Pare

6.	Asthma	by Clarke et al
7.	Bronchoscopy	by Straddling
8.	Tuberculosis	by SK Sharma
9.	Lung diseases in the Tropics	ed. OP Sharma (Marcel Dekker)
10.	The Normal Lung	by Murray (Saunders)
11.	Pulmonary Function Testing	by Clausen (Academic Press)
12.	Respiratory Physiology	by J.B. West (Williams & Wilkins)
13.	Physiology of Respiration	by J.H. Comroe (Yearbook Med Pub.)
14.	Respiratory Function in disease	by Bates et al (Saunders)

Journals

03-05 international Journals and 02 national (all indexed) journals

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Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN RADIODIAGNOSIS

Preamble:

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

The Goal of this program is to impart training in conventional and modern radiology and imaging techniques so that the post graduate student becomes well versed and competent to practice, teach and conduct research in the discipline of radiology. The student should also acquire basic knowledge in the various sub-specialities of radiology. These Guidelines also would also help to standardize Radiodiagnosis teaching at post graduate diploma (DMRD) level throughout the country so that it will benefit in achieving competent radiologist with appropriate expertise.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SPECIFIC LEARNING OBJECTIVES

The objective of the program is to train a student to become a skilled and competent radiologist to conduct and interpret various diagnostic/interventional imaging studies (both conventional and advanced imaging), to organize and conduct research and teaching activities and be well versed with medical ethics and legal aspects of imaging/ intervention.

SUBJECT SPECIFIC COMPETENCIES

A. Cognitive Domain

A post graduate student on completing MD (Radiodiagnosis) should acquire knowledge in the following areas, and be able to:

1. Acquire good basic knowledge in the various sub-specialties of radiology such as chest radiology, neuro-radiology, GI-radiology, uro-radiology, cardio-vascular-radiology, musculoskeletal, interventional radiology, emergency radiology, pediatric radiology and women’s imaging.

2. Independently conduct and interpret all routine and special radiologic and imaging investigations.
3. provide radiological services in acute emergency and trauma including its medico-legal aspects.
4. Elicit indications, diagnostic features and limitation of applications of ultrasonography, CT and MRI and should be able to describe proper cost-effective algorithm of various imaging techniques in a given problem setting.
5. Decide on the various image-guided interventional procedures to be done for diagnosis and therapeutic management.
6. Able to decide on further specialization to be undertaken in any of the branches in Radiodiagnosis such as gastrointestinal radiology, uro-radiology, neuro-radiology, vascular radiology, musculoskeletal radiology, interventional radiology etc.
7. Able to formulate basic research protocols and carry out research in the field of radiology- related clinical problems.
8. Acquire knowledge and teaching capabilities to work as a post graduate student /consultant in Radiodiagnosis and conduct teaching programmes for undergraduates, post graduates as well as paramedical and technical personnel.
9. interact with other specialists and super-specialists so that maximum benefit accrues to the patient.
10. Should be able to organize CME activities in the specialty utilizing modern methods of teaching and evaluation.
11. Acquire knowledge to impart training in both conventional radiology and modern imaging techniques so that the post graduate student is fully competent to practice, teach and do research in the broad discipline of radiology including ultrasound, Computed Tomography and Magnetic Resonance Imaging.
12. Acquire knowledge of interventional radiology.

B. Affective Domain:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.

2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.

3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

Practical Training will include two major aspects:

A) Interpretation of images, and

B) Skill in performing a procedure.

A) Interpretation of images:

The student should be able to interpret images on all imaging modalities of diseases of following organs :

1. **Musculo-skeletal System -** Interpretation of diseases of muscles, soft tissue, bones and joints including congenital, inflammatory, traumatic, endocrine and metabolic, neoplastic and miscellaneous conditions.
2. **Respiratory System -** Interpretation of diseases of the chest wall, diaphragm, pleura and airway; pulmonary infections, pulmonary vasculature; pulmonary neoplasm; diffuse lung disease; mediastinal disease, chest trauma; post-operative lung and X-ray in intensive care.
3. **Cardiovascular System** - Interpretation of diseases and disorders of cardiovascular system (congenital and acquired conditions) and the role of imaging by conventional radiology, ultrasound, colour Doppler, CT, MRI, Angiography and Isotopes Studies.
4. **Gastro-intestinal tract and hepato-biliary pancreatic system** - Interpretation of diseases and disorders of mouth, pharynx, salivary glands, esophagus, stomach, small intestine, large intestine, diseases of omentum, peritoneum and mesentery: acute abdomen, abdominal trauma. Diseases and disorders of liver, biliary system and pancreas**.**
5. **Urogenital System** - Interpretation of various diseases and disorders of genitor-urinary system. These include: congenital, inflammatory, traumatic, neoplastic, calculus disease and miscellaneous conditions.
6. **Central Nervous System (C.N.S.) -** Interpretation of diseases and disorders of the head, neck and spine covering, congenital, infective, vascular, traumatic neoplastic degeneration metabolic and miscellaneous condition.
7. Imaging in Emergency Medicine.
8. Imaging in Obstetrics and Gynecology.
9. Imaging of Breast and interventional procedures.
11. ENT, EYE and Dental Imaging**.**
11. Imaging of endocrine glands and those involved with metabolic diseases.
12. Clinical applied radionuclide imaging.
13. Interventional Radiology

B) Skills in performing a procedure

The student should be able to perform the following procedures:

1) **GIT contrast studies:** Barium studies (swallow, upper GI, Follow through, enema);

fistulogram; sialogram; cologram/ileostogram,

2) **GU:** Excretory urography, MCU, RGU, nephrostogram, genitogram,
3) **Ultrasound:** Studies of whole body including neonatal transfontanell studies, Doppler studies,
4) **CT scan:** should be able to position a patient, plan study as per the clinical indication, do reconstruction of images, perform triple phase study, perform & interpret advanced applications like CT enterography, CT angiography etc.
5) **MRI:** plan and perform MRI studies of whole body
6) **DSA:** should be able to describe the techniques, do (if available to student) transfemoral puncture and insert catheter, help in angiographic procedures both diagnostic and interventional.
7) **Radiography:** should be able to independently do radiography of common and some important uncommon views of different body parts. This includes positioning, centering of X ray beam, setting of exposure parameters, exposing and developing the films. The student should be familiar with not only conventional radiography but with CR and DR systems.
8) **Interventional radiology:** The student should be able to perform simple, common non- vascular procedures under ultrasound and fluoroscopy guidance e.g. abscess drainage, drainage catheter placement, nephrostomy, biliary drainage etc. The student should have knowledge of common vascular interventions e.g stricture dilatation using balloon catheters, embolization with gel foam and other agents, names of common catheters, handling of intravenous contrast reactions; techniques, indications and contraindications for various procedures;

Syllabus

Course contents:

Anatomy

Gross and cross sectional anatomy of all the body systems.

Pathology

Gross morphology of pathological conditions of systemic diseases affecting all organ systems.

Radiology Course

This would cover imaging and interventions of diseases affecting all the body systems:

- Chest
- Cardiovascular system
- Musculoskeletal including soft tissue
- Gastrointestinal system
- Hepato-biliary-pancreatic system
- Urogenital (genito-urinary) system

- CNS including head and neck
- Obstetrics and gynaecology
- ENT, eye, dental, breast
- Endocrine and metabolic system
- Clinically applied radionuclide imaging

Radiological Physics

1. Introduction of general properties of radiation and matter: Fundamentals of nuclear physics and radioactivity
2. Interaction of x-rays and gamma rays with matter and their effects on irradiated materials
3. X-ray Generating Apparatus
4. Screen-film radiography
5. Film processing: Dark room, dry processing, laser /dry chemistry cameras, artifacts.
6. Fluoroscopy: Digital including flat panel units, fluoroscopy cum radiography units
7. Digital radiography: Computed Radiography, Flat panel radiography
8. Other equipments: Ultrasound including Doppler, CT, MRI and DSA
9. Contrast Media (Iodinated, MR & Ultrasound) - types, chemical composition, mechanism of action, dose schedule, route of administration, adverse reaction and their management
10. Nuclear Medicine: Equipments and isotopes in various organ systems and recent advances
11. Picture Archiving and Communication System (PACS) and Radiology Information System (RIS) to make a film-less department and for Teleradiology
12. Radiation protection, dosimetry and radiation biology
13. Image quality and Quality Assurance (QA)
14. Recent advances in radiology and imaging

The student should have knowledge of the following physics experiments:

- Check accuracy of kVp and timer of an X ray unit
- Check accuracy of congruence of optical radiation field
- Check perpendicularity of x ray beam
- Determine focal spot size
- Check linearity of timer of x ray unit
- Check linearity of mA
- Verification of inverse square law for radiation
- Check film screen contact
- Check film screen resolution
- Determine total filtration of an x ray unit
- Processor quality assurance test

- Radiological protection survey of an x ray unit
- Check compatibility of safe light
- Check performance of view box
- Effect of kVp on x ray output

Radiography and processing techniques

1. Processing techniques: includes dark room and dry processing.
2. Radiography of the musculo-skeletal system including extremities.
3. Radiography of the chest, spine, abdomen and pelvic girdle.
4. Radiography of the skull, orbit, sinuses.
5. Contrast techniques and interpretation of GI tract, hepato-biliary tract, pancreas etc.
6. Contrast techniques and interpretation of the Central Nervous system.
7. Contrast techniques and interpretation of the cardiovascular system including chest.
8. Contrast techniques and interpretation of the genito - urinary system including Obstetrics and Gynaecology.
9. Paediatric radiology including MCU, genitogram, bone age.
10. Dental, portable and emergency (casualty) radiography.

TEACHING AND LEARNING METHODS

The training is spread over 3 years and includes following components:

1. Physics related to imaging
2. Rotational posting in various sub-specialties.
3. Seminars, case discussion, journal club**.**
4. Research methodology and statistics.
5. A log book should be maintained by the student and will be checked and signed regularly by the faculty-in-charge during the training program.
6. The postgraduate students shall be required to participate in the teaching and training program of undergraduate students and interns.
7. The postgraduate student would be required to present one poster presentation, to read one paper at a national/state conference and to submit one research paper which should be published or accepted for publication or sent for publication to a peer reviewed journal, during the period of his/her postgraduate studies so as to make him/her eligible to appear at the postgraduate degree examination.
7. Department should encourage e-learning activities.

Rotations:

During the three-year course, suggested rotations are as follows:-

1.	Conventional chest, abdomen, musculoskeletal including skull, spine, PNS and mammography etc	8 months
2.	Contrast studies: G.U., GIT, Hepato-biliary, angiography etc including fluoroscopic guided interventions	8 months
3.	US, Doppler and US guided interventions	8 Months
4.	CT and CT guided interventions	6 Months
5.	Emergency radiology	2 Months
6.	M.R.I.	2 Month
7.	Elective posting	2 Months

During each posting, post graduate student should be able to perform the procedures and interpret the findings.

PROPOSED SCHEDULE FOR ROTATION

1ST Year (1/6)	Conventional Chest & abdomen	Conventional skull, spine, musculo-skeletal etc.	US	Contrast studies - GIT & other fluoroscopic investigations	Contrast studies - G.U. tract	US
(2/6)	US & interventions	Conventional skull, spine, musculo-skeletal etc.	CT	Contrast studies -- GIT & other fluoroscopic investigations	Contrast studies - G.U. tract	US & interve-ntions
2nd Year (3/6)	Conventional Chest & abdomen	Contrast studies - GIT & other fluoroscopic investigations including angiography	Contrast studies - G.U. tract	US & interventions	Emergency	CT
(4/6)	Conventional skull, spine, musculo-skeletal etc.	Contrast studies - G.U. tract including pediatric MCU/genito-gram	US & interven-tions	US & Doppler	Emergency	MRI
3rd year (5/6)	Conventional Chest & mammo-graphy	Contrast studies - GIT & other fluoroscopic investigations including angiography	US & Doppler	Emergency	CT & inter-ventions	Elective
(6/6)	Conventional musculo-skeletal & mammo-graphy	Contrast studies - G.U. tract including pediatric MCU/genito-gram	CT& inter-ventions	CT & inter-ventions	MRI	Elective

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently. For this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, during the training programme

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination.

Quarterly assessment during the MD training should be based on:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, i.e., assessment at the end of training

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

Postgraduate Examination

The Post Graduate Examination was conducted in three parts.

1. **Thesis:**

   Every post graduate student shall carry out work on an assigned research project under the guidance of a recognized Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis (Dissertation). Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

   Thesis shall be submitted at least six months before the Theory and Clinical /

Practical examination. The thesis shall be examined by a minimum of two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory Examination

The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D. shall be held at the end of 3rd academic year. An academic term shall mean six month's training period**.**

There shall be four theory papers:

Paper I: Basic sciences related to Radiology (consists of Anatomy, Pathology, Basic and Radiation Physics, Imaging Techniques, and Film processing).

Paper II: Chest, CVS, CNS including Head & Neck, Eye, ENT, musculo-skeletal, pediatric radiology and Mammography.

Paper III: Abdominal Imaging including GI, GU, Hepatobiliary, endocrine and metabolic, Obstetrics and Gynaecology and Interventional radiology

Paper IV: Recent advances, nuclear medicine; Radiology related to clinical specialties

All papers would consist of short answer questions (minimum 10) covering all aspects of the course.

3. Practical/clinical and oral Examination (will include cases, spots, ultrasound procedure, physics, implements etc)

Practical Examination will have:

1. 3-4 Cases
2. Film Quiz (50 – 60 Spots)
3. To perform Ultrasound on a patient

Oral/Viva voce will include:

- Radiation Physics and quality assurance
- Implements, Catheters and contrast
- Cassettes, films, dark room, equipment
- Radiographic techniques, Radiological procedures,
- Gross pathology

Suggested Reading:

Books (latest edition)

1. Grainger & Allison's Text book of Diganostic Radiology (Churchill Livingstone)
2. Textbook of Gastrontestinal Radiology- Gore and Levine (Saunders)
3. MRI of Brain and Spine - Scott Atlas (LWW)
4. Diagnosis of Diseases of the Chest -Fraser
5. Diagnostic Imaging Series: (Amirsys, Elsevier)
   Abdominal Imaging, Orthopedics, Head and Neck, Neuroradiology, Pediatric Radiology Chest, Obstetrics, Breast
6. MRI in Orthopedics and Sport Injuries - Stoller
7. Skeletal Radiology - Greenspan
8. Abdominal-Pelvic MRI - Semelka (lWW)
9. Caffey's Pediatric Radiology
10. CTI and MRI of the whole body- John R. Haaga
11. Text Book of Radiology and imaging - Davod sulton
12. Diagnostic ultrasound - Carol C. Rumack
13. AIIMS-MAMC-PGI's Comprehensive Textbook of Diagnostic Radiology, Volumes 1, 2, 3

Journals

03-05 international Journals and 02 national (all indexed) journals

1. ~~American Journal of Roentgenology~~
2. ~~Radiology~~
3. ~~Seminars in Ultrasound, CT, MRI~~
4. ~~Radiographics~~
5. ~~Clinical Radiology~~
6. ~~British Journal of Radiology~~
7. ~~Radiological Clinics of North America~~
8. ~~Pediatric Radiology~~
9. ~~Australasian Radiology~~
10. ~~Journal of Computerized Axial Tomography~~
11. ~~Clinical Imaging~~
12. ~~MR Clinics of North America~~
13. ~~Seminars in Roentgenology~~

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Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks* _____
_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

Medical Council of India

NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/17 **Date: 29-08-2022**

National Medical Commission

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN ORTHOPEDICS

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN ORTHOPAEDICS

Preamble

Competency based training programme in Orthopaedics aims to create postgraduate student who, after undergoing the requisite training, should be able to serve the needs of the community and should be competent to solve the problems pertaining to the speciality of Orthopaedics and Trauma.

A postgraduate undergoing training MS in Orthopaedics should be trained to identify and recognize various congenital, developmental, inflammatory, infective, traumatic, metabolic, neuromuscular, degenerative and oncologic disorders of the musculoskeletal system. She/he should be able to provide competent professional services to trauma and orthopaedic patients at a primary/ secondary/tertiary healthcare centres. The PG should acquire knowledge, skill and attitude to provide healthcare and education to the patients and students.

National Medical Commission

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by subject-content specialists. The Expert Group of the NMC had attempted to render uniformity without compromise to the purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies.

In order to achieve sustainable outcomes, certain competencies are essential to be achieved and assessed that will enable the qualified professional to perform the role in practice as an orthopaedic specialist. These roles would be to perform as a:

1. Clinical Expert
2. Professional
3. Scholar
4. Team Member

SUBJECT SPECIFIC OBJECTIVES

The goal of M.S. Orthopaedics is to produce a competent doctor who:

1. Is aware of contemporary advances & developments in medical sciences as related to Orthopaedics and Trauma.
2. Has acquired the competencies pertaining to the subject that are required to be practiced in the community and at all levels of health system.
3. Recognizes the health needs of the patient and family and carries out professional obligations in keeping with principles of the National Health Policy and professional ethics.
4. Is oriented to principles of research methodology.
5. Has acquired skills in educating medical and paramedical professionals.
6. Has acquired skills in effectively communicating with the person, family and the community.

There is need of competency based learning. Core competencies are the essential knowledge, values and skills vital to the successful performance of effective practice of Orthopaedic and Trauma care on patients. Competence-based training is distinctly different from traditional teaching process. Competence-based training focuses on learning by doing.

Competence in medicine has been defined as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individuals and communities being served". Competence is not an achievement but rather a habit of lifelong learning.

Ideally, the assessment of competence (what the student or physician is able to do) should provide insight into actual performance (what he or she does habitually when not observed), as a well as the capacity to adapt to change, find and generate new knowledge, and improve overall performance. The specific learning objectives based on core competence are common to all specialities. As an example of designing learning objectives in the seven domains of core competence are described below:

1. Professionalism
2. Patient care
3. Medical Knowledge
4. Practice-based learning and improvement
5. Interpersonal and Communication skills
6. Systems-based practice
7. Academic skills

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The **Goal** of the MS Orthopedics course is to train a doctor to become a competent teacher, surgeon and researcher in who has acquired competence / skills as given below:

1. Professionalism

1.1 Accepts personal responsibility for care of one's patients, consistent with good work ethics and empathy.

1.2 Demonstrates appropriate truthfulness and honesty with colleagues.

1.3 Recognizes personal beliefs, prejudices, and limitations. His / her personal beliefs and prejudices should not come in the way of providing service.

1.5 Respects patient confidentiality at all times in verbal and written communication with others.

2. Patient Care

2.1 History of and physical examination

2.1.1 Demonstrates ability to obtain a comprehensive and focused history of illness from patient/relatives.

2.1.2 Demonstrates ability to perform a comprehensive and problem-focused physical examination of the concerned human organ.

2.2 Information Management

2.2.1 Demonstrates mastery of the traditional organization of medical data in oral and written presentations.

2.2.2 Demonstrates use and interpretation of diagnostic procedures and data.

2.2.3 Demonstrate ability to use information to produce evidence for the diagnosis and treatment of relevant disease condition/s.

2.3 Procedural

2.3.1 Demonstrates mastery of adequate medical record keeping.

2.3.2 Demonstrates knowledge of accessing data and information systems.

2.3.3 Demonstrates the ability to perform a specific set of procedures identified by the faculty.

3. Medical Knowledge

3.1 Core Discipline

3.1.1 Competencies unique to the discipline,

3.1.2 Competencies derived from the clinical, pre-clinical and para-clinical disciplines.

3.2 Problem Solving

3.2.1 Demonstrates the ability to identify and find information relevant to a clinical problem, using consultation, texts, and the archival literature and electronic media.

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3.2.2 Demonstrates the ability to generate an initial list of differential diagnoses given a specific chief complaint and patient characteristics.

3.2.3 Demonstrates the ability to re-rank the differential diagnoses based on information gathered from the history, physical, and auxiliary studies (investigations).

3.2.4 Demonstrates the ability to explain a mechanism for each aspect of a patient's problem, including biological, behavioural, and social aspects.

3.2.5 Demonstrates the ability to evaluate scientific / clinical information and critically analyze conflicting data and hypotheses.

3.2.6 Demonstrates an ability to counsel a patient providing an option of treatment, conservative or operative.

4. Practice-Based Learning and Improvement

4.1 Physician Scholar

4.1.1 Demonstrates the ability to analyze the quality and implications of medical literature and apply new knowledge in the delivery of health care.

4.1.2 Demonstrates an interest and ability to identify future areas of inquiry in medical research.

4.1.3 Demonstrates enthusiasm and positive attitude in the educational process and participates fully in educational activities.

5. Interpersonal and Communication Skills

5.1 Human Relationships

5.1.1 Demonstrates knowledge of or appropriate inquiry about family and support systems.

5.1.2 Demonstrates an effective system for identifying and addressing ethical, cultural, and spiritual issues associated with health care delivery.

5.1.3 Demonstrates knowledge or applies an understanding of psychological, social, and economic factors which are pertinent to the delivery of health care.

5.1.4 Accurately assesses a patient's exportations and assumptions in accessing the health care system.

5.1.5 Effectively engages the patient and / or family in verbal communications and counselling.

6. System – Based Practice

6.1 Health Care Management

6.1.1 Demonstrates a practical, efficient and cost effective approach to diagnosis and treatment planning and recognizes its social and economic impact.

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6.1.2 Demonstrates the ability to engage the patient family in diagnosis and therapeutic treatment planning.

6.1.3 Demonstrates the ability to recognize and outline initial treatment for patient with life threatening emergencies regardless of aetiology.

6.1.4 Demonstrates knowledge of alternative medicine options and understands their role in health care delivery (AYUSH).

6.2 Health Service Delivery

6.2.1 Demonstrates knowledge of health care financing and applies it in assisting patient to access the best possible care.

6.2.2 Utilizes knowledge of population-based and evidence-based medicine in making patient management decisions.

6.2.3 Utilizes knowledge of managed care systems in making patient treatment plans and health care maintenance plans.

6.3 Health Care Team approach to health care delivery.

6.3.1 Demonstrates an understanding of the roles and competencies of other health care providers.

6.3.2 Demonstrates the ability to engage other health care professionals.

6.3.3 Demonstrates the ability to follow and lead in a team approach to health care delivery.

7. Academic Skills (Scholarly activity)

7.1 Familiarity with basic research methodology, epidemiology, basic information technology skills.

7.2 Planning the protocol of a thesis, its execution and final report.

7.3 Skills to review of relevant literature and asking relevant research question with hypothesis development.

7.4 Conducting clinical sessions for undergraduate medical students, nurses and paramedical workers.

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SUBJECT SPECIFIC COMPETENCIES

1. **Predominant in cognitive domain**:

1.1. Describe the principles of injury and its mechanism and mode, its clinical presentation, plan appropriate investigations and interpret the results, and institute the management of musculoskeletally injured patient, different forces resulting in fractures, biomechanical principles of fracture fixation.

1.2. Identify and describe the surface anatomy and relationship within of the various bones, joints, ligaments, major arteries, veins and nerves of the musculoskeletal system of the spine, upper limb, lower limb and the pelvis, chest, abdomen and head & neck. Identify structural peculiarities of specific bony components and structural speciality of clinical importance during fixation.

1.3. Define and describe the pathophysiology of shock (circulatory failure), types of shock and principles of management.

1.4. Define and describe, types of respiratory failure, the pathophysiology of respiratory failure and management.

1.5. Describe the principles and stages of bone and soft tissue healing, types of bone healing and different intrinsic and extrinsic factors which influence fracture healing.

1.6. Understand and describe the metabolic, nutritional, endocrine, and social impact of trauma, critical illness and biomechanical principles involved in each.

1.7. Enumerate, classify and describe the various bony/soft tissue injuries affecting the axial and appendicular skeletal system in adults and children.

1.8. Describe the principles of internal and external fixation for stabilization of bone and joint injuries.

1.9. Describe the mechanism of homeostasis, fibrinolysis and methods to control haemorrhage and rationale for each management.

1.10. Describe the physiological coagulation cascade and its abnormalities.

1.11. Describe different techniques of pain management as well as recovery of function in specific disease and trauma scenario.

1.12. Describe the pharmacokinetics and pharmacodynamics of drug metabolism and excretion of analgesics, anti-inflammatory agents, antibiotics, disease - modifying agents and chemotherapeutic agents and biologicals.

1.13. Understand the principles of Early Total Care and Damage Control Orthopaedics and planning of definitive orthopaedic management.

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1.14. Understand the principles of biostatistics and research methodology.

1.15. Understand the principles of Angiography, CT/MR angiography, Doppler Ultrasound, Sinogram.

1.16. Acquire the ability to order investigations.

2. Describe the clinical presentation, plan investigations, interpret results and institute steps for the management and prevention of the following disease conditions:
   2.1. Nutritional deficiency diseases affecting the bones and joints,
   2.2. Depositional arthropathies,
   2.3. Endocrine abnormalities of the musculoskeletal system,
   2.4. Metabolic abnormalities of the musculoskeletal system,
   2.5. Congenital anomalies of the musculoskeletal system,
   2.6. Developmental skeletal disorder of the musculoskeletal system,
   2.7. Bone and soft tissue tumours affecting the musculoskeletal system.

3. Describe the pathogenesis and clinical features of the following conditions in adults and children, plan appropriate investigations, interpret the results and institute appropriate management of:
   3.1. Tubercular infections of bone and joints (musculoskeletal system),
   3.2. Pyogenic infections of musculoskeletal system,
   3.3. Mycotic infections of musculoskeletal system,
   3.4. Autoimmune disorders of the musculoskeletal system (HIV),
   3.5. Rheumatoid arthropathy, Ankylosing spondylitis, seronegative arthropathy.
      3.5.1. Osteoarthrosis and spondylosis

4. Describe the pathogenesis and clinical presentation, plan and interpret results of investigations and institute appropriate treatment in the following conditions:
   4.1. Post-polio residual paralysis
   4.2. Cerebral palsy
   4.3. Muscular dystrophies and myopathies
   4.4. Nerve injuries
   4.5. Entrapment neuropathies
   4.6. Spinal dysraphism
   4.7. Spinal anomalies.

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5. Diagnose musculoskeletal manifestation of AIDS and HIV infection and its management.
6. Describe the aetiopathogenesis and clinical presentation, plan and interpret results of investigations and institute appropriate treatment for the management of osteonecrosis of bones.
7. Identify situations requiring rehabilitation services, prescribe suitable orthotic and prosthetic appliances and act as a member of the team providing rehabilitation care.
8. Identify and manage emergency situation in disorders of the musculoskeletal system.
9. Understand the basics of diagnostic imaging in orthopaedics like how and when to order and how to interpret the results of:
    9.1. Plain x-ray
    9.2. Ultrasonography
    9.3. Computerised axial tomography
    9.4. Magnetic resonance imaging
    9.5. PET scan
    9.6. Radio Isotope bone scan
    9.7. Digital Subtraction Angiography (DSA)
    9.8. Dual energy x-ray Absorptiometry
    9.9. Arthrography.
10. Describe the aetiopathogenesis, clinical presentation, identification, plan investigation/s and institute appropriate treatment for oncologic problems of musculoskeletal system (both benign and malignant: primary and secondary).
11. Understand the basics and principles of biomaterials and orthopaedic metallurgy.
12. Describe the principles of normal and abnormal gait and understand the biomedical principles of posture and replacement surgeries.
13. Describe social, economic, environmental, biological and emotional determinants of health in a given patient with a musculoskeletal problem.
14. Identify a research problem, prepare a research protocol, conduct a study, record observations, analyse data, interpret the results, discuss and disseminate the findings

II. Predominant in the Psychomotor domain

1. At the end of the first year of M.S. Orthopaedics programme, the student should be able to:

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1.1. Elicit a clinical history from a patient, do a physical examination, document in a case record, order appropriate investigations and make a clinical diagnosis. (Records of all competencies achieved should be documented in log book/E-Portfolio)

1.2. Impart wound care, where applicable, including different types of wound, and different chemotherapeutic agents for wound care, including VAC application and its care, and local antibiotic delivery system.

1.3. Apply all types of POP casts/slabs, splints and tractions as per need. Learn different types of bandaging.

1.4. Identify shock and provide resuscitation.

1.5. Perform aspiration of joints and local infiltration of appropriate drugs.

1.6. Perform appropriate wound debridement.

1.7. Perform arthrotomy of knee joint and also assist in arthrotomy of hip, anklet and shoulder.

1.8. Perform incision and drainage of abscess.

1.9. Perform split thickness skin grafting.

1.10. Perform fasciotomies.

1.11. Apply external fixators.

1.12. Apply skeletal tractions including skull tongs.

1.13. Triage a disaster situation and multiple trauma patients in an emergency room.

1.14. Perform on bone models, interfragmentary compression screws, external fixation, Tension band wiring and Broad plating.

1.15. Perform closed reduction of common dislocations like shoulder and common fractures like collar fracture, supracondylar fracture.

1.16. Perform on a cadaver standard surgical approaches to the musculo-skeletal system.

2. At the end of the second year of M.S. Orthopaedics course, the student should be able to:

2.1. Take an informed consent for standard orthopaedic procedures.

2.2. Perform closed/open biopsies for lesions of bone, joints and soft tissues.

2.3. Perform split thickness skin grafting and local flaps.

2.4. Perform on bone models, internal fixation with k-wires, screws, plates, Dynamic hip/condylar screws/nailing.

2.5. Perform sequestrectomy and saucerisation.

2.6. Perform arthrotomy of joints like hip/shoulder, ankle, elbow.

2.7. Perform repair of open hand injuries including tendon repair.

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2.8. Perform arthodesis of small joints.

2.9. Perform diagnostic arthroscopy on models and their patients.

2.10. Perform carpal tunnel/tarsal tunnel release.

2.11. Apply Ilizarov external fixator.

2.12. Perform soft tissue releases in contractures, tendon lengthening and correction of deformities.

2.13. Perform amputations at different levels.

2.14. Perform corrective surgeries for Congenital talipes equino-varus (CTEV), DDH, Perthes/ skeletal dysplasia.

2.15. Perform cadaver based procedures, arthroscopy, arthrotomy.

3. At the end of the third year of M.S. Orthopaedics programme, the student should be able to:

3.1. Assist in the surgical management of poly trauma patient.

3.2. Assist in Arthroplasty surgeries of hip, knee, shoulder and the ankle.

3.3. Assist in spinal decompressions and spinal stabilizations.

3.4. Assist in operative arthroscopy of various joints.

3.5. Assist /perform arthrodesis of major joints like hip, knee, shoulder, elbow.

3.6. Assist in corrective osteotomies around the hip, pelvis, knee, elbow, finger and toes.

3.7. Assist in surgical operations on benign and malignant musculoskeletal tumour including radical excision and custom prosthesis replacement.

3.8. Assist in open reduction and internal fixations of complex fractures of acetabulam, pelvis, IPSI lateral floating knee/elbow injuries, shoulder girdle and hand.

3.9. Assist in spinal deformity corrections.

3.10. Independently perform closed/open reduction and internal fixation with DCP, LCP, intra- medullary nailing, LRS.

3.11. Assist in limb lengthening procedures.

3.12. Assist in revision surgeries.

3.13. Provide pre- and post- OP care. This care should be exercised from first year.

3.14. Perform all clinical skills as related to the speciality.

III. Predominant in Affective Domain:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.

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1.1. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.

1.2. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

IV. Attitudes including Communication skills and Professionalism

1. Communication skills: The PG student should:

1.1. Exhibit participation in honest, accurate health related information sharing in a sensitive and suitable manner.

1.2. Recognize that being a good communicator is essential to practice effectively.

1.3. Exhibit effective and sensitive listening skills.

1.4. Recognise the importance and timing of breaking bad news and know how to communicate.

1.5. Exhibit participation in discussion of emotional issues.

1.6. Exhibit leadership in handling complex and advanced communication.

1.7. Recognize the importance of patient confidentiality and the conflict between confidentiality and disclosure.

1.8. Be able to establish rapport in therapeutic bonding with patients, relatives and other stakeholders through appropriate communication.

1.9. Able to obtain comprehensive and relevant history from patients/relatives.

1.10. Able to counsel patients on their condition and needs. Add counselling of diagnosis, prognosis, complications as well as planning for the management.

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2. **Team work**: Seek cooperation. Coordination and communication among treating specialties and paramedical staff.
3. **Counselling of relatives**: regarding patient's condition, seriousness, bereavement and counselling for organ donation in case of brain stem death.
4. **Leadership**: Trauma prevention, education of the public, paramedical and medical persons.
5. **Advocacy**: with the government and other agencies towards cause of trauma care.
6. **Ethics**: The Code of Medical Ethics as proposed by National Medical Commission of India will be learnt and observed.

SUBJECT SPECIFIC PRACTICE-BASED OR PRACTICAL COMPETENCIES

Name/ Description of practice based competencies	Expected quantum
1. Taking a Clinical History from a patient with appropriate physical exam a. Hip-pain, Limp, Deformity, Instability, Both in child and adult b. Knee-pain, Deformity, Instability in child and adult c. Ankle, Foot d. Shoulder e. Elbow f. Wrist g. Head h. Spine	At least 3 clinical encounters in each region
2. In the Bone Skills Lab **Basic** 1. Introduction and tension band wiring 2. Lag screw interfragmentary compression 3. Broad plating 4. Narrow plating 5. Ex-Fix 6. Cancellous screw fixation 7. Umex **Intermediary** 1. DHS 2. DCS 3. Tibia nailing 4. Femur nailing 5. Tibia condyle 6. Elbow 7. Ankle **Advanced:** 1. Pelvis 2. Pubic symphysis 3. Acetabulum 4. MIPPO 5. Hemiarthroplasty 6. Spine posterior 7. Spine anterior	Practice at least twice on bone models and record

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3. On Patients i. **At the end of the first year of M.S. Orthopaedics programme, the student will be able to perform:** a. Wound care - different types of wound, and different chemotherapeutic agents for wound care, including VAC application b. POP casts/slabs, splints and tractions as per need. Learning of different types of bandaging. c. Identify shock and provide resuscitation d. Aspiration of joints and infiltration of appropriate drugs e. wound debridement f. Arthrotomy of knee joint and assist in arthrotomy of Hip, anklet, shoulder. g. Incision and drainage of abscess h. Split thickness skin grafting i. Fasciotomes j. External fixators k. Skeletal tractions including skull tongs l. Triage a disaster situation and multiple trauma patients in an emergency room m. Perform on bone models, interfragmentary compression screws, external fixation, Tension band wiring and Broad plating n. Closed reduction of common dislocations like shoulder and common fractures like collar fracture, supracondylar fracture. o. Perform on a cadaver standard surgical approaches to the musculo skeletal system. **ii. At the end of the second year of M.S. Orthopaedics course, the student should be able to:** a. Perform closed/open biopsies for lesions of bone, joints and soft tissues b. Perform split thickness skin grafting and local flaps	As per the clinical volume available in each institution

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c. Perform on bone models, internal fixation with k-wires, screws, plates. Dynamic hip/condylar screws/nailing. d. Perform sequestrectomy and saucerisation e. Perform arthrotomy of joints like hip/shoulder, ankle, elbow f. Perform repair of open hand injuries including tendon repair g. Perform arthodesis of small joints h. Perform diagnostic arthroscopy on models and their patients i. Perform carpal tunnel/tarsal tunnel release j. Apply ilizarov external fixator k. Perform soft tissue releases in contractures, tendon lengthening and correction of deformities l. Perform amputations at different levels m. Perform corrective surgeries for CTEV, DDH, perthes/ skeletal dysplasia n. Perform cadaver based procedures, Arthroscopy, Arthrotomy.	As per the clinical volume available in each institution
iii. At the end of the third year of M.S. Orthopaedics programme, the student should be able to: a. Assist in the surgical management of poly trauma patient b. Assist in Arthroplasty surgeries of hip, knee, shoulder and the ankle c. Assist in spinal decompressions and spinal stabilizations d. Assist in operative arthroscopy of various joints e. Assist /perform arthrodesis of major joints like hip, knee, shoulder, elbow f. Assist in corrective osteotomies around the hip, pelvis, knee, elbow, finger and toes g. Assist in surgical operations on benign and malignant musculoskeletal tumour including radical excision and custom prosthesis replacement. h. Assist in open reduction and internal fixations of complex fractures of acetabulam, pelvis, IPSI lateral floating knee/elbow injuries, shoulder girdle and hand i. Assist in spinal deformity corrections	As per the clinical volume available in each institution

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j. Independently perform closed/open reduction and internal fixation with DCP, LCP, intra meduallary nailing, LRS k. Assist in limb lengthening procedures l. Assist in Revision surgeries m. Provide pre and post OP care This care should be exercised from first year n. Perform all clinical skills as related to the speciality.	

SYLLABUS

I. COGNITIVE DOMAIN

At the end of the M.S. Orthopaedics programme, the post graduate student should be competent and show sufficient understanding of Basic Sciences as applicable to Orthopaedics and Trauma through a problem based approach.

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1. Basic Sciences as related to Orthopaedics and Trauma

a) Embryogenesis of all organ systems
b) Structure and function of Central Nervous System
c) Structure and function of the peripheral Nervous System
d) Structure and function of the arterial and venous system
e) Structure and functions of the head & neck, abdomen, thorax and extremities.

2. Physiological basis and Pathophysiology in Health and Disease

a) Physical Growth
b) Temperature regulation
c) Acid Base Balance
d) Fluid Balance
e) Hematopoiesis
f) Hemostasis
g) Electrolyte balance
h) Bone mineralization: Calcium-Phosphate balance
i) Renal functions

j) Hepatic function
k) Respiratory functions
l) Cardiac functions
m) Gastrointestinal functions
n) Endocrine functions
o) Developmental Milestones
p) Nutritional Needs of Orthopaedic/Trauma Patients
q) Allergy

3. **Clinical Microbiology as related to Orthopaedic infections**
   a) Virology
   b) Bacteriology
   c) Mycology
   d) Parasitology (Protozoology and Helminthology)
   e) Waste disposal, Sterilization, Disinfection

4. Clinical Pharmacology as related to Orthopaedics & Trauma
   a) Pharmacokinetics – of common medications used in Orthopaedics & Trauma
   b) Antimicrobials
   c) Analgesia, Sedation
   d) Drug Interactions
   e) Adverse effects
   f) Antidotes for Poisons
   g) Drug induced disease

5. **Professionalism and Ethics**
   a) Professionalism
   b) Ethics
   c) Medico legal essentials

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6. **Wound healing principles**
    a) Types of wounds
    b) Stages of wound healing
    c) Biochemical & Molecular factors in wound healing
    d) Chemotherapeutic and other Pharmaceuticals in wound care
    e) Host, Environment and agent factors
7. **Bone Healing**
    a) Principles of bone healing
    b) Biological bone healing
    c) Factors influencing bone healing
    d) Biomechanism of bone healing

TEACHING AND LEARNING METHODS

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General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skills oriented. Learning in the program, essentially autonomous and self-directed, and emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the postgraduate (PG) courses shall work as full-time (junior) residents during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a log book for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real time.

Teaching-Learning methods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinical meetings, seminars, small group discussion, bed-side teaching, case-based learning, simulation-based teaching, self-directed learning, integrated learning, interdepartmental meetings and any other collaborative activity with the allied departments. Methods with exposure to the applied aspects of the subject relevant to basic/clinical sciences should also be used. **The suggested examples of teaching-learning methods are given below but are not limited to these. The frequency of various below mentioned teaching-learning methods**

can vary based on the subject's requirements, competencies, work load and overall working schedule in the concerned subject.

A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures per year in the concerned PG department is suggested. Topics to be selected would be as per subject requirements. All postgraduate trainees will be required to attend these lectures. Lectures can cover topics such as:

1. Subject related important topics as per specialty requirement
2. Recent advances
3. Research methodology and biostatistics
4. **Salient features of Undergraduate/Postgraduate medical curriculum**
5. Teaching and assessment methodology.

Topic numbers 3, 4, 5 can be done during research methodology/biostatistics and medical education workshops in the institute.

B 1. Journal club: Minimum of twice a month is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

B 2. ORTHO RADIOLOGY MEETS: Twice a month discussions amongst Ortho & Radiology Residents under facilitation of faculty on various imaging modalities used and its interpretation.

B.3. ORTHO SURGICAL PATHOLOGICAL MEET: Special emphasis on the surgical pathology radiological aspect of the case in the pathology department. Clinician (Ortho resident) presents the clinical details of the case, radiology PG student describes the Radiological findings and its interpretation and Pathology student describes the morbid anatomy and histopathology of the same case.

B. 4. SKILLS LAB SESSIONS: Once a fortnight for first 2 years.

C. Student Seminar: Minimum of twice a month is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive evidence-based review of the topic. The student should be graded by the faculty and peers.

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D. Student Symposium: Minimum of once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by the faculty and peers.

E. Laboratory work / Bedside clinics/case presentation: Case presentation once a week in the ward, outpatient department/special clinics.

Laboratory work/Clinics/bedside teaching should be coordinated and guided by faculty from the department. Various methods like DOAP (Demonstrate, Observe, Assist, Perform), simulations in skill lab, and case-based discussions etc. are to be used. Faculty from the department should participate in moderating the teaching-learning sessions during clinical rounds.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main Department and other department/s on topics of current/common interest or clinical cases; eg., combined clinical round with Radiology, Pathology etc.

G. a. Rotational clinical / community / institutional postings

Depending on local institutional policy and the subject specialty needs, postgraduate trainees may be posted in relevant departments/ units/ institutions. The aim would be to acquire more in-depth knowledge as applicable to the concerned specialty. Postings would be rotated between various units/departments and details to be included in the specialty-based Guidelines. Few examples are listed below:

1. Clinical postings

A major portion of posting should be in Orthopaedics department. It should include in-patients, out-patients, ICU, trauma, emergency room and speciality clinics.

Rotation of posting

- Inter-unit rotation in the department should be done for a period of up to one year.
- Rotation in appropriate related subspecialties for a total period not exceeding 06 months.

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- Medical Education Unit (MEU) or Department of Medical Education (DOME) (optional)

T/L Education

- Bone Skills Lab sessions – Twice a week
- Surgical Audit sessions – Once every week
- Cadaver based education – Twice a month
- Web based e-learning sessions – Once a fortnight
- Simulated environment learning – Two sessions in a week
- **Mortality & Morbidity meetings with SURGICAL AUDIT:** Once a month

G b. Posting under "District Residency Programme" (DRP):

All postgraduate students pursuing MS/MS in broad specialities in all Medical Colleges/Institutions shall undergo a compulsory rotation of three months in District Hospitals/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th or 5th semester of the Postgraduate programme and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident".

Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists / clinicians in different hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

H. Teaching research skills

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Writing a thesis should be used for inculcating research knowledge and skills. All postgraduate students shall conduct a research project of sufficient depth to be presented to the University as a postgraduate thesis under the supervision of an eligible faculty member of the department as guide and one or more co-guides who may be from the same or other departments.

In addition to the thesis project, every postgraduate trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be reinforced.

I. Training in teaching skills

MEU/DOME should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on the teaching skills of the student.

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J. Log book

During the training period, the postgraduate student should maintain a Log Book indicating the duration of the postings/work done in Wards, OPDs, Casualty and other areas of posting. This should indicate the procedures assisted and performed and the teaching sessions attended. The log book entries must be done in real time. The log book is thus a record of various activities by the student like: (1) Overall participation & performance, (2) attendance, (3) participation in sessions, (4) record of completion of pre-determined activities, and (5) acquisition of selected competencies.

The purpose of the Log Book is to:

a) help maintain a record of the work done during training,
b) enable Faculty/Consultants to have direct information about the work done and intervene, if necessary,
c) provide feedback and assess the progress of learning with experience gained periodically.

The Log Book should be used in the internal assessment of the student, should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce completed log book in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate from the Head of Department regarding the clinical competence and skillful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in log book particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and at least two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty are referred to the MCI Logbook Guidelines uploaded on the Website.

K. **Course in Research Methodology**: All postgraduate students shall complete an online course in Research Methodology within six months of the commencement of the batch and generate the online certificate on successful completion of the course.

Other aspects

- The Postgraduate trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The Postgraduate trainees should undergo training in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS).
- The Postgraduate trainees must undergo training in information technology and use of computers.

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learnt initially on the models, later to be performed under supervision followed by independent performance. For this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., assessment to improve learning

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Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

The Internal Assessment should be conducted in theory and practical/clinical examination, should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

Quarterly assessment during the MS training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self-directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs
6. Mini Cex encounter – at least 4
7. Clinical encounter cards - at least -4
8. Direct observation of procedural skills – at least 6 including Cadaver dissection
9. OSCE/Theory, Essay, Short notes
10. MCQS
11. Bone Skill Lab performance assessment

Note: These sessions may be organized and recorded as an institutional activity for all postgraduates.

- Attendance at Scientific meetings, CME programmes (at least 02 each)

The student to be assessed periodically as per categories listed in the student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

Essential pre-requisites for appearing for examination include:

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1. **Log book** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.

2. At least **two presentations** at national level conference. One research paper should be published / accepted in an indexed journal**. (It is suggested that the local or University Review committee assess the work sent for publication).**

The summative examination would be carried out as per the Rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination**.**

The postgraduate examination shall be in three parts**:**

1. **Thesis**

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners**.**

2. **Theory examination**

   The examinations shall be organized on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training, as given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ M.S shall be held at the end of 3rd academic year.

   There shall be four theory papers (as per PG Regulations).

   Paper I: Basic sciences as applied to the subject

   Paper II: Traumatology and Rehabilitation

   Paper III: Orthopaedic diseases

   Paper IV: Recent advances in Orthopaedic surgery & General Surgery as applied to Orhopaedics

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3. Practical/clinical and Oral/viva voce examination

Practical examination

Practical examination should be spread over **two** days and include various major components of the syllabus focusing mainly on the psychomotor domain.

Oral/Viva voce examination on defined areas should be conducted by each examiner separately. Oral examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject focusing on psychomotor and affective domain. It should include:

- Stations for clinical, procedural and communication skills
- Log Book Records and reports of day-to-day observation during the training
- Should test the post graduate student's overall knowledge of the subject in:
    - Ortho Radiology
    - Ortho Pathology
    - Histopathology & Gross anatomy
    - Instruments
    - Orthotics and Prosthotics

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Recommended Reading:

1. Campbell's Operative Orthopaedics, Vols 1, 2, 3 & 4 Campbell's Operative Orthopaedics, 4-Volume Set, 14th Edition by Frederick M Azar, MD, S. Terry Canale, MD and James H. Beaty, MD
2. Mercer's Orthopaedic Surgery Vol. 1 & 2, Author(s) : Robert B Duthie Edition: Nineth, Year of Publication: 2003
3. Rockwood And Greens – Fractures in Adults, Vol 1& 2 Rockwood and Green's Fractures in Adults Author(s): Paul Tornetta , William Ricci MD, FAAOS, Charles M. Court-Brown MD, FRCS Ed (Orth), Margaret M. McQueen MD, Michael McKee MD, FRCS (C)Publication Date: March 27, 2019
4. Fractures in Children – Rockwood & Wilkins - Rockwood and Wilkins Fractures in Children Edition: 9. Author(s): Peter M Waters MD, David L. Skaggs MD, John M. Flynn. Publication Date: March 19, 2019

5. Paediatric Orthopaedics – Tachidjian, Vol 4 Tachdjian's Pediatric Orthopaedics: From the Texas Scottish Rite Hospital for Children, 6th edition - November 27, 2020 Author: John Herring
6. Concise System Of Orthopaedics And Fractures – Graham Apley Apley's Concise System of Orthopaedics and Fractures Louis Solomon, David Warwick, Selvadurai Nayagam CRC Press, 31-Mar-2005
7. Textbook of Orthopaedics and Trauma – Kulkarni, Vol 1 Textbook of Orthopedics and Trauma (4 Volumes) GS Kulkarni, Sushrut Babhulkar, Publish Year 2016
8. B.D. Chaurasia's Human Anatomy, Vol1,Vol 2, Vol 3 B D Chaurasia's Handbook of Anatomy English Editions 2022 Eighth Editions Volume 2 (paperpack, CHAURASIAS), Author: CHAURASIAS, Publisher: CBS Publishers, Publishing Date 2022
9. Pharmacology and Pharmacotherapeutics – Satoskar- Pharmacology and Pharmacotherapeutics, 24th Edition - June 30, 2015, Authors: RS Satoskar, Nirmala Rege, SD Bhandarkar
10. Orthopaedics Anatomy and Surgical Approaches Frederick Wreckling Orthopaedic Anatomy and Surgical Approaches Edited by Frederick W. Reckling, Jo Anne B. Reckling and Melvyn P. Mohn, S. P. Frostick, First Published August 1, 1991
11. Green's Operative Hand Surgery-Vol. 1&. 2, Green, David P; Hotchkiss, Robert N Green's Operative Hand Surgery, 2-Volume Set 7th Edition - February 24, 2016, Authors: Scott W. Wolfe, William C. Pederson, Scott H. Kozin, Mark S. Cohen
12. Surgical Exposures in Orthopedics: The Anatomic Approach, Hoppenfeld, Stanley; De Boer, Piet Surgical Exposures in Orthopaedics: The Anatomic Approach, Edition: 6, Author(s): Piet de Boer MD, Richard Buckley MD, FRCSC, Stanley Hoppenfeld MD, Publication Date: October 7, 2021
13. Text Book of Ilizarov Surgical Techniques Bone Correction And Lengthening, Golyakhovsky, Vladimir; Frankel, Victor H Textbook of Ilizarov Surgical Techniques: Bone Correction and Lengthening by Vladimir Golyakhovsky, Victor H Frankel, Publishing Year 2010
14. Applied Orthopaedic Biomechanics, Dutta, Santosh; Datta, Debasis Applied Orthopaedic Biomechanics, by Debasis Datta Santosh K Dutta Publisher : B.I.Publications, Year 2008.

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Journals

03-05 international Journals and 02 national (all indexed) journals.

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Annexure 1

Student appraisal form for MS in Orthopedics											
	Element	**Less than Satisfactory**			**Satisfactory**			**More than satisfactory**			**Comments**
		1	2	3	4	5	6	7	8	9	
1	**Scholastic Aptitude and Learning**										
1.1	Has Knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc.)										
1.3	Conduct of research and other scholarly activity assigned (e.g Posters, publications etc.)										
1.4	Documentation of acquisition of competence (eg. Log book)										
1.5	Performance in work based assessments										
1.6	Self- directed Learning										
2	**Care of the patient**										
2.1	Ability to provide patient care appropriate to level of training										
2.2	Ability to work with other members of the health care team										
2.3	Ability to communicate appropriately and empathetically with patients families and care givers										
2.4	Ability to do procedures appropriate for the level of training and assigned role										

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2.5	Ability to record and document work accurately and appropriate for level of training										
2.6	Participation and contribution to health care quality improvement										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethical appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment been discussed with the trainee?	Yes	No								
	If not explain										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

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Subject Expert Group members for preparation of REVISED Guidelines for competency based postgraduate training programme for MS in Orthopaedics

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN OTORHINOLARYGOLOGY

Preamble:

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

The purpose of MS ENT is to standardize Otorhinolaryngology teaching at Post Graduate level throughout the country so that it will benefit in achieving uniformity in undergraduate teaching as well and resultantly creating competent ENT Surgeons with appropriate expertise.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

At the end of postgraduate training the student should be able to:

1. Practice his specialty ethically keeping in mind the requirement of the patient, community and people at large.
2. Demonstrate sufficient understanding of basic sciences related to his specialty and be able to integrate such knowledge in his Clinical practice.
3. Diagnose and manage majority of conditions in his specialty (clinically and with the help of relevant investigations)
4. Plan and advise measures for the promotive, preventive, curative and rehabilitative aspects of health and diseases in the specialty of ENT.
5. Should be able to demonstrate his cognitive skills in the field of ENT and its ancillary branches during the formative and summative evaluation processes.
6. Play the assigned role in the implementation of National Health Programs
7. Demonstrate competence in basic concepts of research methodology and writing thesis and research papers.
8. Develop good learning, communication and teaching skills.

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9. Demonstrate sufficient understanding of basic sciences and the clinical applications related to the specialty to be able to integrate this knowledge into Clinical practice. Acquire in-depth knowledge in the subject including recent advances.
10. Demonstrate that he is fully conversant with the latest diagnostics & therapeutics available.

SUBJECT SPECIFIC LEARNING OBJECTIVES

1. Theoretical Knowledge:

A student should have fair knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology and Pharmacology) as applied to ENT and be able to integrate such knowledge in his clinical practice. She/He should acquire in-depth knowledge of his subject including recent advances. She/He should be fully conversant with the bedside procedures (diagnostic and therapeutic) and having knowledge of latest diagnostics and therapeutics available.

2. Clinical / Practical skills:

A student should be adept at good history taking, physical examination, providing basic life support and advanced cardiac life support, common procedures like FNAC, Biopsy, aspiration from serous cavities, lumber puncture etc. She/he should be able to choose the required investigations to enhance the attitude, communication skills, including dealing with patient's relatives with the required empathy, adapt to changing trends in education, learning methods and evolving new diagnostic and therapeutic techniques in the subject of ENT.

3. Research:

She/He should know the basic concepts of research methodology, plan a research project, plan and write a thesis and should know how to use library facilities. Basic knowledge of statistics is also required. Knowledge about use of internet resources is required.

4. Teaching:

The student should learn the basic methodology of teaching and assessment and develop competence in teaching medical/paramedical students and their assessment.

SUBJECT SPECIFIC COMPETENCIES

A. Cognitive Domain

At the end of training, the student should be able to demonstrate ability to practically apply knowledge gained during training period. This would include the following:

Basic Sciences related to Otolaryngology

- Physiology- Mechanism of perception of smell and taste, mechanism of breathing and voice production, lacrimation, deglutition and salivation. Functional tests of the nose and paranasal sinuses, mechanism of cough and sneezing.
- Physics of sound, theories of hearing, mechanism of perception of sound and speech production, physiology of equilibrium and cerebral function. Physiology of brain in connection with hearing, speech, smell and phonation. Audiologic tests like audiometry, impedance, evoked potentials, OAE, Speech audiometry.
- Physiology of larynx, tracheobronchial tree and oesophagus - Histology of mucous membranes, internal ear and other associated organs and structures, nose, PNS NPx, Larynx, Tracheo-Bronchial tree, Lymphoepithetical system. Mechanism of immune system/immunology and genetics.
- Anatomy-Embryogenesis of ear, nose and throat including palate and the larynx, Oesophagus, trachea and lungs, tongue, salivary gland Head and Neck and skull base etc.
- Parapharyngeal spaces in the neck including connective tissue barriers of larynx.
- Applied anatomy of the skull bones, accessory sinuses, external, middle and inner ears, nose, PNS, nasopharynx, meninges, brain, pharynx, larynx, trachea and bronchi, lungs, pleurae, oesophagus and the mediastinum.
- Anatomy of all cranial nerves with their functions.

Principles and Practices of Otolaryngology, Audiology and Speech Pathology

- Clinical Methodology as applied to ORL HN diseases in adult and children and the accessory sinuses, diagnosis and surgical treatment of diseases of nose, throat and ear in adult and children. Prevention and treatment, infectious diseases of Otolaryngology and Head Neck region. Circulatory and nervous disturbances of the nose, throat and ear and their effects on other organs of the body. Deformities, injuries sinus infections, polyps and the tumors of the nose, and paranasal sinuses.
- Examination of the ear, deafness and allied diseases, complications of diseases of the ear. Injuries, tumors, nervous and circulatory neurological disturbances of the ear. Diagnosis and treatment of tinnitus and vertigo. Diagnosis and rehabilitation of the Hearing handicapped including, dispensing of hearing aid other vibrotatile aids.
    - Surgical pathology of Otolaryngology and Head Neck region.
    - Basic knowledge of anaesthesia as related to ENT.
    - Examination of diseases of children (Paediatric ORL) in connection with throat and larynx. Neurological and vascular disturbances. Congenital and neonatal stridor.
    - Pathology of various diseases of the larynx and throat, tracheo-bronchial tree and their causative organisms.

- Indications and various techniques of direct laryngoscopy, nasal endoscopy. Bronchoscopy and oesophagoscopy, including microlaryngoscopic procedures.
- Reading of radiograms, scans, audiograms, nystagmograms and tympanograms in connection with ENT diseases/disorders.
- Special apparatus for the diagnosis and treatment of the diseases of ear, nose and throat including audiometer, BERA, Speech analyser etc.

Recent advances in Otolaryngology and Head Neck surgery

- Recent developments in the diagnosis, pathogenesis and treatment of the ENT diseases
- The knowledge of the frontiers of the oto-laryngology and lateral skull base surgery
- Rhinoplasty, endoscopic sinus surgery, and anterior cranial fossa surgery
- Knowledge of LASERS and fibre optics
- Other methods of managing Hearing loss
- Implantable hearing aids cochlear implants
- Phonosurgery
- Etiology and Managements of sleep apnoea/snoring
- Hypophysectomy and optic nerve decompressions
- Immunotherapy and modalities of the gene therapy
- Newer techniques for Radiotherapy including, use of gamma knife for treatment of Intracranial tumors and other malignancy
- Chemotherapy of cancer

General Surgical Principles and Head-Neck Surgery

- General Surgery, Head and Neck oncology, and Medicine as applicable to the ENT disorders/diseases. Surgery of congenital deformities of nose, ear (Pinna) and trachea/oesophagus etc.
- Radiology, Imaging – computed tomography and magnetic resonance imaging, (MRI) and intervention radiology and angiography as related to ENT
- General Pathologic aspects such as wound healing and also pathology and Pathogenesis of ENT diseases, Pharmacology, molecular biology, genetics, cytology, haematology, and immunology as applicable to otolaryngology
- General Principles of faciomaxillary traumatology and neck injury
- Plastic Surgery as applicable to Otolaryngology

B. Affective Domain

1. The student will show integrity, accountability, respect, compassion and dedicated patient care. The student will demonstrate a commitment to excellence and continuous professional development.
2. The student should demonstrate a commitment to ethical principles relating to providing patient care, confidentiality of patient information and informed consent.
3. The student should show sensitivity and responsiveness to patients' culture, age, gender and disabilities.
4. The student should be able to choose the required investigations to enhance the attitude, communicative skills, including dealing with patient's relatives with the required empathy, adapt to changing trends in education, learning methods and evolving new diagnostic and therapeutic techniques in the subject of ENT.

C. Psychomotor Domain

By the end of the training, a student should be able to demonstrate his skills in:

- Taking a good history and demonstrating good examination techniques.
- arrive at a logical working diagnosis, differential diagnosis after clinical examination and order appropriate investigations keeping in mind their relevance (need based) and thereby provide appropriate care that is ethical, compassionate, responsive and cost effective and in conformation with statutory rules.
- Should be able to perform and demonstrate the practical skills in the field of ENT including the following:
    - Examination of the ear, nose and throat oral cavity examination
    - Clinico-physiological examination and evaluation of the audio-vestibulo neurological system
    - Examination of the larynx and the throat including flexible endoscopy, stroboscopy, voice analysis and the clinico-physiological examination of the speech
    - Examination of the otological and audiological system including Tuning fork testing, audiological evaluation, micro and otoendoscopy
    - Clinical and physiological evaluation of the nose and paranasal sinuses including nasal endoscopy and olfactory evaluation
    - Examination of the neck and its structures
- Should demonstrate and perform various therapeutic skills related to the speciality such as :
    - Tracheostomy
    - Anterior/ posterior nasal packing
    - Ear Packing and Syringing
    - Foreign body removal from air nose and throat

- Airway management including basic life support skills, Cardiopulmonary resuscitation, intubation, homeostasis maintenance, IV alimentation and fluid, electrolyte maintenance and principles of blood transfusion alimentation including Nasogastric feeding, gastrostomy
- Wound suturing, dressings and care of the wounds
- Basic principles of rehabilitation
- common procedures like FNAC, biopsy, aspiration from serous cavities, lumber puncture etc.

- Should understand principles of and interpret X-rays/CT/MRI, audiograms, ENG, BERA, OAE, ultrasonographic abnormalities and other diagnostic procedures in relation to the speciality
- Should have observed/performed under supervision the various surgical procedures in relation to the speciality

Syllabus

Course contents:

1. Anatomy and Physiology of Ear, Nose and Throat, Trachea and esophagus.
2. The generation and reception of speech
3. Radiographic anatomy of the ear, nose, throat and imaging.
4. Bacteriology in relation to Otorhinolaryngology
5. Allergy and rhinitis
6. Haematology in relation to Otolaryngology
7. Anaesthesia for Otolaryngology
8. Pharmacology of drugs used in ENT
9. Electrolyte, fluid balance/shock conditions
10. Use of teaching aids
11. Routine blood, urine testing
12. Preparation of slides
13. Facial nerve stimulation test
14. Audiometric tests like pure tone Audiometry, Impedance Audiometry, Free field Audiometry, Specialized tests of hearing including SISI, Tone decay, ABLB, Speech discrimination score etc.
15. Vestibular tests like caloric testing (Water and Air) stopping test, Fukuda's test,
16. Evoked response audiometry.

Ear:

1. The physical and functional examination of the ear
2. The functional and physical examination of the vestibular system.
3. Tinnitus
4. Affections of external ear
5. Repair of deformities of the external ear.

6. Congenital conditions of the middle ear cleft
7. Traumatic conductive deafness
8. Acute inflammation of the middle ear cleft
9. Non-suppurative otitis media
10. Chronic suppurative otitis media
11. Management of chronic suppurative otitis media
12. Complications of infections of middle ear.
13. Tumors of the middle ear cleft and temporal bone
14. Diseases of the otic capsule-otosclerosis
15. Diseases of the otic capsule-other diseases
16. The deaf child
17. Acoustic neuroma
18. Ototoxicity
19. Presbycusis
20. Diagnosis and management of sudden and fluctuant sensorineural hearing loss
21. Meniere's disease
22. Neurologic aspects of vertigo
23. Facial paralysis
24. Rehabilitation of adults with acquired Hearing loss-Hearing aids
25. The cochlear Implants
26. Nystagmus
27. Otoacoustic emissions

Nose:

1. Examination of the nose
2. Conditions of the external nose
3. Injuries of the facial skeleton
4. Congenital diseases of the nose
5. The nasal septum
6. Foreign bodies in the nose, rhinolith
7. Epistaxis
8. Acute chronic inflammations of the nasal cavities
9. Vasomotor rhinitis-allergic and non-allergic
10. Nasal polyposis
11. Abnormalities of smell
12. Acute sinusitis
13. Chronic sinusitis
14. Nasal Allergy/Fungal allergic sinusitis
15. Complications of acute and chronic sinusitis
16. Tumors of nose and sinuses
17. Facial pains
18. Trans-ethmoidal hypophysectomy

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19. Functional endoscopic sinus surgery (FESS)

Throat:

1. Methods of examination of the mouth and pharynx
2. Diseases of the mouth
3. Diseases of the salivary glands
4. Pharyngeal lesions associated with general diseases
5. Diseases of the tonsils and adenoids (excluding neoplasms)
6. Tumors of the pharynx
7. Hypopharyngeal diverticulum (Pharyngeal Pouch)
8. Methods of examining and larynx and tracheobronchial tree
9. Congenital diseases of the larynx
10. Laryngeal disorders in singers and other voice users
11. Neurological affections of larynx and pharynx
12. Intubation of the larynx, laryngotomy and tracheostomy
13. Cervical node dissection
14. Skin grafts in Otolaryngology and reconstructive methods including regional and distant flaps for repair of defects after excision of tumors or trauma.
15. Micro laryngeal surgery/thyroplasty

Miscellaneous and head and neck:

1. Cranial nerves
2. Raised intracranial tension-causes, diagnosis, management with particular reference to otitis hydrocephalus
3. Head injuries and I.C. Haemorrhage
4. Pituitary gland, anatomy, physiology hypo - and hyper - pituitarism, new growths.
5. Intracranial venous sinuses and their affections
5. Osteology: skull, mandible cervical and thoracic vertebral sternum
6. Cervical fascia, facial spaces in neck, retro-pharyngeal and parapharyngeal Abscesses
7. Anatomy and physiology of thyroid gland, goitre, diseases of the thyroid and carcinoma of thyroid
8. Large blood vessels in neck, thoracic duck development of major cervical and thoracic blood vessels.
9. Head and neck reconstructive surgery

Drugs used in ENT:

1. Antibiotics Antihistaminic
2. Nasal vasoconstrictors
3. Local anaesthetics
4. Corticosteroids

5. Cyto-toxic agents
6. Antibiotics
7. Radioactive isotopes
8. Antifungal agents
9. Vasopressive and other agents used in shock like states.

General:

1. Physiology of circulation, regulation of blood pressure, reactions of body to haemorrhage, patho-physiology of shock, fluid balance, blood transfusion and its hazards, fluid replacement therapy, burns
2. Agents used in shock like states

Desirable

1. The ears and nasal sinuses in the aerospace environment
2. Physiological consideration of pressure effects on the ear and sinuses in deep water diving
3. The principles of cancer immunology with particular reference to head and neck cancer
4. Principles of chemotherapy in head and neck cancer
5. Recording of nystagmus by ENG and its interpretation

Ear:

1. Traumatic lesions of the inner ear
2. Inflammatory lesions of the vestibular and auditory nerve
3. Vascular lesions of the inner ear
4. Electronystagmography
5. Skull base/Neurologic surgery

Nose:

1. Cosmetic surgery of the nose
2. Non-healing granuloma of the nose
3. Surgery of the pterygopalatine fossa
4. LASER Surgery

Throat:

1. Oesophageal conditions in the practice of ear, nose and throat surgery
2. Disorders of speech
3. Lower respiratory conditions in Otolaryngology

Miscellaneous and head and neck

1. Functional Anatomy of cerebellum and brainstem

2. Anatomy of mediastinum
3. Pleura, plural cavity, broncho-pulmonary segments and their clinical importance
4. Facial plastic surgery

TEACHING AND LEARNING METHODS

Teaching methodology

Didactic lectures are of least importance; small group discussion such as seminars, journal clubs, symposia, reviews and guest lectures should get priority for theoretical knowledge. Bedside teaching, grand rounds, structured interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning with appropriate emphasis on e-learning. Student should have hand-on training in performing various procedures and ability to interpret various tests/investigations. Exposure to newer specialized diagnostic/therapeutic procedures concerning her/his subject should be given. Self-learning tools like assignments and case-based learning may be promoted. Exposure to newer specialized diagnostic/therapeutic procedures concerning ENT should be given.

1. **Rotations:**
    - A major portion of posting should be in ENT Department. It should include in-patients, out-patients, ICU, trauma, emergency room, specialty clinics includingVertigo Clinic, Rhinology Clinic, Otology Clinic, Cancer Clinic, Cadaveric dissection Lab, Audiology and speech therapy.
    - Inter-unit rotation in the department should be done for a period of up to one year.
    - Rotation in appropriate related subspecialties for a total period not exceeding 06 months.
2. **Clinical meetings:**
   There should be intra- and inter- departmental meetings for discussing the uncommon /interesting cases involving multiple departments.
3. **Log book:** Each student must be asked to present a specified number of cases for clinical discussion, perform procedures/tests/operations/present seminars/review articles from various journals in inter-unit/interdepartmental teaching sessions. They should be entered in a Log Book. The Log books shall be checked and assessed periodically by the faculty members imparting the training.
4. **Thesis writing and research:**
   Thesis writing is compulsory.
5. The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
6. A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at

a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

7. The student should know the basic concepts of research methodology, plan a research project, be able to retrieve information from the library. The student should have a basic knowledge of statistics.
8. Department should encourage e-learning activities.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of surgical skills laboratories in the medical colleges is mandatory.

ASSESSMENT

Assessment should be comprehensive & objective. It should address the stated competencies of the course. The assessment needs to be spread over the duration of the course.

FORMATIVE ASSESSMENT, i.e., assessment during the training would include: Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Quarterly assessment during the MS training should be based on following educational activities:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

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The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT ie.,at the end of the training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The examination will be in three parts:

1. **Thesis**

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the candidate to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A candidate shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify candidate's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

Theory shall consist of four papers of 3 hours each.

Paper I: Basic Sciences related Otolaryngology

Paper II: Principles and Practices of Otolaryngology

Paper III: Recent advances in Otolaryngology and Head Neck surgery.

Paper IV: General Surgical Principles and Head-Neck Surgery.

3. Clinical / Practical and viva voce Examination

Clinical examination shall be conducted to test the knowledge, skills, attitude and competence of the post graduate students for undertaking independent work as a

specialist/teacher, for which post graduate students shall examine a minimum one long case and two short cases.

The Oral examination shall be thorough and shall aim at assessing the post graduate student's knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the specialty, which form a part of the examination.

Assessment may include Objective Structured Clinical Examination(OSCE).

Oral/Viva-voce examination needs to assess knowledge on X-rays, instrumentation, operative procedures. Due weightage should be given to Log Book Records and day-to-day observation during the training.

Recommended Reading:

Books (latest edition)

- Scott-Brown's *Otorhinolaryngology and Head and Neck Surgery*
- Cummings *Otolaryngology - Head and Neck Surgery*
- *Otolaryngology, Otology &Neurotalogy* by Paprella&Micheal
- Glasscock-Shambaugh's*Surgery of the Ear*
- *Essentials of Functional Sinus Surgery* by Heinz Stammberger MD
- *Color Atlas of Head & Neck Surgery* by Jatin P Shah
- *Handbook of Clinical Audiology*by Jack Katz
- Stell& Maran's *Textbook of Head and Neck Surgery and Oncology*

Journals

03-05 international Journals and 02 national (all indexed) journals

Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
_____

***REMARKS: Any significant positive or negative attributesof a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN OBSTETRICS AND GYNAECOLOGY

Preamble:

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

The purpose of MS Obstetrics and Gynaecology is to standardize Obstetrics & Gynaecology teaching at Post Graduate level throughout the country so that it will benefit in achieving uniformity in undergraduate teaching as well and resultantly creating competent Obstetrician and Gynaecologist with appropriate expertise.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

Programme Objectives

The **goal** of the MS course in Obstetrics and Gynaecology is to produce a competent Obstetrician and Gynaecologist who can:

a. Provide quality care to the community in the diagnosis and management of Antenatal, Intra-natal and Post-natal period of normal and abnormal pregnancy and labor.
b. provide effective and adequate care to a pregnant woman with complicated pregnancy.
c. provide effective and adequate care to a normal and high risk neonate.
d. perform obstetrical ultrasound in normal and abnormal pregnancy including Doppler.
e. manage effectively all obstetrical and gynecological emergencies and if necessary make appropriate referrals.
f. provide quality care to the community in the diagnosis and management of gynaecological problems including screening, and management of all gynecological cancers including during pregnancy.

g. conduct a comprehensive evaluation of infertile couple and have a broad based knowledge of assisted reproductive techniques including – ovulation induction, *in vitro* fertilization and intra-cytoplasmic sperm injection, gamete donation, surrogacy and the legal and ethical implications of these procedures.

h. provide counseling and delivery of fertility regulation methods including reversible and irreversible contraception, emergency contraception etc.

i. provide quality care to women having spontaneous abortion or requesting Medical Termination of Pregnancy (MTP) and manage their related complications.

SUBJECT SPECIFIC COMPETENCIES

A. Cognitive Domain

At the end of the MS Course in Obstetrics and Gynaecology, the student should have acquired knowledge in the following:

- recognizes the health needs of women and adolescents and carries out professional obligations in keeping with principles of National Health Policy and professional ethics
- has acquired the competencies pertaining to Obstetrics and Gynaecology that are required to be practiced in the community and at all levels of health system
- on genetics as applicable to Obstetrics.
- on benign and malignant gynecological disorders.
- on Gynecological Endocrinology and infertility.
- on interpretation of various laboratory investigations and other diagnostic modalities in Obstetrics & Gynecology.
- on essentials of Pediatric and adolescent Gynecology.
- on care of postmenopausal women and geriatric Gynecology.
- on elementary knowledge of female breast & its diseases.
- on vital statistics in Obstetrics & Gynecology.
- Anesthesiology related to Obstetrics & Gynecology.
- Reproductive and Child Health, family welfare & reproductive tract infections.
- STD and AIDS & Government of India perspective on women's health related issues.
- Medico-legal aspects in Obstetrics & Gynecology.
- Asepsis, sterilization and disposal of medical waste.
- be able to effectively communicate with the family and the community
- is aware of the contemporary advances and developments in medical sciences as related to Obstetrics and Gynaecology.

- maintain medical records properly and know the medico-legal aspects in respect of Obstetrics & Gynecology
- Understands the difference between audit and research and how to plan a research project and demonstrate the skills to critically appraise scientific data and literature
- has acquired skills in educating medical and paramedical professionals

Ethical and Legal Issues:

The post graduate student should understand the principles and legal issues surrounding informed consent with particular awareness of the implication for the unborn child, postmortem examinations consent to surgical procedures including tubal ligation/vasectomy, parental consent and medical certification, research and teaching and properly maintain medical records.

Risk Management:

The post graduate student should demonstrate a working knowledge of the principles of risk management and their relationship to clinical governance and complaints procedures.

Confidentiality:

The post graduate student should:

- be aware of the relevant strategies to ensure confidentiality and when it might be broken.
- understand the principles of adult teaching and should be able to teach common practical procedures in Obstetrics and Gynaecology and involved in educational programme in Obstetrics and Gynaecology for medical and paramedical staff.
- be abreast with all recent advances in Obstetrics and Gynaecology and practice evidence based medicine.

Use of information technology, audits and standards:

The post graduate student should:

- acquire a full understating of all common usage of computing systems including the principles of data collection, storage, retrieval, analysis and presentation.
- understand quality improvement and management and how to perform, interpret and use of clinical audit cycles and the production and application of clinical standards, guidelines and protocols.

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- understand National Health Programmes related to Obstetrics and Gynaecology and should be aware of all the Acts and Laws related to specialty.

Health of Adolescent Girls and Post-Menopausal Women

The student should:

- Recognize the importance of good health of adolescent and postmenopausal women.
- Identification and management of health problems of post-menopausal women.
- Understanding and planning and intervention program of social, educational and health needs of adolescent girls and menopausal women.
- Education regarding rights and confidentiality of women's health, specifically related to reproductive function, sexuality, contraception and safe abortion.
- Geriatric problems.

Reproductive Tract and 'HIV' Infection

- Epidemiology of RTI and HIV infection in Indian women of reproductive age group.
- Cause, effect and management of these infections.
- HIV infections in pregnancy, its effects and management.
- Relationship of RTI and HIV with gynaecological disorders.
- Planning and implementation of preventive strategies.

Medico-legal Aspects

- Knowledge and correct application of various Acts and Laws while practicing Obstetrics and Gynaecology, particularly MTP Act and sterilization, Preconception and P.N.D.T. Act.
- Knowledge of importance of proper recording of facts about history, examination findings, investigation reports and treatment administered in all patients.
- Knowledge of steps recommended for examination and management of rape cases.
- Knowledge of steps taken in the event of death of a patient.

B. Affective domain

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.

2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

At the end of the course, the student should acquire following clinical & operative skills and be able to:

Operative Skills in Obstetrics and Gynaecology

- Adequate proficiency in common minor and major operations, post-operative management and management of their complications.
- Operative procedures which must be done by P G students during training period: ***(in graded manner - assisting, operating with senior person assisting, operating under supervision)***

(Operations MUST BE DONE/OBSERVED during PG training programme and log book maintained)

1. Obstetrics: Venesection, culdocentesis
Conduct normal deliveries
Episiotomy and its repair

- Application of forceps and ventouse (10).
- Carry out caesarian section delivery (10 must be done)
- Manual removal of placenta
- Management of genital tract obstetrical injuries.
- Post partum sterilization/Minilap tubal ligation (20 must be done)
- Medical termination of pregnancy - various methods (20 must be done)

2. Gynaecology: Endometrial / cervical biopsy.
Dilatation and curettage
Coldocentesis, Colpotomy

- Opening and closing of abdomen (10 must be done)
- Operations for pelvic organ prolapse
- Ovarian cyst operation
- Operation for ectopic pregnancy
- Vaginal and abdominal hysterectomy

Operations must be OBSERVED and/or ASSISTED when possible:

- Internal podalic version
- Caesarea Hysterectomy
- Internal iliac artery ligation
- Destructive obstetrical operations
- Tubal microsurgery
- Radical operations for gynaec malignancies
- Repair of genital fistulae
- Operations for incontinence
- Myomectomy, Laparoscopic and hysteroscopic surgery

Diagnostic Procedures

- Interpretation of x-rays - Twins, common fetal malformations / mal-presentations, abnormal pelvis (pelvimetry), Hysterosalpingography
- Sonographic pictures at various stages of pregnancy - normal and abnormal pregnancies, Fetal biophysical profile, common gynaecological pathologies.
- Amniocentesis
- Fetal surveillance methods - Electronic fetal monitoring and its interpretation
- Post-coital test
- Vaginal Pap Smear
- Colposcopy
- Endoscopy - Laparo and Hystero-scopy.

Health of Adolescent Girls and Post-Menopausal Women

- Provide advice on importance of good health of adolescent and postmenopausal women.
- Identification and management of health problems of post-menopausal women.
- Planning and intervention program of social, educational and health needs of adolescent girls and menopausal women.
- Provide education regarding rights and confidentiality of women's health, specifically related to reproductive function, sexuality, contraception and safe abortion.
- Provide advice on geriatric problems.

Reproductive Tract and 'HIV' Infection

- Provide advice on management of RTI and HIV infections in Indian women of reproductive age group.

- Provide advice on management of HIV infections in pregnancy, relationship of RTI and HIV with gynaecological disorders.
- Planning and implementation of preventive strategies.

Medico-legal Aspects

- Correct application of various Acts and Laws while practicing obstetrics and gynaecology, particularly MTP Act and sterilization, Preconception and P.N.D.T. Act.
- Implement proper recording of facts about history, examination findings, investigation reports and treatment administered in all patients.
- Implement the steps recommended for examination and management of rape cases.
- Follow proper procedures in the event of death of a patient.

Environment and Health

- Follow proper procedures in safe disposal of human body fluids and other materials.
- Follow proper procedures and universal precautions in examination and surgical procedures for the prevention of HIV and other diseases.

Syllabus

Course Contents:

Paper I

1. Basic Sciences

- Normal and abnormal development, structure and function (female and male) urogenital system and female breast.
- Applied Anatomy of genito-urinary system, abdomen, pelvis, pelvic floor, anterior abdominal wall, upper thigh (inguinal ligament, inguinal canal, vulva, rectum and anal canal).
- Physiology of spermatogenesis.
- Endocrinology related to male and female reproduction (Neurotransmitters).
- Anatomy and physiology of urinary and lower GI (Rectum / anal canal) tract.
- Development, structure and function of placenta, umbilical cord and amniotic fluid.
- Anatomical and physiological changes in female genital tract during pregnancy.
- Anatomy of fetus, fetal growth and development, fetal physiology and fetal circulation.
- Physiological and neuro-endocrinal changes during puberty, adolescence, menstruation, ovulation, fertilization, climacteric and menopause.

- Biochemical and endocrine changes during pregnancy, including systemic changes in cardiovascular, hematological, renal hepatic, renal, hepatic and other systems.
- Biophysical and biochemical changes in uterus and cervix during pregnancy and labor.
- Pharmacology of identified drugs used during pregnancy, labour, post-partum period in reference to their absorption, distribution, excretion, (hepatic) metabolism, transfer of the drugs across the placenta, effect of the drugs (used) on labor, on fetus, their excretion through breast milk.
- Mechanism of action, excretion, metabolism of identified drugs used in the management of Gynaecological disorder.
- Role of hormones in Obstetrics and Gynaecology.
- ***Markers in Obstetrics & Gynaecology*** - Non-neoplastic and neoplastic diseases
- Pathophysiology of ovaries, fallopian tubes, uterus, cervix, vagina and external genitalia in healthy and diseased conditions.
- Normal and abnormal pathology of placenta, umbilical cord, amniotic fluid and fetus.
- Normal and abnormal microbiology of genital tract. Bacterial, viral and parasitical infections responsible for maternal, fetal and gynaecological disorders.
- Humoral and cellular immunology in Obstetrics & Gynaecology.
- Gametogenesis, fertilization, implantation and early development of embryo.
- Normal Pregnancy, physiological changes during pregnancy, labor and pauperism.
- Immunology of pregnancy.
- Lactation.

2. Medical Genetics

- Basic medical genetics including cytogenetics.
- Pattern of inheritance
- Chromosomal abnormalities - types, incidence, diagnosis, management and recurrence risk.
- General principles of Teratology.
- Screening, counseling and prevention of developmental abnormalities.
- Birth defects - genetics, teratology and counseling.

Paper II

Clinical obstetrics

1. Antenatal Care:

- Prenatal care of normal pregnancy including examination, nutrition, immunization and follow up.
- Identification and management of complications and complicated of pregnancy – abortion, ectopic pregnancy, vesicular mole, Gestational trophoblastic Diseases, hyperemesis gravidarum, multiple pregnancy, antipartum hemorrhage, pregnancy induced hypertension, preeclampsia, eclampsia, Other associated hypertensive disorders, Anemia, Rh incompatibility, diabetes, heart disease, renal and hepatic diseases, preterm - post term pregnancies, intrauterine fetal growth retardation,
- Neurological, hematological, dermatological diseases, immunological disorders and other medical and surgical disorders/problems associated with pregnancy, Multiple pregnancies, Hydramnios, Oligoamnios.
- Diagnosis of contracted pelvis (CPD) and its management.
- High-risk pregnancy
- Pregnancy associated with complications, medical and surgical problems.
- Prolonged gestation.
- Preterm labor, premature rupture of membranes.
- Blood group incompatibilities.
- Recurrent pregnancy wastage.
- Evaluation of fetal and maternal health in complicated pregnancy by making use of diagnostic modalities including modern once (USG, Doppler, Electronic monitors) and plan for safe delivery for mother and fetus. Identifying fetus at risk and its management. Prenatal diagnostic modalities including modern ones.
- Infections in pregnancy (bacterial, viral, fungal, protozoan)
- Malaria, Toxoplasmosis.
- Viral – Rubella, CMV, Herpes, HIV, Hepatic viral infections (B, C etc)
- Sexually Transmitted Infections (STDs)
- Mother to fetal transmission of infections.
- Identification and management of fetal malpositions and malpresentations.
- Management of pregnancies complicated by medical, surgical (with other specialties as required) and gynecological diseases.
- Anemia, hematological disorders
- Respiratory, Heart, Renal, Liver, skin diseases.
- Gastrointestinal, Hypertensive, Autoimmune, Endocrine disorders.
- Associated Surgical Problems.
  Acute Abdomen (surgical emergencies - appendicitis and GI emergencies).
  Other associated surgical problems.
- Gynaecological disorders associate with pregnancy - congenital genital tract developmental anomalies, Gynaec pathologies - fibroid uterus, Ca Cx, genital prolapse etc.
- Prenatal diagnosis (of fetal problems and abnormalities), treatment – Fetal therapy
- M.T.P, PC & P.N.D.T Act etc

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- National health MCH programs, social obstetrics and vital statistics
- Recent advances in Obstetrics.

2. Intra-partum care:

- Normal labor - mechanism and management.
- Partographic monitoring of labor progress, recognition of abnormal labor and its appropriate management.
- Identification and conduct of abnormal labor and complicated delivery - breech, forceps delivery, caesarian section, destructive operations.
- Induction and augmentation of labor.
- Management of abnormal labor - Abnormal pelvis, soft tissue abnormalities of birth canal, mal-presentation, mal-positions of fetus, abnormal uterine action, obstructed labor and other distocias.
- Analgesia and anaesthesia in labor.
- Maternal and fetal monitoring in normal and abnormal labor (including electronic fetal monitoring).
- Identification and management of intrapartum complications, Cord presentation, complication of 3rd stage of labor - retained placenta, inversion of uterus, rupture of uterus, post partum hemorrhage.

3. Post Partum

- Complication of 3rd stage of labor retained placenta, inversion of uterus, post partum hemorrhage, rupture of uterus, Management of primary and secondary post-partum hemorrhage, retained placenta, uterine inversion. Post-partum collapse, amniotic fluid embolism
- Identification and management of genital tract trauma - perineal tear, cervical/vaginal tear, episiotomy complications, rupture uterus.
- Management of critically ill woman.
- Post partum shock, sepsis and psychosis.
- Postpartum contraception.
  Breast feeding practice; counseling and importance of breast-feeding. Problems in breast-feeding and their management, Baby friendly practices.
- Problems of newborn - at birth (resuscitation), management of early neonatal problems.
- Normal and abnormal purpureum - sepsis, thrombophlebitis, mastitis, psychosis.
  Hematological problems in Obstetrics including coagulation disorders. Use of blood and blood components/products.

4. Operative Obstetrics:

- Decision-making, technique and management of complications.
- Vaginal instrumental delivery, Caesarian section, Obst. Hysterectomy, destructive operations, manipulations (External/internal podalic version, manual removal of placenta etc)
- Medical Termination of Pregnancy - safe abortion - selection of cases, technique and management of complication. MTP law.

5. New Born

1. Care of new born: Normal and high risk new born (including NICU care).
2. Asphyxia and neonatal resuscitation.
3. Neonatal sepsis - prevention, detection and management.
4. Neonatal hyper - bilirubinemia - investigation and management.
5. Birth trauma - Detection and management.
6. Detection and management of fetal/neonatal malformation.
7. Management of common neonatal problems.

Paper III

Clinical Gynaecology and Fertility Regulation

- Epidemiology and etiopathogenesis of gynaecological disorders.
- Diagnostic modalities and management of common benign and malignant gynaecological diseases (diseases of genital tract):
  Fibroid uterus
  Endometriosis and adenomyosis
  Endometrial hyperplasia
  Genital prolapse (uterine and vaginal)
  Cervical erosion, cervicitis, cervical polyps, cervical neoplasia.
  Vaginal cysts, vaginal infections, vaginal neoplasia (VIN)
  Benign Ovarian pathologies
  Malignant genital neoplasia - of ovary, Fallopian tubes, uterus, cervix, vagina, vulva and Gestational Trophoblastic diseases, Cancer Breast.
- Diagnosis and surgical management of clinical conditions related to congenital malformations of genital tract. Reconstructive surgery in gynaecology.
- Intersex, ambiguous sex and chromosomal abnormalities.
- Reproductive endocrinology: Evaluation of Primary/secondary Amenorrhea, management of Hyperprolactinemia, Hirsutism, Chronic an-ovulation, PCOD, thyroid and other endocrine dysfunctions.
- Infertility - Evaluation and management
    - Methods of Ovulation Induction

- Tubal (Micro) surgery
- Management of immunological factors of Infertility
- Male infertility
- Obesity and other Infertility problems.
- **(Introductory knowledge of)** Advanced Assisted Reproductive Techniques (ART)

- Reproductive tract Infections: prevention, diagnosis and treatment.
  - STD
  - HIV
  - Other Infections
  - Genital Tuberculosis.
- Principles of radiotherapy and chemotherapy in gynaecological malignancies. Choice, schedule of administration and complications of such therapies.
- Rational approach in diagnosis and management of endocrinal abnormalities such as: menstrual abnormalities, amenorrhea (primary/secondary), dysfunctional uterine bleeding, polycystic ovarian disease, hyperprolactinemia (galoctorrhea), hyperandrogenism, thyroid - pituitary - adrenal disorders, menopause and its treatment (HRT).
- Urological problems in Gynaecology - Diagnosis and management.
  - Urinary tract infection
  - Urogenital Fistulae
  - Incontinence
  - Other urological problems
- Orthopedic problems in Gynaecology.
- Menopause: management (HRT) and prevention of its complications.
- Endoscopy (Laparoscopy - Hysteroscopy)
  - Diagnostic and simple therapeutic procedures (PG students must be trained to do these procedures)
  - Recent advances in gynaecology - Diagnostic and therapeutic
  - Pediatric, Adolescent and Geriatric Gyanecology
  - **Introduction to Advance Operative procedures.**

Operative Gynaecology

- Abdominal and Vaginal Hysterectomy
- Surgical Procedures for genital prolapse, fibromyoma, endometriosis, ovarian, adenexal, uterine, cervical, vaginal and vulval pathologies.
- Surgical treatment for urinary and other fistulae, Urinary incontinence
- Operative Endoscopy

Family Welfare and Demography

- Definition of demography and its importance in Obstetrics and Gynaecology.

- Statistics regarding maternal mortality, perinatal mortality/morbidity, birth rate, fertility rate.
- Organizational and operational aspects of National health policies and programs, in relation to population and family welfare including RCH.
- Various temporary and permanent methods of male and female contraceptive methods.
- Knowledge of in contraceptive techniques (including recent developments).
    1. Temporary methods
    2. Permanent Methods.
    3. Recent advances in contraceptive technology
- Provide adequate services to service seekers of contraception including follow up.
- Medical Termination of Pregnancy: Act, its implementation, providing safe and adequate services.
- Demography and population dynamics.
- Contraception (fertility control)

Male and Female Infertility

- History taking, examination and investigation.
- Causes and management of male infertility.
- Indications, procedures of Assisted Reproductive Techniques in relation to male infertility problems.

TEACHING AND LEARNING METHODS

Postgraduate Training

Teaching methodology should be imparted to the students through:

- Lectures, seminars, symposia, Inter- and intra- departmental meetings (clinic-pathological, Radio-diagnosis, Radiotherapy, Anaesthesia, Pediatrics/ Neonatology), maternal morbidity/mortality meetings and journal club. ***Records of these are to be maintained by the department.***
- By encouraging and allowing the students to attend and actively participate in CMEs, Conferences by presenting papers.
- Maintenance of log book: Log books shall be checked and assessed periodically by the faculty members imparting the training.
- Writing thesis following appropriate research methodology, ethical clearance and good clinical practice guidelines.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

- A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- Department should encourage e-learning activities.

Practical and Clinical Training

- Emphasis should be self learning, group discussions and case presentations.
- Student should be trained about proper History taking, Clinical examination, advising / ordering relevant investigations, their interpretation and instituting medical / surgical management by posting students in OPD, specialty clinics, wards, operation theaters, Labor room, family planning clinics and other departments like anesthesiology, neonatology, radiology/ radiotherapy. **Students should be able to perform and interpret ultra - sonography in Obstetrics and Gynaecology, NST, Partogram**

Rotations:

- Details of 3 years posting in the PG programme (6 terms of 6 months each)

a. Allied posts should be done during the course *– for 8 weeks*

i.	Neonatology	- 2 weeks
ii.	Anaesthesia	- 2 weeks
iii.	Radiology/Radiotherapy	- 2 weeks
iv.	Surgery	- 2 weeks
v.	Oncology	- 2 weeks

b. Details of training in the subject during resident posting

The student should attend to the duties (Routine and emergency):

Out patient Department and special clinics

Inpatients

Operation Theater

Labor Room

Writing clinical notes regularly and maintains records.

1st term - working under supervision of senior residents and teaching faculty.

2nd & 3rd term-	***Besides patient care in O.P.D., wards, Casualty and labor room, carrying out minor operations under supervision and assisting in major operation.***
4th 5th & 6th term -	***independent duties in management of patient including major operations under supervision of teaching faculty***

c. Surgeries to be done during PG training. **(Details in the Syllabus)**

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of surgical skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, during the training includes

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Quarterly assessment during the MS training should be based on following educational activities:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

Postgraduate Examination shall be in three parts:

1. Thesis

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory Examination:

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period**.**

There should be four theory papers, as given below:

Paper I: Applied Basic sciences.
Paper II: Obstetrics including social obstetrics and Diseases of New Born
Paper III: Gynaecology including fertility regulation
Paper IV: Recent Advances in Obstetrics & Gynaecology

3. Clinical/Practical & oral/viva voce Examination: shall be as given below:

a) Obstetrics:

Clinical

Long Case: 1 case
2 cases with different problems

Short Case/ Spot Case: 1 case

Viva voce including:

- Instruments
- Pathology specimens
- Drugs and X-rays, Sonography etc.
- Dummy Pelvis

b) Gynaecology:

Clinical

Long Case: 1 case

2 cases with different problems

Short Case/ Spot Case: 1 case

Viva including:

- Instruments
- Pathology specimens
- Drugs and X-rays, Sonography etc.
- Family planning

Recommended Reading:

Books (latest edition)

Obstetrics

1. William Textbook of Obstetrics
2. High risk Obstetrics - James
3. High risk pregnancy - Ian Donal
4. Text book of Operative Obstetrics - Munro Kerr.
5. Medical disorder in pregnancy - De Sweit
6. High risk pregnancy - Arias
7. A text book of Obstetrics - Thrnbull
8. Text book of Obstetrics - Holland & Brews.
9. Manual of Obstetrics - Daftary & Chakravarty

Gynaecology

1. Text book of Gynaecology - Novak
2. Text book of Operative Gynaecology - Te-lindes
3. Text book of operative gynaecology - Shaws
4. Text book of Gynaecology and Reproductive Endocrinology - Speroft
5. Text book of Obstetrics & Gynaecology - Dewhurst
6. Manual of Gynaecological Oncology - Disai
7. Text book of Gynaecology – Jaeffcot

Journals

03-05 international Journals and 02 national (all indexed) journals

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Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN OPHTHALMOLOGY

Preamble:

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

The purpose of this programme is to standardize Ophthalmology teaching at post graduate level throughout the country so that it will benefit in achieving uniformity in post graduate and undergraduate teaching as well as result in creating competent ophthalmic surgeons with appropriate expertise.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

Programme Objectives

The clinical post graduate training programmes are intended at developing in a student a blend of qualities that of a clinical specialist, a teacher and a researcher. These programmes are organized such that a post graduate student should possess the following qualities, knowledge and skills:

a. The student should possess basic knowledge of the structure, function and development of the human body as related to ophthalmology, of the factors which may disturb these mechanisms and the disorders of structure and function which may result thereafter.
b. The student should be able to practice and handle most day-to-day problems independently in ophthalmology. The student should recognize the limitations of his/her own clinical knowledge and know when to seek further help.
c. The student should understand the effects of environment on health and be familiar with the epidemiology of at least the more common diseases in the field of ophthalmology.

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d. The student should be able to integrate the preventive methods with the curative and rehabilitative measures in the comprehensive management of the disease.

e. The student should be familiar with common eye problems occurring in rural areas and be able to deal with them effectively.

f. The student should also be made aware of Mobile Ophthalmic Unit and its working and components.

g. The student should be familiar with the current developments in Ophthalmic Sciences.

h. The student should be able to plan educational programmes in Ophthalmology in association with senior colleagues and be familiar with the modern methods of teaching and evaluation.

i. The student should be able to identify a problem for research, plan a rational approach to its solution, execute it and critically evaluate his/her data in the light of existing knowledge.

j. The student should reach the conclusions by logical deduction and should be able to assess evidence both as to its reliability and its relevance.

k. The student should have basic knowledge of medico-legal aspects of medicine.

l. The student should be familiar with patient counseling and proper consent taking.

SUBJECT SPECIFIC COMPETENCIES

A post graduate student upon successfully qualifying in the M.S. (Ophthalmology) examination should be able to:

a) Offer to the community, the current quality of 'standard of care' in ophthalmic diagnosis as well as therapeutics, medical or surgical, in most of the common situations encountered at the level of health services.

b) Periodically self assess his or her performance and keep abreast with ongoing advances in the field and apply the same in his/her practice.

c) Be aware of her/his own limitations to the application of the specialty in situations, which warrant referral to more qualified centers or individuals.

d) Apply research and epidemiological methods during his/her practice. The post graduate student should be able to present or publish work done by him/her.

e) Contribute as an individual/group towards the fulfillment of national objectives with regard to prevention of blindness.

f) Effectively communicate with patients or relatives so as to educate them sufficiently and give them the full benefit of informed consent to treatment and ensure compliance.

At the end of the course, the student should have acquired knowledge in the following:

A. Cognitive domain

Basic Medical Sciences:

- Attain understanding of the structure and function of the eye and its parts in health and disease.
- Attain understanding and application of knowledge of the structure and function of the parts of Central Nervous System and other parts of the body with influence or control on the structure and function of the eye.
- Attain understanding of and develop competence in executing common general laboratory procedures employed in diagnosis and research in Ophthalmology.

1. Clinical Ophthalmology:

Given adequate opportunity to work on the basis of graded responsibilities in outpatients, inpatient and operation theatres on a rational basis in the clinical sections from the day of entry to the completion of the training programme, the students should be able to:

- Acquire scientific and rational approach to the diagnosis of ophthalmic cases presented.
- Acquire understanding of and develop inquisitiveness to investigate to establish cause and effect of the disease.
- To manage and treat all types of ophthalmic cases.
- To competently handle and execute safely all routine surgical procedures on lens, glaucoma, lid, sac, adnexa, retina and muscle anomalies.
- To competently handle all ophthalmic medical and surgical emergencies.
- To be familiar with micro-surgery and special surgical techniques.
- To demonstrate the knowledge of the pharmacological (including toxic) aspects of drugs used in ophthalmic practice and drugs commonly used in general diseases affecting the eyes.

2. Refraction:

- Acquire competence in assessment of refractive errors and prescription of glasses for all types of refraction problems.
- Acquire basic knowledge of manufacture and fitting of glasses and competence of judging the accuracy and defects of the dispensed glasses.

3. Ophthalmic super-specialties:

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Given an opportunity to work on a rotational basis in various special clinics of sub-specialties of ophthalmology, if possible, the student should be able to:

- Examine, diagnose and demonstrate understanding of management of the problems of neuro-ophthalmology and refer appropriate cases to neurology and neuro-surgery.
- Examine, diagnose and demonstrate understanding of management of (medical and surgical) complicated problems in the field of (a) lens, (b) glaucoma, c) cornea, (d) retina, (e) pediatric ophthalmology, (f) oculoplasty, (g) uvea, and (I) genetic problems in ophthalmology.
- To demonstrate understanding of the manufacture, and competence in prescription and dispensing of contact lenses and ocular prosthesis.

5. Ophthalmic pathological/microbiological/biochemical sciences

- Be able to interpret the diagnosis in correlation with the clinical data and routine materials received in such cases.

6. Community Ophthalmology

Eye camps may be conducted where the PG students are posted for imparting training to according to a set methodology. The community and school surveys may also be conducted by the post graduate students.

The post graduate students are given an opportunity to participate in surveys, eye camps. They should be able to guide rehabilitation workers in the organisation and training of the blinds in art of daily living and in the vocational training of the blind leading to gainful employment.

7. Research :

- Recognise a research problem.
- State the objectives in terms of what is expected to be achieved in the end.
- Plan a rational approach with appropriate controls with full awareness of the statistical validity of the size of the material.
- Spell out the methodology and carry out most of the technical procedures required for the study.
- Accurately and objectively record on systematic lines results and observation made.
- Analyze the data with the aid of an appropriate statistical analysis.

- Interpret the observations in the light of existing knowledge and highlight in what ways the study has advanced existing knowledge on the subject and what further remains to be done.
- Write a thesis in accordance with the prescribed instructions.
- Write at least one scientific paper as expected of International Standards from the material of this thesis.

B. Affective Domain:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.

2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.

3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

At the end of the course, the student should acquire following clinical skills:

Essential diagnostic skills:

I. Examination techniques along with interpretation

1. Slit lamp Examination

i. Diffuse examination
ii. Focal examination
iii. Retroillumination – direct and indirect
iv. Sclerotic scatter
v. Specular reflection
vi. Staining modalities and interpretation

2. Fundus evaluation

- Direct/Indirect ophthamoscopy
- Fundus drawing
- 3-mirror examination of the fundus
- 78-D/90-D/60-D examination
- Amsler’s charting

II. Basic investigations along with their interpretation

1. Tonometry

Tonometry - Applanation/Identation/Non-contact

2. Gonioscopy

Gonioscopy grading of the anterior chamber angle

3. Tear/ Lacrimal function tests

i. Staining- fluorescein and Rose Bengal
ii. Schirmer test/tear film break up time
iii. Syringing
iv. Dacrocystography

4. Corneal

- Corneal scraping and cauterization
- Smear preparation and interpretation (Gram's stain /KOH)
- Media inoculation
- Keratometry - performance and interpretation
- Pachymetry
- Corneal topography - if available

5. Colour Vision evaluation

- Ishihara pseudoisochromatic plates
- Farnsworth Munsell, if available

6. Refraction

i. Retinoscopy- Streak/ Priestley Smith
ii. Use of Jackson's cross-cylinder
iii. Subjective and objective refraction
iv. Prescription of glasses

7. Diagnosis and assessment of Squint

i. Ocular position and motility examination
ii. Synoptophore usage
iii. Lees screen usage
iv. Diplopia charting
v. Assessment of strabismus - cover tests/prisms bars
vi. Amblyopia diagnosis and treatment
vii. Assessment of convergence, accommodation, stereopsis, suppression

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8. Exophthalmometry

Usage of Hertel's exophthalmometer - proptosis measurement

9. Contact lenses

- Fitting and assessment of RGP and soft lenses
- Subjective verification of over refraction
- Complications arising of contact lens use
- Educating the patient regarding CL usage and imparting relevant knowledge of the complications arising thereon

10. Low Vision Aids

- Knowledge of basic optical devices available and relative advantages and disadvantages of each.
- The basics of fitting with knowledge of availability & cost

III. The post graduate must be well versed with the following investigative modalities although the student may or may not perform it individually. But, she/he should be able to interpret results of the following tests:

1. Fundus photography
2. Fluorescein angiography
3. Ophthalmic ultrasound A-scan/B scan
4. Automated perimetry for glaucoma and neurological lesions
5. Radiological tests - X rays - Antero posterior/ Lateral view
   PNS (Water's view) / Optic canal views

   Localisation of intra-ocular and intra-orbital FBs

   Interpretations of -USG/ CT/ MRI Scans
6. OCT and UBM
7. ERG, EOG, and VEP

IV. Minor surgical procedures – Must know and perform independently

- Conjunctival and corneal foreign body removal on the slit lamp
- Chalazion incision and curettage
- Pterygium excision
- Biopsy of small lid tumours
- Suture removal- skin/conjunctival/corneal/ corneoscleral
- Tarsorrhaphy
- Subconjunctival injection
- Retrobulbar, parabulbar anaesthesia
- Posterior Sub-Tenon's injections

- Artificial eye fitting

V. Surgical procedures

1. Must know and can perform independently

a. Ocular anaesthesia:

- Retrobulbar anaesthesia
- Peribulbar anaesthesia
- Facial blocks- O'Brein / Atkinson/Van lint and modifications
- Frontal blocks
- Infra orbital blocks
- Blocks for sac surgery

2. Must be able to independently perform and deal with complications arising from the following surgeries :

- Lid Surgery - Tarsorrhaphy
  Ectropion and entropion
  Lid repair following trauma
  Epilation
- Destructive procedures
  Evisceration with or without implant
  Enucleation with or without implant

- Sac surgery
  i. Dacryocystectomy
  ii. Dacryocystorhinostomy
  iii. Probing for congenital obstruction of nasolacrimal duct

- Strabismus surgery
  Recession and resection procedures on the horizontal recti.
- Orbit surgery
  Incision and drainage via anterior orbitotomy for abscess
- Cyclocryotherapy/Cyclophotocoagulation

3. PG Students should be well conversant with use of operating microscope and must be able to perform the surgeries listed below competently under the same:

- Cataract surgery
  i. Standard ECCE (extracapsular cataract extraction; first year) with or without IOL implantation

ii. Small incision ECCE with or without IOL implantation and/or Phacoemulsification with PC IOL implantation

iii. Intracapsular cataract extraction (second year)

iv. Cataract with Phacoemusification (third year)

v. Secondary AC or PC IOL implantation

- Vitrectomy/Scleral buckling
    - Intra-vitreal and intra-cameral (anterior chamber) injection techniques and doses of drugs for the same
    - Needs to know the basis of open sky vitrectomy (anterior segment) as well as management of cataract surgery complications.
    - Assisting vitrectomy and scleral buckling procedures
- Ocular surface procedures

  Pterygium excision with modifications

  Conjunctival cyst excision/foreign body removal

  Corneal foreign body removal

  Conjunctival flap/ peritomy
- Glaucoma

  Trabeculectomy
- Corneal

  Repair of corneo - scleral perforations

  Corneal suture removal

  Application of glue and bandage contact lens

4. Should have performed/assisted the following microscopic surgeries

   i. Keratoplasty

   Therapeutic and optical

   ii Glaucoma surgery

   Pharmacological modulation of trabeculectomy

   Trabeculotomy

   Goniotomy

   Glaucoma valve implant surgery

5. Desirable to be able to perform following laser procedures
    - Yag Capsulotomy
    - Laser iridotomy
    - Focal and panretinal photocoagulation
6. Should have assisted/knowledge of Keratorefractive procedures

Operations:

The PG is provided with an opportunity to perform operations both extra-ocular and intra-ocular with the assistance of the senior post graduate students and/or under the direct supervision of a faculty member. The student is provided with an opportunity

to learn special and complex operations by assisting the senior post graduate student or the faculty in operations of cases of the specialty and be responsible for the post-operative care of these cases.

In **first phase**, the post graduate student is given training in preparations of cases for operation, pre-medication and regional anaesthetic blocks. In the **next phase**, the post graduate student assists the operating surgeon during the operations. In the **third phase**, the post graduate student operates independently assisted by senior post graduate student or a faculty member. She/he is required to be proficient in some operations and show familiarity with others.

Syllabus

Course contents:

These are only broad guidelines and are illustrative, there may be overlap between sections.

I. Basic Sciences:

1. Orbital and ocular anatomy
    i. Gross anatomy
    ii. Histology
    iii. Embryology
2. Ocular Physiology
3. Ocular Pathology
4. Ocular Biochemistry
    General biochemistry, biochemistry applicable to ocular function
5. Ocular Microbiology
    General Microbiology, specific microbiology applicable to the eye
6. Immunology with particular reference to ocular immunology
7. Genetics in ophthalmology
8. Community Eye Health

II. Optics

a. Basic physics of optics
b. Applied ophthalmic optics
c. Applied optics including optical devices
d. Disorders of Refraction

III. Clinical Ophthalmology

i. Disorders of the lids
ii. Disorders of the lacrimal system
iii. Disorders of the Conjunctiva
iv. Disorders of the Sclera

v. Disorders of the Cornea
vi. Disorders of the Uveal Tract
vii. Disorders of the Lens
viii. Disorders of the Retina
ix. Disorders of the Optic Nerve and Visual Pathway
x. Disorders of the Orbit
xi. Glaucoma
xii. Neuro-ophthalmology
xiii. Paediatric ophthalmology
xiv. Ocular involvement in systemic disease
xv. Immune ocular disorders
xvi. Strabismus and Amblyopia
xvii. Ocular oncology

TEACHING AND LEARNING METHODS

Teaching Methodology:

The theoretical knowledge is imparted to the post graduate student through distinct courses of lecture demonstrations, seminars, symposia and inter- and intra-departmental meetings. The students are exposed to recent advances through discussions in journal clubs and participation in CMEs, and symposia.

The post graduate students are imparted clinical training in several ways:

1. ***Group Discussion***

   The junior post graduate students may present the symposium to their senior postgraduates where it is fully discussed before finally being discussed in front of the faculty or senior eye specialists. A free and fair discussion is encouraged. These discussions enable the post graduate students to prepare for a general discussion in the class.

2. ***Clinical Case discussion***

a. Bedside discussion on the rounds and outpatient teaching take their toll with patient management. Therefore in addition to these, clinical case discussions should form part of a department's schedule at a fixed time every week. This could range from 1-2 hours and could be held at least once a week. The choice and manner of presentation and discussion varies widely and is left to the discretion of the department. Every effort should be made to include as wide a variety of cases as possible over three years with multiple repetitions. Problem oriented approach is better as it aids in decision making skills.

b. In addition to bedside teaching rounds, at least 5-hr of formal teaching per week are necessary.

c. Consultant case presentation is another approach which should be encouraged as it aids in solving complex problems and also is forum for discussion of interesting cases.

d. Case discussions on the patient's records written by the student is to be encouraged as it helps exercise the student's diagnostic and decision making skills. It also helps the consultant in critical evaluation of the student's progress academically.

e. Case presentation at other in-hospital multidisciplinary forums.

f. The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

g. Department should encourage e-learning activities.

3. Seminars

Seminars should be conducted at least once weekly. The duration should be at least one hour. The topics selected should be repeated once in 3 years so as to cover as wide a range of topics as possible. Seminars could be individual presentations or a continuum (large topic) with many post graduate students participating.

4. Journal clubs

Journals are reviewed in particular covering all articles in that subject over a 6 months period and are discussed by the post graduate student under the following headings.

1) Aim 2) Methods 3) Observations
4) Discussions and 5) Conclusions

The post graduate student to whom the journal is allotted presents the journal summaries to the senior postgraduates. They are expected to show their understanding of the aspects covered in the article and clarify any of the points raised in the article, offer criticisms and evaluate the article in the light of known literature.

5. A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

6. Out-Patients: For the first six months of the training programme, post graduate students may be attached to a faculty member to be able to pick up methods of history taking and ocular examination in ophthalmic practice. During this period

the post graduate student may also be oriented to the common ophthalmic problems. After 6 months, the clinical post graduate student may work independently, where he receives new and old cases including refractions and prescribes for them. The post graduate students are attached to a senior post graduate student and faculty member whom they can consult in case of difficulty.

7. **Wards:** Each post graduate student may be allotted beds in the in-patient section depending upon the total bed capacity and the number of the post graduates. The whole concept is to provide the post graduate student increasing opportunity to work with increasing responsibility according to seniority. A detailed history and case record is to be maintained by the post graduate student.

Relevance of beds and admissions in Ophthalmology has really gone down at present, as most of the surgical and special investigative procedures are being performed on out-patient basis. Most of the teaching has to be imparted in out-patients department and special Clinics.

8. **Rotations: Specialty clinics**

The student may rotate in the following subspecialty clinics:

- Anterior segment and cataract
- Glaucoma
- Oculoplastics
- Paediatric ophthalmology and strabismus
- Retina and Uvea
- Cornea, Contact lens and low vision
- Neuroophthalmology
- Refractive Clinic

9. **Practicals in Ocular Histopathology**

The post graduate students may be provided with fully stained slides of the ocular tissues along with relevant clinical data and discuss the diagnosis and differential diagnosis on the basis of the information provided

10. Attend accredited scientific meetings (CME, Symposia, and Conferences).

11. Additional sessions on basic sciences, biostatistics, research methodology, teaching methodology, hospital waste management, health economics, medical ethics and legal issues related to ophthalmology practice are suggested.

13. Maintenance of **log book**: Log books shall be checked and assessed periodically by the faculty members imparting the training.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of surgical skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, ie, during the training

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

FORMATIVE ASSESSMENT, ie., during the training

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Quarterly assessment during the MS training should be based on following educational activities:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I)

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The Post Graduate examination shall be in three parts:

1. Thesis:

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall

be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners. From regulations)

2. Theory Examination:

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

There shall be four theory papers.

Paper I: Basic Sciences related to Ophthalmology, Refraction & Optics

Paper II: Clinical Ophthalmology

Paper III: Systemic Diseases in Relation to Ophthalmology

Paper IV: Recent Advances in Ophthalmology and Community Ophthalmology

3. Clinical/Practical and oral/viva voce examination

Clinical

1 long case

2 short cases with different problems

2 fundus Cases

1 refraction case

. **Oral/Viva voce Examination shall be comprehensive enough to test the** post graduate student**'s overall knowledge of the subject and shall include:**

i. Instruments
ii. Pathology specimens
iii. Drugs, X-rays, USG/OCT/CT/MRI Scans, etc.
iv. Visual fields and other ophthalmic diagnostic charts

Recommended Reading:

Books (latest edition)

1. Ophthalmic Surgery: Principles and Techniques. Blackwell Science. Albert DM.
2. Principles and Practice of Ophthalmology. Albert DM, Jakobiec. W B Saunders
3. Principles & Practice of Ophthalmology. Gholam A Paymen
4. The Current American Academy of Ophthalmology Basic and Clinical Science Course (13 volumes)
5. Duke Elder's Practice of Refraction. Abrams D. Churchill Livingstone.
6. Text book of Ophthalmology. Yanoff and Duker
7. Retina. Stephen J Ryan:
8. Ophthalmic Ultrasound: Sandra Byrne and Ronald Green.
9. Cornea: Fundamentals, Diagnosis, and Management. Krachmer JH, Mannis MJ, Holland EJ. Mosby Elsevier.
10. Ophthalmology. Yanoff N, Duker JS. Mosby Elsevier.
11. Review of Ophthalmology. Friedman NJ, Kaiser PK, Trattler WB. Elseview Saunders, Philadelphia.
12. Corneal Transplantation. Vajpayee RB. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
13. Fundamentals of Clinical Ophthalmology Series. Coster D. Cornea. Blackwell Publishing Limited.
14. The Contact Lens Manual. A practical guide to fitting. Gasson A, Morris A J. Butterworth Heinemann Elsevier.
15. Steinert's cataract surgery.
16. Shields Text book of glaucoma
17. Smith and Nozik : Uvea
18. Rootman's diseases of the orbit
19. Eyelid, conjunctival and orbital tumors. An atlas and textbook. Shields JA, Shields CL. Philadelphia: Lippincott Williams & Wilkins.
20. Intraocular tumors. An atlas and textbook. Shields JA, Shields CL.
21. Pediatric Ophthalmology. Taylor and Hoyt: Saunders Ltd.
22. Management of Strabismus and Amblyopia. Pratt-Johnson and Tilson: Thieme Verlag.
23. Handbook of Pediatric Eye and Systemic disease. Wright, Spiegel and Thompson.
24. BinocularVision and Ocular Motility. Theory and Management of Strabismus. Von Noorden GK. Mosby.
25. Surgical Management of Strabismus. Helveston:
26. Strabismus: A Decision Making Approach. Von Noorden and Helveston:
27. Thyroid Eye Diseases. Char DR. Williams and Wilkins, Baltimore.

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28. A Manual of Systematic Eyelid Surgery.Collin JRO (ed). Churchill Livingstone, Edinburgh.
29. Refractive Surgery. Agarwal A, Agarwal A, Jacob Soosan. Jaypee.
30. LASIK Complications, Prevention and management. Gimbel HV, Penno EEA. Slack Inc.
31. Management of Complications of Refractive Surgery. Alio JL, Azar DT. Springer.
32. Quality of Vision: Essential Optics for the Cataract and Refractive Surgeon. Holladay JT. Slack Inc.
33. Ocular Pharmacology: Havener
34. Anatomy: Wolff 's Anatomy of the Eye and Orbit
35. Physiology: Adler's Physiology of the Eye
36. Textbook of Ophthalmology (2 volumes). Easty DL, Sparrow JM.Oxford Oxford Medical Publications.
37. The Eye. Basic Sciences in Practice. Forrester JV, Dick AD, McMenamin PG, Lee WR. W B Saunders.
38. A Stereoscopic Atlas of Macular Diseases: Diagnosis and Treatment. Gass JDM.
39. Neuroophthalmology. Glaser JS. LipincottWilliams & Wilkins. .
40. Clinical Ophthalmic Pathology. Harry J, Misson G. Butterworth/Heinemann.
41. Inherited Retinal Diseases. A Diagnostic Guide. Jimenez Sierra JM, Ogden TE, Van Boemel GB. Mosby.
42. Clinical Ophthalmology. Kanski JJ. Butterworth/Heinemann.
43. ABC of Resuscitation. Colquhoun, M. C., Evans, T. R., Handley, A. J. BMJ Publishing Group.
44. Walsh and Hoyt's Clinical Neuroophthalmology (5 volumes). Miller NR, Newman NJ, Williams and Wilkins.
45. The human eye. Oyster CW Sinauer Associates. Sunderland. Massachusetts
46. Paediatric Ophthalmology. Taylor D. Blackwell Science.
47. Decision Making in Ophthalmology. Van Heuven WAJ, Zwann J. Mosby.
48. Parsons' Diseases of the eye. Sihota and Tandon.
49. Wills Eye Manual
50. International Council of Ophthalmology Residency Curriculum available at http://www.icoph.org/

Journals

03-05 international Journals and 02 national (all indexed) journals

Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

Medical Council of India

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN GENERAL SURGERY

Preamble:

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

A post graduate specialist having undergone the required training should be able to recognize the health needs of the community, should be competent to handle effectively medical / surgical problems and should be aware of the recent advances pertaining to his specialty. The PG student should be competent to provide professional services with empathy and humane approach. The PG student should acquire the basic skills in teaching of medical / para-medical students and is also expected to know the principles of research methodology and self-directed learning for continuous professional development.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

Clinical Objectives

At the end of postgraduate training, the PG student should be able to: -

1. diagnose and appropriately manage common surgical ailments in a given situation.
2. provide adequate preoperative, post-operative and follow-up care of surgical patients.
3. identify situations calling for urgent or early surgical intervention and refer at the optimum time to the appropriate centers.
4. counsel and guide patients and relatives regarding need, implications and problems of surgery in the individual patient.
5. provide and coordinate emergency resuscitative measures in acute surgical situations including trauma.
6. organize and conduct relief measures in situations of mass disaster including triage.

7. effectively participate in the National Health Programs especially in the Family Welfare Programs.
8. discharge effectively medico-legal and ethical responsibilities and practice his specialty ethically.
9. must learn to minimize medical errors.
10. must update knowledge in recent advances and newer techniques in the management of the patients.
11. must learn to obtain informed consent prior to performance of operative procedure.
12. perform surgical audit on a regular basis and maintain records (manual and/or electronic) for life.
13. participate regularly in departmental academic activities by presenting Seminar, Case discussion, Journal Club and Topic discussion on weekly basis and maintain logbook.
14. demonstrate sufficient understanding of basic sciences related to his specialty.
14. plan and advise measures for the prevention and rehabilitation of patients belonging to his specialty.

Research:

The student should:

1. know the basic concepts of research methodology, plan a research project and know how to consult library.
2. should have basic knowledge of statistics.

Teaching:

The student should learn the basic methodology of teaching and develop competence in teaching medical/paramedical students.

Professionalism:

1. The student will show integrity, accountability, respect, compassion and dedicated patient care. The student will demonstrate a commitment to excellence and continuous professional development.
2. The student should demonstrate a commitment to ethical principles relating to providing patient care, confidentiality of patient information and informed consent.
3. The student should show sensitivity and responsiveness to patients' culture, age, gender and disabilities.

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. Cognitive domain

- Demonstrate knowledge of applied aspects of basic sciences like applied anatomy, physiology, biochemistry, pathology, microbiology and pharmacology.
- Demonstrate knowledge of the bedside procedures and latest diagnostics and therapeutics available.
- Describe aetoiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children.
- Demonstrate the theoretical knowledge of general principles of surgery.
- Demonstrate the theoretical knowledge of systemic surgery including disaster management and recent advances.
- Demonstrate the theoretical knowledge to choose, and interpret appropriate diagnostic and therapeutic imaging including ultrasound, Mammogram, CT scan, MRI.
- Demonstrate the knowledge of ethics, medico-legal aspects, communication skills and leadership skills. The PG student should be able to provide professional services with empathy and humane approach.

B. Affective domain

- Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
- Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
- Develop communication skills to word reports, obtain a proper relevant history and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.
- Obtain informed consent for any examination/procedure and explain to the patient and attendants the disease and its prognosis with a humane approach.
- Provide appropriate care that is ethical, compassionate, responsive and cost effective and in conformation with statutory rules.

C. Psychomotor domain

- Perform a humane and thorough clinical examination including internal examinations and examinations of all organs/systems in adults and children
- Write a complete case record with all necessary details.
- Arrive at a logical working diagnosis / differential diagnosis after clinical examination.
- Order appropriate investigations keeping in mind their relevance (need based).
- Choose, perform and interpret appropriate imaging in trauma - ultrasound FAST (Focused Abdominal Sonography in Trauma).

- Perform minor operative procedures and common general surgical operations independently and the major procedures under guidance.
- Provide basic and advanced life saving support services in emergency situations
- Provide required immediate treatment and comprehensive treatment taking the help of specialist as required.
- Perform minimally invasive surgery in appropriate clinical settings. Must have undergone basic training in operative laparoscopy related to general and GI Surgery.
- Undertake complete patient monitoring including the preoperative and post operative care of the patient.
- Write a proper discharge summary with all relevant information.

Syllabus

Course Contents:

No limit can be fixed and no fixed number of topics can be prescribed as course contents. She/he is expected to know the subject in depth, however, emphasis should be on the diseases/health problems most prevalent in that area. Knowledge of recent advances and basic sciences as applicable to his/her specialty should get high priority. Competence in surgical skills commensurate with the specialty (actual hands - on training) must be ensured.

1. General topics:

A student should have fair knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology and Pharmacology) as applied to his specialty. Further, the student should acquire in-depth knowledge of his subject including recent advances and should be fully conversant with the bedside procedures (diagnostic and therapeutic) and having knowledge of latest diagnostics and therapeutics available.

1. History of medicine with special reference to ancient Indian texts
2. Health economics - basic terms, health insurance
3. Medical sociology, doctor-patient relationship, family adjustments in disease, organizational behavior, conflict resolution
4. Computers - record keeping, computer aided learning, virtual reality, robotics
5. Hazards in hospital and protection:
   AIDS, hepatitis B, tuberculosis, radiation, psychological
6. Environment protection - bio-medical waste management
7. Surgical audit, evidence based surgical practice, quality assurance
8. Concept of essential drugs and rational use of drugs
9. Procurement of stores and material & personal management

10. Research methodology - library consultation, formulating research, selection of topic, writing thesis protocol, preparation of consent form from patients
11. Bio-medical statistics, clinical trials
12. Medical ethics
13. Consumer protection
14. Newer antibiotics
15. Problem of resistance.
16. Sepsis - SIRS
17. Nosocomial infection
18. Advances in imaging technologies
19. Disaster management, mass casualties, Triage
20. O.T. design, technologies, equipment
21. Critical care in surgical practice
22. Response to trauma
23. Wound healing
24. Fluid and electrolyte balance
25. Nutrition
26. Blood transfusion
27. Brain death
28. Cadaveric organ retrieval

1. Systemic Surgery

The student must acquire knowledge in the following important topics are but teaching should not be limited to these topics. A standard text-book may be followed, which will also identify the level of learning expected of the trainees.

- Wound healing including recent advances
- Asepsis, antisepsis, sterilization and universal precaution
- Surgical knots, sutures, drains, bandages and splints
- Surgical infections, causes of infections, prevention
- Common aerobic and anaerobic organisms and newer organisms causing infection including *Helicobacter Pylori*
- Tetanus, gas gangrene treatment & prevention
- Chronic specific infections TB, Filariasis
- Boils, cellulites, abscess, narcotizing fascitis and synergistic infection
- Antibiotic therapy rationale including antibiotic prophylaxis, misuse, abuse
- Hospital acquired nosocomial infection causes and prevention including MRSA etc.
- HIV, AIDS and Hepatitis B & C, Universal precautions when dealing with patients suffering from these diseases
- Fluid and electrolyte balance including acid – base disturbance, consequences,

interpretation of blood gas analysis data and management

- Rhabdomyolysis and prevention of renal failure
- Shock (septicaemic, hypovolaemic, Neurogenic, anaphylactic), etiology, pathophysiology and management
- Blood and blood components, transfusion indication, contraindication, mismatch and prevention and management of complications of massive blood transfusion
- Common preoperative preparation (detailed preoperative workup, risk assessment according to the disease and general condition of the patient as per ASA grade) and detailed postoperative complications following major and minor surgical procedures
- Surgical aspects of diabetes mellitus particularly management of diabetic foot and gangrene, preoperative control of diabetes, consequences of hypo- and hyper-glycaemia in a postoperative setting
- Consequences and management of bites and stings including snake, dog, human bites
- Mechanisms and management of missile, blast and gunshot injuries
- Organ transplantation: Basic principles including cadaver donation, related Human Organ Transplant Acts, ethical and medicolegal aspects.
- Nutritional support to surgical patients
- Common skin and subcutaneous condition
- Sinus and fistulae, pressure sores
- Acute arterial occlusion, diagnosis and initiate management
- Types of gangrene, Burger's disease and atherosclerosis
- Investigations in case of arterial obstruction, amputation, vascular injuries: basic principles and management
- Venous disorders: Varicose veins
- Diagnosis, principles of therapy, prevention of DVT: basic principles and management
- Lymphatic: Diagnosis and principles of management of lymphangitis and lymphedema
- Surgical management of Filariasis
- Burns: causes, prevention and management
- Wounds of scalp and its management
- Recognition, diagnosis and monitoring of patients with head injury, Glasgow coma scale
- Undergo advanced trauma and cardiac support course (certified) before appearing in final examination
- Recognition of acute cerebral compression, indication for referrals.
- Cleft lip and palate
- Leukoplakia, retention cysts, ulcers of tongue

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- Oral malignancies
- Salivary gland neoplasms
- Branchial cyst, cystic hygroma
- Cervical lymphadenitis nonspecific and tuberculous, metastatic lymph nodes and lymphomas.
- Diagnosis and principles of management of goitre
- Thyroglossal cyst and fistula
- Thyrotoxicosis
- Thyroid neoplasms
- Management of solitary thyroid nodule
- Thoracic outlet syndrome
- Management of nipple discharge
- Breast abscess
- Clinical breast examination, breast self examination
- Screening and investigation of breast lump
- Concept of Single Stop Breast Clinic
- Cancer breast diagnosis, staging and multimodality management (common neoadjuvant and adjuvant and palliative chemotherapy protocols and indications of radiation and hormonal therapy, pathology and interpretation of Tumour Markers, breast cancer support groups and counseling)
- Recognition and treatment of pneumothorax, haemothorax
- Pulmonary embolism: Index of suspicion, prevention/recognition and treatment
- Flail chest, stove in chest
- Postoperative pulmonary complication
- Empyema thoracis
- Recognition of oesophgeal atresisa and principles of management
- Neoplasms of the lung including its prevention by tobacco control
- Cancer oesophagus: principles of management including importance of early detection and timely referral to specialist
- Achalasia cardia
- Gastro-esophageal reflux disease (GERD)
- Congenital hypertrophic pyloric stenosis
- Aetiopathogenesis, diagnosis and management of peptic ulcer including role of H. Pylori and its diagnosis and eradication
- Cancer stomach
- Signs and tests of liver dysfunction
- Amoebic liver abscess and its non-operative management
- Hydatid cyst and its medical and surgical management including laparoscopic management
- Portal hypertension, index of suspicion, symptoms and signs of liver failure and

timely referral to a specialist center

- Obstructive jaundice with emphasis on differentiating medical vs surgical Jaundice, algorithm of investigation, diagnosis and surgical treatment options
- Neoplasms of liver
- Rupture spleen
- Indications for splenectomy
- Clinical features, diagnosis, complications and principles of management of cholelithiasis and cholecystitis including laparoscopic cholecystectomy
- Management of bile duct stones including endoscopic, open and laparoscopic management
- Carcinoma gall bladder, incidental cancer gallbladder, index of suspicion and its staging and principles of management
- Choledochal cyst
- Acute pancreatitis both due to gallstones and alcohol
- Chronic pancreatitis
- Carcinoma pancreas
- Peritonitis: causes, recognition, diagnosis, complications and principles of management with knowledge of typhoid perforation, tuberculous peritonitis, postoperative peritonitis
- Abdominal pain types and causes with emphasis on diagnosing early intra-abdominal acute pathology requiring surgical intervention
- Intestinal amoebiasis and other worms manifestation (Ascariasis) and their surgical complications (Intestinal Obstruction, perforation, gastrointestinal bleeding, involvement of biliary tract)
- Abdominal tuberculosis both peritoneal and intestinal
- Intestinal obstruction
- **Appendix:** Diagnosis and management of acute appendicitis
- Appendicular lump and abscess

Colon

- Congenital disorders, Congenital megacolon
- Colitis infective / non infective
- Inflammatory bowel diseases
- Premalignant conditions of large bowel
- Ulcerative colitis
- Carcinoma colon
- Principles of management of types of colostomy

Rectum and Anal Canal:

- Congenital disorders, Anorectal anamolies
- Prolapse of rectum

- Carcinoma rectum
- Anal Canal: surgical anatomy, features and management of fissures, fistula - in – ano.
- Perianal and ischiorectal abscess
- Haemorrhoids – Non-operative outpatient procedures for the control of bleeding (Banding, cryotherapy, injection) operative options - open and closed haemorrhoidectomy and stapled haemorrhoidectomy
- Anal carcinoma
- Clinical features, diagnosis, complication and principles of management of inguinal hernia including laparoscopic repair
- Umbilical, femoral hernia and epigastric hernia
- Open and Laparoscopic repair of incisional/primary ventral hernia
- Urinary symptoms and investigations of urinary tract
- Diagnosis and principles of management of urolithiasis
- Lower Urinary tract symptoms or prostatism
- Benign prostatic hyperplasia; diagnosis and management
- Genital tuberculosis in male
- Phimosis and paraphimosis
- Carcinoma penis
- Diagnosis and principles of treatment of undescendecd testis
- Torsion testis
- Hydrocele, haematocele and pyocele Varicocele: Diagnosis (Medical Board for fitness)
- Varicocele: Diagnosis (Medical Board for fitness)
- Acute and chronic epididymo-orchitis
- Testicular tumours
- Principles of management of urethral injuries
- Management of soft tissue sarcoma
- Prosthetic materials used in surgical practice
- Telemedicine, teleproctoring and e-learning
- Communication skills

A student should be expert in good history taking, physical examination, providing basic life support and advanced cardiac life support, common procedures like FNAC, Biopsy, aspiration from serous cavities, lumber puncture etc. The student should be able to choose the required investigations.

Clinical cases and Symptoms-based approach to the patient with:

1. Ulcers in oral cavity

2. Solitary nodule of the thyroid
3. Lymph node in the neck
4. Suspected breast lump
5. Benign breast disease
6. Acute abdominal pain
7. Blunt Trauma Abdomen
8. Gall stone disease
9. Dysphagia
10. Chronic abdominal pain
11. Epigastric mass
12. Right hypochrondium mass
13. Right iliac fossa mass
14. Renal mass
15. Inguino-scrotal swelling
16. Scrotal swelling
17. Gastric outlet obstruction
18. Upper gastrointestinal bleeding
19. Lower gastrointestinal bleeding
20. Anorectal symptoms
21. Acute intestinal obstruction
22. Obstructive jaundice
23. Acute retention of Urine
24. Bladder outlet obstruction
25. Haematuria
26. Peripheral vascular disease
27. Varicose veins
28. New born with developmental anomalies
29. Hydronephrosis , Pyonephrosis, perinephric abscess
30. Renal tuberculosis
31. Renal tumors
32. Carcinoma prostate
33. Genital tuberculosis in male

At the end of the course, post graduate students should be able to perform independently (including perioperative management) the following:

- Start IV lines and monitor infusions
- Start and monitor blood transfusion
- Venous cut-down
- Start and manage a C.V.P. line
- Conduct CPR (Cardiopulmonary resuscitation)

- Basic/ advance life support
- Endotracheal intubation
- Insert nasogastric tube
- Proctoscopy
- Urethral catheterisation
- Surgical management of wounds
- Biopsies including image guided
- Manage pneumothorax / pleural space collections
- Infiltration, surface and digital Nerve blocks
- Incise and drain superficial abscesses
- Control external hemorrhage
- Vasectomy (Preferably non-scalpel)
- Circumcision
- Surgery for hydrocele
- Surgery for hernia
- Surgery and Injection/banding of piles
- Management of all types of shock
- Assessment and management of burns
- Hemithyroidectomy
- Excision of thyroglossal cyst
- Excision Biopsy of Cervical Lymphnode
- Excision of benign breast lump
- Modified Radical mastectomy
- Axillary Lymphnode Biopsy
- Excision of gynaecomastia
- Excision of skin and subcutaneous swellings
- Split thickness skin graft
- Management of hernias
- Laparoscopic and open cholecystectomy
- Management of Liver abscess
- appendectomy
- Management of intestinal obstruction, small bowel resection, perforation and anastomosis
- Colostomy

The student must have observed or assisted (the list is illustrative) in the following:

- Hartmann’s procedure for cancer rectum
- Spleenectomy (emergency)
- Stomach perforation
- Varicose Vein surgery

- Craniotomy (Head Injury)
- Superficial parotidectomy
- Submandibular gland excision
- Soft tissue tumours including sarcoma
- Pancreaticoduodenal resection
- Hydatid cyst liver
- Pancreatic surgery
- Retroperitoneal operations

TEACHING AND LEARNING METHODS

Teaching methodology

Didactic lectures are of least importance; small group discussion such as seminars, journal clubs, symposia, reviews and guest lectures should get priority for theoretical knowledge. Bedside teaching, grand rounds, structured interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning with appropriate emphasis on e-learning. Student should have hand-on training in performing various procedures and ability to interpret various tests/investigations. Exposure to newer specialized diagnostic/therapeutic procedures concerning her/his subject should be given. Self-learning tools like assignments and case-based learning may be promoted.

1. **Clinical postings**

   A major portion of posting should be in General Surgery. It should include in-patients, out-patients, ICU, trauma, emergency room and speciality clinics.

   Rotation of posting

   - Inter-unit rotation in the department should be done for a period of up to one year.
   - Rotation in appropriate related subspecialties for a total period not exceeding 06 months.

2. **Clinical meetings:**

   There should be intra- and inter- departmental meetings for discussing the uncommon /interesting cases involving multiple departments.

3. **Log book:** Each student must be asked to present a specified number of cases for clinical discussion, perform procedures/tests/operations/present seminars/review articles from various journals in inter-unit/interdepartmental teaching sessions. They should be entered in a Log Book. The Log books shall be checked and assessed periodically by the faculty members imparting the training.

4. **Thesis writing and research:**

   Thesis writing is compulsory.

5. The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
6. A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
7. The student should know the basic concepts of research methodology, plan a research project, be able to retrieve information from the library. The student should have a basic knowledge of statistics.
8. Department should encourage e-learning activities.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of surgical skills laboratories in the medical colleges is mandatory.

ASSESSMENT

Assessment should be comprehensive & objective. It should address the stated competencies of the course. The assessment needs to be spread over the duration of the course.

FORMATIVE ASSESSMENT, i.e., assessment during the training would include:
Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Quarterly assessment during the MS training should be based on following educational activities:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**

4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The examination will be in three parts:

1. **Thesis**

   Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the candidate to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

   Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A candidate shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. **Theory**

   The examinations shall be organised on the basis of ‘Grading’or ‘Marking system’ to evaluate and to certify candidate's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in ‘Theory’ as well as ‘Practical’ separately shall be mandatory for passing examination as a whole. The examination for MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

   Theory shall consist of four papers of 3 hours each.

   Paper I: Basic Sciences

   Paper II: Principles and Practice of Surgery

   Paper III: Principles and practice of Operative Surgery

Paper IV: Recent Advances in Surgery

3. Clinical / Practical and viva voce Examination

Clinical examination shall be conducted to test the knowledge, skills, attitude and competence of the post graduate students for undertaking independent work as a specialist/Teacher, for which post graduate students shall examine a minimum one long case and two short cases.

The Oral examination shall be thorough and shall aim at assessing the post graduate student's knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the specialty, which form a part of the examination.

Assessment may include Objective structured clinical examination.(OSCE)

Oral/Viva-voce examination needs to assess knowledge on X-rays, instrumentation, operative procedures. Due weightage should be given to Log Book Records and day-to-day observation during the training.

Recommended Reading:

Books (latest edition)

1. *Text Book of Surgery*, by Christopher Davis
2. ASI Text Book of Surgery
3. *Surgery of Colon, Rectum and Anal canal*, by Goligher J C
4. Schwartz *Text Book of Surgery*
5. *Textbook on Laparoscopic Surgery*
6. *Trauma (Mattox)*
7. *Recent Advances in Surgery*
8. *Year Book of Surgery*
9. *Surgical Clinics of North America*
10. *Short practice of Surgery* by Bailey and Love
11. *A manual of clinical Surgery*, by S Das
12. Hamilton Bailey's demonstration of clinical signs
13. Pye's *Surgical Handicraft*

Journals

03-05 international Journals and 02 national (all indexed) journals

Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

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Course Content

Human Anatomy **First M.B.B.S. (From August 2019)**

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 1; page no.41-90)

Teaching Lectures(hours)-220 Self directed learning (hours)- 40 **hours**

Small group teachings/tutorials/Integrated teaching/Practicals(hours)-415 Total(hours) -675 Early clinical exposure(hours)- 90 to be divided equally in all three subjects .

Competency No.	Topics & Subtopics
1	**Anatomical Terminology**
AN1.1	Anatomical position planes, movement in our body
AN1.2	Composition of bone & bone marrow
2	**General features of bones & Joints**
AN2.1	Parts, blood and nerve supply of long bone
AN2.2	Laws of ossification
AN2.3	Features of sesamoid bone
AN2.4	Cartilage
AN2.5	Types of Joints & examples
AN2.6	Nerve supply of joints & Hilton's law
3	**General features of Muscle**
AN3.1	Classification of muscles
AN3.2	Parts of skeletal muscle
AN3.3	Shunt and spurt muscles

4	**General features of skin and fascia**
AN4.1	Types of skin& dermatomes in body
AN4.2	Structure & function of skin
AN4.3	Superficial fascia
AN4.4	Deep fascia
AN4.5	Principles of skin incisions
5	**General features of the cardiovascular system**
AN5.1	Blood Lymph & vascular system
AN5.2	Pulmonary and systemic circulation
AN5.3	Arteries & Veins
AN5.4	Functional Classification of Vessels
AN5.5	Portal System
AN5.6	Anastomoses
AN5.7	Meta-arterioles, sphincters & AV anastomoses
AN5.8	Thrombosis, infarction & aneurysm
6	**General Features of lymphatic system**
AN6.1	Components & functions of Lymphatic system
AN6.2	Lymph capillaries & Circulation
AN6.3	Lymphoedema & tumor spread

7	**Introduction to the nervous system**
AN7.1	General plan & components of CNS, ANS, PNS.
AN7.2	Components of nervous tissue & functions
AN7.3	Classifications & parts of neuron
AN7.4	Typical spinal nerve
AN7.5	Principles of innervation of muscles
AN7.6	Loss of innervation of a muscle and applied anatomy
AN7.7	Synapse –types
AN7.8	Ganglia

8	**Features of individual bones (Upper Limb)**
AN8.1	Bones of upper limb
AN8.2	Joints formed by bones of upper limb
AN8.3	Peculiarities of clavicle
AN8.4	Muscle attachments of bones
AN8.5	Articulated hand
AN8.6	Scaphoid fracture
9	**Pectoral region**
AN9.1	Pectoralis major & pectoralis minor
AN9.2	Breast
AN9.3	Development of breast

10	**Axilla, Shoulder and Scapular region**
AN10.1	Boundaries & Contents of axilla
AN10.2	Axillary artery & Vein
AN10.3	Brachial plexus
AN10.4	Axillary lymphnodes
AN10.5	Variation in brachial plexus
AN10.6	Erb's Palsy & klumpke's paralysis
AN10.7	Enlarged axillary lymph nodes
AN10.8	Trapezius and latissimus dorsi
AN10.9	Anastomosis around the scapula & triangle of auscultation
AN10.10	Deltoid and rotator cuff muscles
AN10.11	Serratus anterior
AN10.12	Shoulder joint
AN10.13	Axillary nerve injury during IM injections

11	**Arm & Cubital fossa**
AN11.1	Biceps & triceps brachii
AN11.2	Important nerves and vessels in arm
AN11.3	Venipuncture of cubital veins
AN11.4	Saturday night palsy

AN11.5	Cubital fossa
AN11.6	Elbow joint anastomosis
12	**Forearm & hand**
AN12.1	Muscle groups of ventral forearm
AN12.2	Nerves & vessels of forearm
AN12.3	Flexor retinaculum
AN12.4	Carpal tunnel syndrome
AN12.5	Muscles of hand. movements of thumb
AN12.6	Movements of thumb
AN12.7	Vessels & nerves in hand
AN12.8	Claw hand
AN12.9	Fibrous flexor sheaths, synovial sheaths
AN12.10	Infection of Fascial spaces of palm
AN12.11	Muscle groups of dorsal forearm
AN12.12	Nerves and vessels of back of forearm
AN12.13	Wrist drop
AN12.14	Extensor retinaculum
AN12.15	Extensor expansion formation
13	**General Features, Joints, radiographs & surface marking**
AN13.1	Fascia, compartments, veins & lymphatic of upper limbs
AN13.2	Dermatomes of upper limbs
AN13.3	Joints of upper limb Elbow, Radio-ulnar, wrist & first carpometacarpal joint)

AN13.4	Joints of upper limb Sternoclavicular, Acromioclavicular, Carpometacarpal joints & Metacarpophalangeal joints
AN13.5	Radiographs of UL
AN13.6	Bony landmarks of UL
AN13.7	Surface projection of vessels, testing of muscle
AN13.8	Development of UL
14	**Features of individual bones (Lower Limb)**
AN14.1	Features of given bones
AN14.2	Joints formed by given bone
AN14.3	Importance of ossification of femur & tibia
AN14.4	Articulated foot
15	**Front & Medial side of thigh**
AN15.1	Nerves & vessels of thigh
AN15.2	Major Muscles
AN15.3	Femoral triangle
AN15.4	Psoas abscess & Femoral hernia
AN15.5	Adductor canal
16	**Gluteal region & back of thigh**

AN16.1	Nerves and vessels
AN16.2	Sciatic nerve injury
AN16.3	Trendelenburg sign
AN16.4	Hamstrings muscle
AN16.5	Nerve & vessels of back of thigh
AN16.6	Popliteal fossa
17	**Hip Joint**
AN17.1	Details of hip joint
AN17.2	Fracture neck of femur
AN17.3	Dislocation
18	**Knee joint, Anterolateral compartment of leg & dorsum of foot**
AN18.1	Major muscles
AN18.2	Nerves & vessels
AN18.3	Foot drop
AN18.4	Knee joint
AN18.5	Locking and unlocking
AN18.6	Knee joint injuries with its applied anatomy
AN18.7	Osteoarthritis
19	**Back of leg & sole**
AN19.1	Major muscles
AN19.2	Nerves & Vessels

AN19.3	Peripheral heart
AN19.4	Rupture of calcaneal tendon
AN19.5	Arches of foot
AN19.6	Flat & club foot
AN19.7	Metatarsalgia & plantar fasciitis
20	**General Features, joints, radiographs & surface marking**
AN20.1	Tibiofibular & ankle joint
AN20.2	Subtalar and transverse tarsal joints
AN20.3	Fascia, venous drainage, lymphatic Retinacula & dermatomes of Lower limb
AN20.4	Enlarged inguinal lymph nodes
AN20.5	Varicose veins & deep vein thrombosis
AN20.6	Radiographs of lower limb
AN20.7	Bony landmarks
AN20.8	Vessels of lower limb palpation
AN20.9	Surface projection nerves & veins
AN20.10	Development of lower limb
21	**Thoracic cage**
AN21.1	Sternum,Typical Rib, first Rib & typical thoracic vertebra
AN21.2	A typical Ribs & vertebra
AN21.3	Thoracic inlet, cavity and outlet

AN21.4	Intercostal muscles
AN21.5	Typical intercostal nerve
AN21.6	Intercostal vessels
AN21.7	A typical intercostal nerve subcostal artery, superior Artery
AN21.8	Joints of thorax
AN21.9	Mechanics of respiration
AN21.10	Costochondral & interchondral joints
AN21.11	Mediastinum
22	**Heart & Pericardium**
AN22.1	Pericardium
AN22.2	Each chamber of heart
AN22.3	Coronary arteries
AN22.4	Ischemic heart disease
AN22.5	Coronary sinus
AN22.6	Fibrous skeleton of heart
AN22.7	Conducting system of heart
23	**Mediastinum**
AN23.1	Oesophagus
AN23.2	Thoracic duct
AN23.3	Superior venacava , Azygos, hemiazygos & accessory hemiazygos veins
AN23.4	Arch of aorta & descending aorta

AN23.5	Thoracic sympathetic chain
AN23.6	Splanchnic nerves
AN23.7	Lymphatic duct
24	**Lungs & Trachea**
AN24.1	Pleura, Pleural, recess & applied anatomy
AN24.2	Root of lung & bronchial tree
AN24.3	Broncho pulmonary segment
AN24.4	Phrenic nerve
AN24.5	Blood Supply nerve supply Lymphatic drainage of Lungs
AN24.6	Trachea
25	**Thorax**
AN25.1	Draw & label microanatomy of trachea and lung
AN25.2	Development of pleura, lung & heart
AN25.3	Fetal circulation
AN25.4	Atrial septal defect, Ventricular septal defect, Fallot's tetralogy & Tracheo-oesophageal fistula
AN25.5	Transposition of great vessels, Dextrocardia, Patent ductus arteriosus & Coarctation of aorta
AN25.6	Development of aortic arch arteries, SVC, IVC & coronary Sinus.
AN25.7	Chest Radiograph AP & Lateral view
AN25.8	Barium swallow
AN25.9	Surface projection of pleura heart lungs
26	Skull osteology

AN26.1	Anatomy of skull bones
AN26.2	Skull Norma
AN26.3	Interior of skull
AN26.4	Mandible
AN26.5	Typical and Atypical cervical vertebrae (Atlas & axis)
AN26.6	Bones that ossify in membrane
AN26.7	7th cervical vertebra
27	Scalp
AN27.1	Scalp, Blood supply,nerve supply, Layers & Surgical importance
AN27.2	Emmissary veins
28	Face & parotid region
AN28.1	Facial muscles
AN28.2	Nerve supply of facial muscles
AN28.3	Facial vessels
AN28.4	Facial Nerve
AN28.5	Cervical Lymph node
AN28.6	Superficial muscles of face
AN28.7	Facial Nerve Palsy
AN28.8	Deep facial vein
AN28.9	Parotid gland
AN28.10	Frey’s syndrome Can be covered with 28.3

29	**Posterior triangle of neck**
AN29.1	Sternocleidomastoid
AN29.2	Erb's & Klumpke's palsy
AN29.3	wry neck
AN29.4	Omohyoid, scalenus & levator scapulae
30	**Cranial cavity**
AN30.1	Cranial fossa
AN30.2	Foramina
AN30.3	Dural venous sinuses
AN30.4	Cavernous sinuses
AN30.5	Visual Pathways
31	**Orbit**
AN31.1	Extra ocular muscles
AN31.2	Nerves and vessels in the orbit
AN31.3	Horner's syndrome
AN31.4	Lacrimal apparatus
AN31.5	3rd, 4th & 6th Cranial Nerves
32	**Anterior Triangle**
AN32.1	Anterior triangle
AN32.2	Carotid, muscular, digastric and submental triangles
33	**Temporal and Infratemporal regions**

AN33.1	Temporal & infratemporal fossae
AN33.2	Muscle of mastication
AN33.3	Temporomandibular joint
AN33.4	Pterygoid venous plexus
AN33.5	Dislocation with Temporomandibular joint
34	**Submandibular region**
AN34.1	Submandibular Salivary Gland & Ganglion
AN34.2	Submandibular stones
35	**Deep Structures in the neck**
AN35.1	Deep Cervical Fascia
AN35.2	Thyroid gland
AN35.3	Subclavian Artery
AN35.4	internal jugular & Brachiocephalic vein
AN35.5	Cervical lymph nodes
AN35.6	Cervical Sympathetic chain
AN35.7	IX, X, XI, & XII, Cranial nerve
AN35.8	Thyroid Swellings
AN35.9	Clinical features of compression by Cervical rib
AN35.10	Fascial Spaces of neck
36	**Mouth, pharynx & palate**

AN36.1	1) Soft palate 2) Palatine tonsil
AN36.2	Waldeyer's Lymphatic Ring
AN36.3	Pyriform fossa & Applied
AN36.4	Tonsils & Adenoids with applied anatomy
AN36.5	Clinical significance of Kilian's dehiscence
37	**Cavity of Nose**
AN37.1	Nasal septum, lateral wall of Nose,
AN37.2	Paranasal sinuses
AN37.3	Maxillary sinus –Applied Anatomy
38	Larynx
AN38.1	Intrinsic & Extrinsic muscles of larynx
AN38.2	Anatomical aspects of laryngitis
AN38.3	Recurrent laryngeal nerve Injury
39	**Tongue**
AN39.1	Tongue
AN39.2	XII Cranial hypoglossal Applied Anatomy
40	**Organs of hearing and equilibrium**
AN40.1	External ear

AN40.2	Middle ear
AN40.3	Internal ear
AN40.4	Applied Anatomy otitis externa / media
AN40.5	Myringotomy
41	**Eyeball**
AN41.1	Eyeball
AN41.2	Eyeball applied cataract, glaucoma & central retinal artery occlusion
AN41.3	Intraocular muscles
42	**Back region**
AN42.1	Vertebral canal
AN42.2	Sub occipital triangle
AN42.3	Semi spinalis capitis & Splenius Capitis
43	**Head & neck joints, Histology, Development , Radiography & surface marking**
AN43.1	Movements with muscles producing the movements of atlantooccipital joint & atlantoaxial joint
AN43.2	Pituitary , Thyroid, parathyroid & Salivary gland tongue, Epiglottis, Cornea, Retina
AN43.3	Microanatomy of olfactory epithelium, Eyelid, lip. Optic nerve, pineal gland
AN43.4	Development and anomalies of face, palate, tongue, brachial apparatus pituitary gland, Thyroid, Eye
AN43.5	Muscles of facial Expression, extraocular muscles palpation of carotid, superficial temporal, facial arteries, location of internal jugular & Ext. jugular veins. hyoid bone, thyroid cartilage, cricoid cartilage

AN43.6	Surface anatomy thyroid, parotid gland common carotid artery, IJV, SCV, EJV, facial artery.
AN43.7	X-Ray skull AP & Lat. view
AN43.8	Carotid & vertebral Angiogram
AN43.9	Structures in carotid & vertebral angiogram
44	**Anterior abdominal wall**
AN44.1	Planes, Quadrants of abdomen.
AN44.2	Fascia, nerves & Blood supply of ant. Abdominal wall.
AN44.3	Rectus sheath
AN44.4	Inguinal canal
AN44.5	Inguinal Hernia
AN44.6	Muscles of Ant. Abdominal wall
AN44.7	Common Abdominal Incisions
45	**Posterior abdominal wall**
AN45.1	Thoracolumbar fascia
AN45.2	Lumbar plexus
AN45.3	Back muscles
46	**Male external genitalia**
AN46.1	Testis & its descent
AN46.2	Epididymis
AN46.3	Penis
AN46.4	Varicocele
AN46.5	Phimosis & circumcision

47	**Abdominal cavity**
AN47.1	Lesser & Greater sac
AN47.2	Peritoneal folds & pouches
AN47.3	Ascites & peritonitis
AN47.4	Sub phrenic Abscess
AN47.5	Major Viscera
AN47.6	Accessory spleen, Kehr's sign, Vagotomy, Liver biopsy
AN47.7	Calot's triangle
AN47.8	Portal vein, Inferior Vena Cava, Renal vein
AN47.9	Abdominal aorta, coeliac trunk
AN47.10	Portosystemic Anastomosis
AN47.11	Portal Hypertension
AN47.12	Nerve plexus post. Abdominal wall.
AN47.13	Thoraco abdominal diaphragm
AN47.14	Diaphragmatic Hernia
48	**Pelvic wall and viscera**
AN48.1	Muscles of pelvic diaphragm
AN48.2	Male & female pelvic viscera
AN48.3	Internal iliac Artery
AN48.4	Sacral plexus
AN48.5	BPH, Uterine anomalies anal fistula
AN48.6	Automatic bladder

AN48.7	BPH & prostate cancer
AN48.8	P/V & P/R examination
49	**Perineum**
AN49.1	Sup. & deep perineal pouch
AN49.2	Perineal body
AN49.3	Perineal Membrane in male & female
AN49.4	Ischiorectal fossa
AN49.5	Perineal tear, episiotomy perineal abscess & Anal fissure
50	**Vertebral Column**
AN50.1	Curvatures of vertebral Column
AN50.2	Intervertebral joint & sacroiliac joint, Pubic symphysis
AN50.3	Lumbar puncture
AN50.4	Scoliosis, lordosis, PID, Spina bifida, Spondylolisthesis
51	**Sectional Anatomy**
AN51.1	Cross section at T8, T10, & L1
AN51.2	Midsagittal section male & female pelvis
52	**Histology & Embryology**
AN52.1	GIT
AN52.2	Excretory system
AN52.3	Cardiooesophageal junction, Corpus luteum

AN52.4	Development of anterior abdominal wall
AN52.5	Congenital anomalies of Diaphragm
AN52.6	Congenital anomalies of foregut midgut hindgut
AN52.7	Urinary System Development
AN52.8	Reproductive system Development
53	**Osteology**
AN53.1	Bone – Identification, anatomical position, articulations & attachments
AN53.2	Bony pelvis
AN53.3	Bones of abdominopelvic region
AN53.4	Clinical importance of bones of abdominopelvic region
54	**Radio diagnosis**
AN54.1	KUB plain X Ray abdomen
AN54.2	(contrast X ray Barium swallow, Barium meal, Barium enema,) Cholecystography, intravenous pyelography & Hysterosalpingography
AN54.3	ERCP, CT abdomen, MRI Arteriography in radio diagnosis of abdomen
55	**Surface marking**
AN55.1	Surface projections of regions and planes of abdomen , superficial inguinal ring, deep inguinal ring, Mc Burney's point, renal angle & murphy's point
AN55.2	Surface marking of stomach, Liver, Fundus of gall bladder, Spleen, Duodenum, Pancreas, lleocaecal junction, Kidneys & Root of mesentery
56	**Meninges & CSF**

AN56.1	Various layers of meninges with its extent & modifications
AN56.2	Formation and circulation of CSF with its applied anatomy
57	**Spinal Cord**
AN57.1	External features of spinal cord
AN57.2	Extent of spinal cord in child & adult with its clinical implication
AN57.3	Transverse section of spinal cord at mid-cervical & midthoracic level
AN57.4	Ascending & descending tracts at mid thoracic level of spinal cord
AN57.5	Describe anatomical basis of syringomyelia
58	**Medulla Oblongata**
AN58.1	External features of medulla oblongata
AN58.2	Transverse section of medulla oblongata at the level of 1) pyramidal decussation 2) sensory decussation 3) ION
AN58.3	Cranial nerve nuclei in medulla oblongata with their functional group
AN58.4	Anatomical basis & effects of medial & lateral medullary Syndrome
59	**Pons**
AN59.1	External features of pons
AN59.2	Transverse section of pons at the upper and lower level
AN59.3	Cranial nerve nuclei in pons with their functional group
60	**Cerebellum**
AN60.1	External & internal features of cerebellum
AN60.2	Connections of cerebellar cortex and intracerebellar nuclei
AN60.3	Anatomical basis of cerebellar dysfunction

61	**Midbrain**
AN61.1	External & internal features of midbrain
AN61.2	Internal features of midbrain at the level of superior & inferior colliculus
AN61.3	Anatomical basis & effects of benedikt's and weber's syndrome
62	**Cranial nerve nuclei & cerebral hemispheres**
AN62.1	Cranial nerve nuclei with its functional component
AN62.2	Surfaces, sulci, gyri, poles & functional areas of cerebral hemisphere
AN62.3	White matter of cerebrum
AN62.4	Parts & major connections of basal ganglia & limbic lobe
AN62.5	Boundaries, parts, gross relation, major nuclei and connections of dorsal thalamus, hypothalamus, epithalamus, metathalamus and subthalamus
AN62.6	Formation, branches & major areas of distribution of circle of willis
63	**Ventricular System**
AN63.1	Parts, boundaries & features of 3^{rd}, 4^{th} & lateral ventricle
AN63.2	Describe anatomical basis of congenital hydrocephalus
64	**Histology & Embryology**
AN64.1	Micro anatomical features of spinal cord, cerebellum & cerebrum
AN64.2	Development of neural tube, spinal cord, medulla oblongata, pons, midbrain, cerebral hemisphere& cerebellum

AN64.3	Various types of open neural tube defects with its embryological basis
65	**Epithelium histology**
AN65.1	Types of epithelium under the microscope & describe the various types that correlate to its function
AN65.2	Ultrastructure of epithelium
66	**Connective tissue histology**
AN66.1	Various types of connective tissue with functional correlation
AN66.2	Ultrastructure of connective tissue
67	**Muscle histology**
AN67.1	Various types of muscle under the microscope
AN67.2	Classification of various types of muscle and describe the structure-function correlation of the same
AN67.3	Ultrastructure of muscular tissue
	Nervous tissue histology
AN68.1	Multipolar & unipolar neuron, ganglia, peripheral nerve
AN68.2	Structure-function correlation of neuron
AN68.3	Ultrastructure of nervous tissue
69	**Blood Vessels**
AN69.1	Elastic & muscular blood vessels, capillaries under the microscope
AN69.2	Various types and structure-function correlation of blood vessel
AN69.3	Describe the ultrastructure of blood vessels
70	**Glands & Lymphoid tissue**
AN70.1	Various exocrine gland under the microscope & distinguish between serous, mucous and mixed acini

AN70.2	Identify the lymphoid tissue under the microscope & describe microanatomy of lymph, node, spleen, thymus, tonsil and correlate the structure with function
71	**Bone & Cartilage**
AN71.1	Bones under the microscope classify various types & describe the structure – Function correlation of the same
AN71.2	Structure of cartilage under the microscope & describe various types and structure-function correlation of the same
	Integumentary system
AN72.3	Skin and its appendages under the microscope and correlate the structure with function
	Chromosomes
AN73.1	Structure of chromosomes with classification
AN73.2	Technique of karyotyping with its applications
AN73.3	Lyon's hypothesis
	Patterns of inheritance
AN74.1	Various modes of inheritance with examples
AN74.2	Pedigree charts for the various types of inheritance & give examples of diseases of each mode of inheritance
AN74.3	Multifactorial inheritance with examples
AN74.4	Genetic basis & clinical features of Achondroplasia, Cystic Fibrosis, Vitamin D resistant rickets, Haemophilia, Duchene's muscular dystrophy & sickle cell anaemia
75	**Principle of Genetics, Chromosomal Aberrations & Clinical Genetics**
AN75.1	Structural and numerical chromosomal aberrations
AN75.2	Mosaics and chimeras with example
AN75.3	Genetic basis & clinical features of prader willi syndrome, Edward syndrome & patau syndrome
AN75.4	Genetic basis of variation : polymorphism and mutation

AN75.5	Principles of genetic counselling
76	**Introduction to embryology**
AN76.1	Stages of human life
AN76.2	Phylogeny, ontogeny, trimester, viability
77	**Gametogenesis and fertilization**
AN77.1	Uterine changes occurring during the menstrual cycle
AN77.2	Synchrony between the ovarian and menstrual cycles
AN77.3	Spermatogenesis and oogenesis along with diagrams
AN77.4	Stages and consequences of fertilization
AN77.5	Anatomical principles underlying contraception
AN77.6	Teratogenic influences, Fertility & sterility, surrogate motherhood, social significance of “sex-ratio”.
78	**Second week of development**
AN78.1	Cleavage and formation of blastocyst
AN78.2	Development of trophoblast
AN78.3	Process of implantation & common abnormal sites of implantation
AN78.4	Formation of extra –embryonic mesoderm and coelom, bilaminar disc and prochordal plate
AN78.5	Abortion; deciducal reaction, pregnancy test
79	**3rd to 8th week of development**
AN79.1	Formation & fate of the primitive streak
AN79.2	Development of trophoblast , fate of Notochord
AN79.3	Process of neurulation

AN79.4	Describe the development of somites and intra-embryonic coelom
AN79.5	Embryological basis of congenital malformations, nucleus pulposus, sacrococcygeal teratomas, neural tube defects
AN79.6	Describe the diagnosis of pregnancy in first trimester and role of teratogens, alpha-fetoprotein
80	**Fetal membranes**
AN80.1	Formation , functions & fate of chorion; amnion; yolk sac; allantois & decidua
AN80.2	Formation & structure of umbilical cord
AN80.3	Formation of placenta, its physiological functions, foetomaternal circulation & placental barrier
AN80.4	Embryological basis of twinning in monozygotic & dizygotic twins
AN80.5	Role of placental hormones in uterine growth & parturition
AN80.6	Embryological basis of estimation of fetal age.
AN80.7	Various types of umbilical cord attachments
81	**Prenatal Diagnosis**
AN81.1	Various methods of prenatal diagnosis
AN81.2	Indications, process and disadvantages of amniocentesis
AN81.3	Indications, process and disadvantages of chorion villus biopsy
82	**Ethics in anatomy**
AN82.1	Respect and follow the corrected procedure when handling cadavers and other biologic tissue

Paper wise distribution of topics for Prelim & MUHS Annual Examination

Year: First MBBS Subject: Anatomy

Paper	Section	Topics
I	A	MCQs on all topics of the paper I
	B & C	Superior extremity
		General embryology
		Genetics
		Head , neck , face
		Central nervous system
		One short answer question on AETCOM module 1.1 & 1.5
		Scenario based / application questions can be on any topic of the paper I
		For long answer question and scenario based / application questions , region will not be repeated
II	A	MCQs on all topics of the paper II
	B & C	General Anatomy
		General histology
		Gross Anatomy of Abdomen and Pelvis
		Gross Anatomy of Inferior extremity
		Thorax
		Scenario based / application questions can be on any topic of the paper II
		For long answer question and scenario based / application questions , region will not be repeated

Internal Assessment

Anatomy

Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards

Sr. No	**I-Exam (December)**			**II-Exam (March)**		
	Theory	Practical (Including 05 Marks for Journal & Log Book)	Total Marks	Theory	Practical Including 05 Marks for Journal & Log Book	Total Marks
1	100	50	150	100	50	150

Sr. No	Preliminary Examinations			Sr. No	Remedial internal assessment examination for **Non - eligible** students		
	III-Exam **(July)**				**October**		
	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks		Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks
1	200	100	300	1	200	100	300

1. There will be 3 internal assessment examinations in the academic year. The structure of Preliminary examinations should be similar to the structure of University examination.
2. There will be only one additional examination for absent students (due to genuine reason) after approval by the Committee Constituted for the same. It should be taken after preliminary examination and before submission of internal assessment marks to the University.
3. First internal assessment examination will be held in December, second internal assessment examination will be held in March and third internal assessment examination will be held in July.
4. Internal assessment marks for theory and practical will be converted to out of 40. Internal assessment marks, after Conversion, should be submitted to university by 7th of August.
5. The student must secure at least 50% marks for total marks (combined in theory and practical / clinical: not less than 40% marks in theory and practical separately) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final university examination of that subject. Internal assessment marks will reflect as separate head of passing at the summative examination.
6. **Remedial internal assessment examination for Non - eligible students**: Student who were not eligible due to less than 50% combined or less than 40% in any theory or practical, will re appear as repeater student for Prelim exam which will be conducted before Supplementary Exam. His/her internal assessment will be calculated on the basis of this Examination marks only. Students who will not be eligible in this Examination will appear with regular batch as repeater student.
7. The internal assessment marks of the remedial examination alone shall be considered and converted into out of 40.
8. Conversion **Formula for calculation of marks in internal assessment examinations**

	First IA	Second IA	Third IA (Prelim)	Total	Internal assessment marks: Conversion formula (out of 40)	Eligibility to appear for final University examination (after conversion out of 40) (40% Separately in Theory and Practical, 50% Combined)	
Theory	100	100	200	400	$\frac{\text{Total marks obtained}}{10}$	16 (minimum)	Total of Theory + Practical Must be 40.
Practical	50	50	100	200	$\frac{\text{Total marks obtained}}{5}$	16 (minimum)	

9. Conversion formula for calculation of marks in Remedial internal assessment examination

	Remedial Exam (Prelim)	Int. Assess. marks conversion formula (out of 40)	Eligibility to appear for Supplementary Exam. (after conversion out of 40) (40% Separately in Theory and Practical, 50% Combined)	
Theory	200	$\frac{\text{Total marks obtained}}{5}$	16 (minimum)	Total of Theory + Practical Must be 40.
Practical	100	$\frac{\text{Total marks obtained}}{2.5}$	16 (minimum)	

While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table

Internal Assessment Marks	**Final rounded marks**
15.01 to 15.49	15
15.50 to 15.99	16

First Year MBBS Practical Mark's Structure Internal Assessment Examinations I & II (Applicable for batch admitted in M.B.B.S Course from Academic Year 2019-20 & onwards)

Anatomy Practical										
Seat No.	**Soft Part**	**Micro Anatomy (5 Spots)**	**Micro Anatomy slide for Discussion (1 slide)**	**Hard Part (Bones)**	**Embryology Models**	**Clinical Anatomy Including Genetics charts (2 spots)**	**Journal/ Logbook**	**Radiology**	**Living Anatomy**	**Practical Total**
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Max. Marks	**10**	**05**	**05**	**05**	**05**	**05**	**05**	**05**	**05**	**50**

First Year MBBS Practical Mark's Structure (Prelim)

Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards

Anatomy													
Practical									Oral/Viva				Total
Seat No.	Soft Part	Micro Anatomy (10 Spots)	Micro Anatomy slides for Discussion (2 slides)	Axial Skeleton	Embryology Models	Clinical Anatomy Including Genetic charts (2 Spots)	Journal /logbook	Total	Appendicular Skeleton	X - ray	Surface Living Anatomy	Total	PR/Oral Total
	A	B	C	D	E	F	G	H	I	J	K	L	M
Max. Marks	25	10	05	10	10	10	10	80	10	05	05	20	100

(Please Note - The above examination pattern will be applicable to the students admitted from Academic Year 2019-20 and onwards, which is informed to all Medical Colleges vide University letter No MUHS /X-1 /UG /1692 /2020 Date: 28/02/2020)

First Year MBBS Practical Mark's Structure (MUHS Exam)

Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards

Anatomy												
Practical								Oral/Viva				Total
Seat No.	Soft Part	Micro Anatomy (10 Spots)	Micro Anatomy slides for Discussion (2 slides)	Axial Skeleton	Embryology Models	Clinical Anatomy Including Genetic charts (2 Spots)	Total	Appendicular Skeleton	Radiology	Surface Living Anatomy	Total	PR/Oral Total
	A	B	C	D	E	F	G	H	I	J	K	L
Max. Marks	30	10	10	10	10	10	80	10	05	05	20	100

(Please Note - The above examination pattern will be applicable to the students admitted from Academic Year 2019-20 and onwards, which is informed to all Medical Colleges vide University letter No MUHS /X-1 /UG /1692 /2020 Date: 28/02/2020)

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**First MBBS** *(applicable w.e.f. Sept. 2020& onwards examinations)*						2. Subject Code	: ***Appendix - a***
3. Subject (PSP)	:	**Anatomy / Physiology / Biochemistry**							
(TT)	:								
4. Paper :	:	***I***	5. Total Marks	: **100**	6. Total Time	: **3 Hrs.**		7. Remu. (PS)	: **Rs. 300/-**
								8. Remu. (PM)	: **Rs. 350/-**
9. Web Pattern	: [ ]		10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]		12. Web Old QP	: [ ]

Instructions:

SECTION "A" MCQ

1) *Fill ● (dark) the appropriate empty circle below the question number once only.*
2) *Use **blue/black** ball point pen only.*
3) *Each Question carries **One mark.***
4) *A student will not be allotted any marks if he/she overwrites, strikes out or puts white ink on the circle once filled (darkened)*
5) *Do not write anything on the blank portion of the question paper if written anything, such type of act will be considered as an attempt to resort to unfair means.*

SECTION "A" MCQ (20 Marks)

Q1. Multiple Choice Questions (Total 20 MCQ of One mark each) ***(4 MCQ Should be clinical application based)*** (20x1=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answer book for all sections.*

SECTION "B" (80 Marks)

2. Brief answer questions (Any Ten out of Eleven) (10x 2= 20)

a) b) c) d) e) f) g) h) i) j) k)

3. Short Answer Questions (Any Eight out of Nine) (8x5= 40)

One SAQ has to be on AETCOM Module ***(For Anatomy 1.1, 1.5, For Physiology 1.2.,1.3&For Biochemistry, 1.4) &***
Minimum 2 SAQs should be Case Based Questions/ Clinically applied Questions.

a) b) c) d) e) f) g) h) i)

4. Long Answer Questions (Any Two out of Three) (2x 10= 20)

a) b) c)

Note: All questions should be structured .Wherever necessary; split up of marks should be specified.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	: **First MBBS** *(applicable w.e.f. Sept. 2020& onwards examinations)*					2. Subject Code	: ***Appendix - a***
3. Subject (PSP)	: **Anatomy / Physiology / Biochemistry**						
(TT)	:						
4. Paper :	: ***II***	5. Total Marks	: **100**	6. Total Time	: **3 Hrs.**	7. Remu. (PS)	: **Rs. 300/-**
						8. Remu. (PM)	: **Rs. 350/-**
9. Web Pattern	: [ ]	10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]	12. Web Old QP	: [ ]

Instructions:

SECTION "A" MCQ

1) *Fill ● (dark) the appropriate empty circle below the question number once only.*
2) *Use **blue/black** ball point pen only.*
3) *Each Question carries **One mark.***
4) *A student will not be allotted any marks if he/she overwrites, strikes out or puts white ink on the circle once filled (darkened)*
5) *Do not write anything on the blank portion of the question paper if written anything, such type of act will be considered as an attempt to resort to unfair means.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) ***(4 MCQ Should be clinical application based)*** (20x1=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answer book for all sections.*

SECTION "B" (80 Marks)

2. Brief answer questions (Any Ten out of Eleven) (10x 2= 20)

a) b) c) d) e) f) g) h) i) j) k)

3. Short Answer Questions (Any Eight out of Nine) (8x5= 40)

Minimum 2 SAQs should be Case Based Questions/ Clinically applied Questions.

4. a) b) c) d) e) f) g) h) i) (2x 10= 20)

Long Answer Questions (Any Two out of Three)

b) c)

Note: All questions should be structured .Wherever necessary, split up of marks should be specified.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

MARKLIST FOR PRACTICAL / ORAL / VIVA VOCE

(Summer / Winter – 20…Exam (MBBS UG Courses)

(Applicable for batch admitted in M.B.B.S Course from Academic Year 2019-20 & onwards)

Course : FIRST MBBS **Subject : Anatomy**

CENTRE : **Marks : (Practical = Practical/Clinical + Viva) Min. 50 Max. 100**

Date : / /20 **Batch :**

Practical								Oral/Viva				Total
Seat No.	Soft Part	Histology (Spotting)	2 slide for Discussion	Axial Skeleton	Embryo	Clinical Anatomy	Practical Total	Appendicular Skeleton	X-ray	Surface Living Anatomy	Oral/Viva Total	PR/Oral Total
	A	B	C	D	E	F	G	H	I	J	K	L
Max. Marks	30	10	10	10	10	10	**80**	10	05	05	**20**	**100**

Note : Both Examiners should jointly conduct practical examination for each student.

Verified above entries from Answerbooks and we hereby certify that the marks entered against each Seat Number are found correct.

	NAME OF EXAMINER	COLLEGE	SIGNATURE WITH DATE	
1			Convenor	
2			Internal	
3			External	
4			External	

RECOMMENDED BOOKS

1) Gray's Anatomy
2) Sahana's Human Anatomy
3) Chouraia's Human Anatomy 3 volumes
4) Cunningham's manual of Practical Anatomy
5) Regional Anatomy by R. J. Last
6) Human Histology by Inderbir Singh
7) Atlas of Human Histology- DIFORE
8) Surgical Anatomy- McGregor
9) Histolgoy- by ham,
10) Human Embryology – Inderbir Singh,
11) Medical Embryology – Langman,
12) Surface Anatomy & Radiology – Halim Das,
13) General Anatomy by – Chowrisia
14) Text book of Neuroanatomy – Inderbir Singh
15) Central Nervous System – Podar Bhagat
16) Clinical anatomy for medical students – Richard Snell
17) J.S.P. Lumbley at all – M.C.Q's in Anatomy
18) Text Book of General Anatomy – V. Subhadra Devi
19) Dissection Manual with Regions & Applied Anatomy, Lower Extremity Abdomen Pelvis and Perineum Vol 2 -1 Edition 2018 - Dr. Mercy Navis
20) Dissection Manual with Regions & Applied Anatomy, Head , Neck &Brain. Mercy Navis
21) Clinical Anatomy by-Neeta V Kulkarni.
22) Salubris Prep- Manual AETCOM- PRE CLINICAL- Jyoti Gaikwad & Varsha Navgire.

Course Content

Physiology **First M.B.B.S. (From August 2019)**

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 1; page no.91-118)

Teaching hours Lectures(hours)-160 Self directed learning (hours)-25

Small group teachings/tutorials/Integrated teaching/Practicals(hours)-310 Total(hours) -495 Early clinical exposure(hours)- 90 to be divided equally in all three subjects .

Competency No.	Topics & subtopics
1	**General Physiology**
PY. 1.1	Structure and Functions of a Mammalian Cell
PY. 1.2	Principles of Homeostasis
PY. 1.3	Intercellular communication
PY. 1.4	Apoptosis – Programmed cell death
PY. 1.5	Transport mechanisms across cell membranes
PY. 1.6	Fluid compartment of the body, its ionic composition & measurements
PY. 1.7	Concept of pH & Buffer systems in the body
PY. 1.8	Molecular basis of resting membrane potential and action potential in excitable tissue
PY. 1.9	Methods used to demonstrate the functions of the cells and its products, its communication and their applications in Clinical care and research.
2	**Topic: Hematology**
PY. 2.1	Composition & functions of blood components
PY. 2.2	Original, forms, variations and functions of plasma proteins
PY. 2.3	Synthesis and functions of Hemoglobin & explain its breakdown. Describe variants of hemoglobin

PY. 2.4	RBC formation (erythropoiesis & its regulation) and its functions
PY. 2.5	Types of anaemias & Jaundice
PY. 2.6	WBC formation (granulopoiesis) & its regulation
PY. 2.7	Formation of platelets, functions & variations
PY. 2.8	Physiological basis of hemostasis and anticoagulants. Describe bleeding & clotting disorders (Hemophilia, purpura)
PY. 2.9	Different blood groups and clinical importance of blood grouping, blood banking and transfusion
PY. 2.10	Types of immunity , development of immunity and its regulation
PY. 2.11	Estimation Hb, RBC, TLC, RBC indices, DLC, Blood group, BT/CT
PY. 2.12	Tests for ESR, Osmotic fragility, Hematocrit , findings and interpretion of test results etc.
PY. 2.13	Steps for reticulocyte and platelet count
3	**Nerve and Muscle Physiology**
PY. 3.1	Structure and functions of a neuron and neuroglia; Nerve Growth Factor & other growth factors/cytokines
PY. 3.2	Types, functions & properties of nerve fibers
PY. 3.3	Degeneration and regeneration in Peripheral nerves
PY. 3.4	Structure neuro-muscular junction and transmission of impulses
PY. 3.5	Action of neuro-muscular blocking agents
PY. 3.6	Pathophysiology of Myasthenia gravis
PY. 3.7	Types of muscle fibres and their structure
PY. 3.8	Action potential and its properties in different muscle types (skeletal & smooth)
PY. 3.9	Molecular basis of muscle contraction in skeletal and in smooth muscles

PY. 3.10	Mode of muscle contraction (isometric and isotonic)
PY. 3.11	Energy source and muscle metabolism
PY. 3.12	Gradation of muscular activity
PY. 3.13	Muscular dystrophy: myopathies
PY. 3.14	Ergography
PY. 3.15	Effect of mild, moderate and severe exercise and changes in cardiorespiratory parameters
PY. 3.16	Harvard Step test and impact on induced physiologic parameters in a simulated environment
PY. 3.17	Strength-duration curve
PY. 3.18	Computer assisted learning (i) amphibian nerve – muscle experiments (ii) amphibian cardiac experiments
4	**Gastro-intestinal Physiology**
PY. 4.1	Structure and functions of digestive system
PY. 4.2	Composition, mechanism of secretion, functions, and regulation of saliva, gastric, pancreatic, intestinal, juices and bile secretion
PY. 4.3	GIT movements, regulation and functions ,defecation reflex. Role of dietary fibre.
PY. 4.4	Physiology of digestion and absorption of nutrients
PY. 4.5	Source of GIT hormones, their regulation and functions
PY. 4.6	Gut-Brain Axis
PY. 4.7	Structure and functions of liver and gall bladder
PY. 4.8	Gastric function tests, pancreatic exocrine function test & liver function tests
PY. 4.9	Physiology aspects of; peptic ulcer, gastro- oesophageal reflux disease, vomiting, diarrhea , constipation, Adynamic ileus, Hirschsprung's disease
PY. 4.10	Clinical examination of the abdomen in a normal volunteer or simulated environment

5	**Cardiovascular Physiology (CVS)**
PY. 5.1	Functional anatomy of heart including chambers sounds; and Pacemaker tissue and conducing system.
PY. 5.2	Properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions
PY. 5.3	Events occurring during the cardiac cycle
PY. 5.4	Generation, conduction of cardiac impulse
PY. 5.5	Physiology of electrocardiogram (E.C.G.), its applications and the cardiac axis
PY. 5.6	Abnormal ECG, arrhythmias, heart block and myocardial infarction.
PY. 5.7	Haemodynamics of circulatory system
PY. 5.8	Local and systemic cardiovascular regulatory mechanisms
PY. 5.9	Factors affecting heart rate, regulation of cardiac output & blood pressure
PY. 5.10	Regional circulation including microcirculation, lymphatic, coronary, cerebral, capillary, Skin, foetal, pulmonary and splanchnic circulation
PY. 5.11	Patho-physiology of shock, syncope and heart failure
PY. 5.12	Blood pressure & pulse recording at rest and in different grades of exercise and postures in a volunteer or simulated environment
PY. 5.13	Record and interpret normal ECG in a volunteer or simulated environment
PY. 5.14	Cardiovascular autonomic function tests in a volunteer or simulated environment
PY. 5.15	Clinical examination of the cardiovascular system in a normal volunteer or simulated environment
PY. 5.16	Recording Arterial pulse tracing using finger plethysmography in a volunteer or simulated environment
6	**Respiratory Physiology**
PY. 6.1	Functional anatomy of respiratory tract

PY. 6.2	Mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities, alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs
PY. 6.3	Transport of respiratory gases: Oxygen and Carbon dioxide
	Regulation of respiration -- Neural & chemical
PY. 6.4	Physiology of high altitude deep sea diving
PY. 6.5	Principles of artificial respiration oxygen therapy, acclimatization and decompression sickness
PY. 6.6	Pathophysiology of dyspnea, hypoxia, cyanosis asphyxia; drowning, periodic breathing
PY. 6.7	Lung function tests & their clinical significance
PY. 6.8	Technique to perform & interpret Spirometry
PY. 6.9	Examination of the respiratory system in a normal volunteer or simulated environment
PY. 6.10	Technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment
7	**Renal Physiology**
PY. 7.1	Structure and function of kidney
PY. 7.2	Structure and functions of juxta glomerular apparatus and role of renin-angiotensin system
PY. 7.3	Mechanism of urine formation and processes involved
PY. 7.4	Significance & implication of Renal clearance
PY. 7.5	Renal regulation of fluid and electrolytes & acid-base balance
PY. 7.6	Innervations of urinary bladder, physiology of micturition and its abnormalities
PY. 7.7	Artificial kidney, dialysis and renal transplantation
PY. 7.8	Renal Function Tests
PY. 7.9	Cystometry and discuss the normal cystometrogram

8	**Endocrine Physiology**
PY. 8.1	Physiology of bone and calcium metabolism
PY. 8.2	Synthesis, secretion, transport, physiological actions, regulation and effects of altered (hypo and hyper) secretion of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and hypothalamus
PY. 8.3	Physiology of Thymus & Pineal Gland
PY. 8.4	Function tests: Thyroid gland; Adrenal cortex, Adrenal medulla and pancreas
PY. 8.5	Metabolic and endocrine consequences of obesity & metabolic syndrome, Stress response. Outline the psychiatry component pertaining to metabolic syndrome
PY. 8.6	Mechanism of action of steroid, protein and amine hormones
9	**Reproductive Physiology**
PY. 9.1	Sex determination; sex differentiation and their abnormalities and outline psychiatry and practical implementation of sex determination
PY. 9.2	Puberty: onset, progression, states; early and delayed puberty and outline adolescent clinical and psychological association
PY. 9.3	Male reproductive system: functions of testis and control of spermatogenesis & factors modifying it and outline its association with psychiatric illness
PY. 9.4	Female reproductive system: (a) functions of ovary and its control; (b) menstrual cycle – hormonal, uterine and ovarian changes
PY. 9.5	Physiological effects of sex hormones
PY. 9.6	Contraceptive methods for male and female. Discuss their advantages & disadvantages
PY. 9.7	Effects of removal of gonads on physiological functions
PY. 9.8	Physiology of pregnancy, parturition & lactation and outline the psychology and psychiatry-disorders associated with it

PY. 9.9	Interpret a normal semen analysis report including (a) sperm court, (b) sperm morphology and (c) sperm motility, as per WHO guidelines and discuss the result
PY. 9.10	Physiological basis of various pregnancy tests
PY. 9.11	Hormonal changes and their effects during perimenopause and menopause
PY. 9.12	Common causes of infertility in a couple and role of IVF in managing a case of infertility
10	**Neurophysiology**
PY. 10.1	Organization of nervous system
PY. 10.2	Functions and properties of synapse, reflex, receptors
PY. 10.3	Somatic sensations & sensory tracts
PY. 10.4	Motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium & vestibular apparatus
PY. 10.5	Structure and functions of reticular activating system, autonomic nervous system (ANS)
PY. 10.6	Spinal cord, its functions, lesion & sensory disturbances
PY. 10.7	Functions of cerebral cortex, basal ganglia thalamus, hypothalamus. Cerebellum and limbic system and their abnormalities
PY. 10.8	Behavioural and EEG characteristics during sleep and mechanism responsible for its production
PY. 10.9	Physiological basis of memory, learning and speech
PY. 10.10	Chemical transmission in the nervous system. (Outline the psychiatry element)
PY. 10.11	Clinical examination of the nervous system: Higher functions, sensory system, motor system, reflexes, cranial nerves in a normal volunteer or simulated environment
PY. 10.12	Normal EEG forms
PY. 10.13	Perception of smell and taste sensation

PY. 10.14	Patho-physiology of altered smell and taste sensation
PY. 10.15	Functional anatomy of ear and auditory pathways & physiology of hearing
PY. 10.16	Pathophysiology of deafness. Hearing tests
PY. 10.17	Functional anatomy of eye, physiology of image formation, physiology of vision including colour vision, refractive errors, colour blindness, physiology of pupil and light reflex
PY. 10.18	Physiological basis of lesion in visual pathway
PY. 10.19	Auditory & visual evoke potentials
PY. 10.20	(i) Testing of visual acuity, colour and field of vision and (ii) hearing (iii) Testing for smell and (iv) taste sensation in volunteer/ simulated environment
11	**Integrated Physiology**
PY. 11.1	Mechanism of temperature regulation
PY. 11.2	Adaptation to altered temperature (heat and cold)
PY. 11.3	Mechanism of fever, cold injuries and heat stroke
PY. 11.4	Cardio-respiratory and metabolic adjustment during exercise; physical training effects
PY. 11.5	Physiological consequences of sedentary lifestyle
PY. 11.6	Physiology of Infancy
PY. 11.7	Physiology of aging; free radicals and antioxidants
PY. 11.8	Cardio-respiratory changes in exercise (isometric and isotonic) with that in the resting state and under different environmental conditions (heat and cold)
PY. 11.9	Interpretation of growth charts
PY. 11.10	Interpretation of anthropometric assessment of infants
PY. 11.11	Concept, criteria for diagnosis of Brain death and its implications
PY. 11.12	Physiological effects of meditation

PY. 11.13	History taking and general examination in the volunteer / simulated environment
PY. 11.14	Basic Life Support in a simulated environment

Paper wise distribution of topics

Year: First MBBS Subject: Physiology

Paper	Section	Topics
I	A	MCQs on all topics of the paper I
	B & C	General Physiology
		Blood
		Respiratory System
		Cardio Vascular System,
		Cardio-respiratory and metabolic adjustment during exercise
		Renal system
		Gastro intestinal system
		Life style, aging, Meditation
		AETCOM module no. 1.2 & 1.3
		Scenario based / application questions can be on any topic of the paper I
		For long answer question and scenario based / application questions , topics will not be repeated
II	A	MCQs on all topics of the paper II
	B & C	Endocrine Physiology
		Reproductive System, Physiology of Infancy
		Special senses
		Central nervous system including brain death Temperature Regulation & applied
		Nerve muscle physiology
		Scenario based / application questions can be on any topic of the paper II
		For long answer question and scenario based / application questions , topics will not be repeated

Internal Assessment

Physiology

Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards

Sr. No	I-Exam (December)			II-Exam (March)		
	Theory	Practical (Including 05 Marks for Journal & Log Book)	Total Marks	Theory	Practical Including 05 Marks for Journal & Log Book	Total Marks
1	100	50	150	100	50	150

Sr. No	Preliminary Examinations			Sr. No	Remedial internal assessment examination for **Non - eligible** students		
	III-Exam **(July)**				**October**		
	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks		Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks
1	200	100	300	1	200	100	300

1. There will be 3 internal assessment examinations in the academic year. The structure of Preliminary examinations should be similar to the structure of University examination.

2. There will be only one additional examination for absent students (due to genuine reason) after approval by the Committee Constituted for the same. It should be taken after preliminary examination and before submission of internal assessment marks to the University.

3. First internal assessment examination will be held in December, second internal assessment examination will be held in March and third internal assessment examination will be held in July.

4. Internal assessment marks for theory and practical will be converted to out of 40. Internal assessment marks, after Conversion, should be submitted to university by 7th of August.

5. The student must secure at least 50% marks for total marks (combined in theory and practical / clinical: not less than 40% marks in theory and practical separately) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final university examination of that subject. Internal assessment marks will reflect as separate head of passing at the summative examination.

6. **Remedial internal assessment examination for Non - eligible students**: Student who were not eligible due to less than 50% combined or less than 40% in any theory or practical, will re appear as repeater student for Prelim exam which will be conducted before Supplementary Exam. His/her internal assessment will be calculated on the basis of this Examination marks only. Students who will not be eligible in this Examination will appear with regular batch as repeater student.

7. The internal assessment marks of the remedial examination alone shall be considered and converted into out of 40.

8. Conversion **Formula for calculation of marks in internal assessment examinations**

	First IA	Second IA	Third IA (Prelim)	Total	Internal assessment marks: Conversion formula (out of 40)	Eligibility to appear for final University examination (after conversion out of 40) (40% Separately in Theory and Practical, 50% Combined)	
Theory	100	100	200	400	$\frac{\text{Total marks obtained}}{10}$	16 (minimum)	Total of Theory + Practical Must be 40.
Practical	50	50	100	200	$\frac{\text{Total marks obtained}}{5}$	16 (minimum)	

9. Conversion formula for calculation of marks in Remedial internal assessment examination

	Remedial Exam (Prelim)	Int. Assess. marks conversion formula (out of 40)	Eligibility to appear for Supplementary Exam. (after conversion out of 40) (40% Separately in Theory and Practical, 50% Combined)	
Theory	200	$\frac{\text{Total marks obtained}}{5}$	16 (minimum)	Total of Theory + Practical Must be 40.
Practical	100	$\frac{\text{Total marks obtained}}{2.5}$	16 (minimum)	

While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table

Internal Assessment Marks	**Final rounded marks**
15.01 to 15.49	15
15.50 to 15.99	16

First Year MBBS Practical Mark's Structure Internal Assessment Examinations I & II (Applicable for batch admitted in M.B.B.S Course from Academic Year 2019-20 & onwards)

Physiology

	Hematology	Clinical Examination/Human Physiology expt. / Short exercises	Journal/ Logbook	Oral Viva	Total
	A	B	C	D	E
Max. Marks	15	20	5	10	50

First Year MBBS Physiology Practical Mark's Structure (Prelim exam)

(Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards)

Seat No.	Exercise 1				Exercise 2	Exercise 3 *	Exercise 4**		Practical (Total)	Oral/Viva (Total)	PR/Oral Total
	Clinical Examination										
	C.V.S	R.S	C.N.S. & Special Senses	General Exam & Abdomen	Hematology	Short exercise	Human Physiology Experiment	Journal & Log book			
	A	B	C	D	E	F	G	H	I	J	K
Max. Mark's	10.0	10.0	10.0	10.0	10.0	15.0	15.0	10.0	90	10.0	100

***Short exercises 3 marks each(3X5)**

1. Case based scenarios/ endocrine disorders photographs .2. Interpretation of function tests. 3. One skeletal graph

4. One cardiac graph 5. Calculation

**** Exercise 4: Human Physiology Experiment** 1. Basic Life Support in a simulated environment 2. ECG 3. Spirometry 4. PEFR 5. EEG Interpretation 6. Ergography 7. Harward step test 8. Perimetry

*** Suggested Methods of Assessment**

Preclinical exam & OSPE

(Please Note - The above examination pattern will be applicable to the students admitted from Academic Year 2019-20 and onwards, which is informed to all Medical Colleges vide University letter No MUHS /X-1 /UG /1692 /2020 Date: 28/02/2020)

First Year MBBS Physiology Practical Mark's Structure(MUHS)

(Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards)

	Exercise 1				Exercise 2	Exercise 3 *	Exercise 4**	Practical (Total)	Oral/Viva (Total)	PR/Oral Total
	Clinical Examination									
	C.V.S	R.S	C.N.S. & Special Senses	General Exam & Abdomen	Hematology	Short exercises	Human Physiology Experiment			
	A	B	C	D	E	F	G	H	I	J
Max. Mark's	10.0	10.0	10.0	10.0	10.0	15.0	15.0	80	20.0	100

***Short exercises 3 marks each(3X5)**

1. Case based scenarios/ endocrine disorders photographs .2. Interpretation of function tests. 3. One skeletal graph

4. One cardiac graph 5. Calculation

**** Exercise 4: Human Physiology Experiment** 1. Basic Life Support in a simulated environment 2. ECG 3. Spirometry 4. PEFR 5. EEG Interpretation 6. Ergography 7. Harward step test 8. Perimetry

*** Suggested Methods of Assessment**

Clinical exam & OSPE

(Please Note - The above examination pattern will be applicable to the students admitted from Academic Year 2019-20 and onwards, which is informed to all Medical Colleges vide University letter No MUHS /X-1 /UG /1692 /2020 Date: 28/02/2020)

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**First MBBS** *(applicable w.e.f. Sept. 2020& onwards examinations)*						2. Subject Code	:	***Appendix - a***	
3. Subject (PSP)	:	**Anatomy / Physiology / Biochemistry**									
(TT)	:										
4. Paper :	:	***I***	5. Total Marks	:	**100**	6. Total Time	:	**3 Hrs.**	7. Remu. (PS)	:	**Rs. 300/-**
									8. Remu. (PM)	:	**Rs. 350/-**
9. Web Pattern	:	[ ]	10. Web Skeleton	:	[ ]	11. Web Syllabus	:	[ ]	12. Web Old QP	:	[ ]

Instructions:

SECTION "A" MCQ

1) *Fill ⬬ (dark) the appropriate empty circle below the question number once only.*
2) *Use **blue/black** ball point pen only.*
3) *Each Question carries **One mark.***
4) *A student will not be allotted any marks if he/she overwrites, strikes out or puts white ink on the circle once filled (darkened)*
5) *Do not write anything on the blank portion of the question paper if written anything, such type of act will be considered as an attempt to resort to unfair means.*

SECTION "A" MCQ (20 Marks)

Q1. Multiple Choice Questions (Total 20 MCQ of One mark each) ***(4 MCQ Should be clinical application based)*** (20x1=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B" (80 Marks)

2. Brief answer questions (Any Ten out of Eleven) (10x 2= 20)

a) b) c) d) e) f) g) h) i) j) k)

3. Short Answer Questions (Any Eight out of Nine) (8x5= 40)

One SAQ has to be on AETCOM Module ***(For Anatomy 1.1, 1.5, For Physiology 1.2.,1.3&For Biochemistry, 1.4) &***
Minimum 2 SAQs should be Case Based Questions/ Clinically applied Questions.

a) b) c) d) e) f) g) h) i)

4. Long Answer Questions (Any Two out of Three) (2x 10= 20)

a) b) c)

Note: All questions should be structured .Wherever necessary; split up of marks should be specified.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**First MBBS** *(applicable w.e.f. Sept. 2020& onwards examinations)*							2. Subject Code	:	***Appendix - a***
3. Subject (PSP)	:	**Anatomy / Physiology / Biochemistry**									
(TT)	:										
4. Paper :	:	***II***	5. Total Marks	:	**100**	6. Total Time	:	**3 Hrs.**	7. Remu. (PS)	:	**Rs. 300/-**
									8. Remu. (PM)	:	**Rs. 350/-**
9. Web Pattern	: [ ]		10. Web Skeleton	: [ ]		11. Web Syllabus	: [ ]		12. Web Old QP	: [ ]	

Instructions:

SECTION "A" MCQ

1) *Fill ● (dark) the appropriate empty circle below the question number once only.*
2) *Use **blue/black** ball point pen only.*
3) *Each Question carries **One mark.***
4) *A student will not be allotted any marks if he/she overwrites, strikes out or puts white ink on the circle once filled (darkened)*
5) *Do not write anything on the blank portion of the question paper if written anything, such type of act will be considered as an attempt to resort to unfair means.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) ***(4 MCQ Should be clinical application based)*** (20x1=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answer book for all sections.*

SECTION "B" (80 Marks)

2. Brief answer questions (Any Ten out of Eleven) (10x 2= 20)

a) b) c) d) e) f) g) h) i) j) k)

3. Short Answer Questions (Any Eight out of Nine) (8x5= 40)

Minimum 2 SAQs should be Case Based Questions/ Clinically applied Questions.

4. a) b) c) d) e) f) g) h) i) (2x 10= 20)

Long Answer Questions (Any Two out of Three)

ı) b) c)

Note: All questions should be structured .Wherever necessary, split up of marks should be specified.

MARKLIST FOR PRACTICAL / ORAL / VIVA VOCE

(Summer / Winter – 20...Exam (MBBS UG Courses)

(Applicable for batch admitted in M.B.B.S Course from Academic Year 2019-20 & onwards)

Course : FIRST MBBS **Subject : Physiology**

CENTRE : **Marks : (Practical = Practical/Clinical + Viva) Min. 50 Max. 100**

Date : / /20 **Batch :**

Practical									Oral/Viva	Total
Seat No.	C.V.C	R.S	C.N.S. & Special senses	Abdomen	Exercise (2) Hematology	Exercise (3) Short Exercise	Human Physiology Experiment	Practical (Total)	Oral/Viva Total	PR/Oral Total
	A	B	C	D	E	F	G	H	I	J
Max. Marks	10	10	10	10	10	15	15	80	20	100

Note : Both Examiners should jointly conduct practical examination for each student.

Verified above entries from Answerbooks and we hereby certify that the marks entered against each Seat Number are found correct.

	NAME OF EXAMINER	COLLEGE	SIGNATURE WITH DATE	
1			Convener	
2			Internal	
3			External	
4			External	

Books recommended:

1) Textbooks of Physiology :

Guyton - Textbook of Physiology Ganong -
Review of Medical Physiology
S. Wright - Applied Physiology

2) Reference Books :

Best and Taylor - Physiological basis of medical practice
Berne & levy. - Principles of Physiology
Dr. V.G. Ranade - Laboratory Manual and Journal of Physiology Practicals
Ghai's VP Varshney, Mona Bedi- Textbook of Physiology -9 th Edition2019.
G.K. Pal-Comprehensive Text Book of Medical Physiology.
Dr.Amarnath B. Solepure - Fundamental Human Neurophysiology-First Edition 2018.

Course Content

(Based on Competency Table published by Medical Council of India.Students/Teachers are directed to refer competency table published on MCI Website for details)

Subject: Biochemistry **Year: First MBBS**

Competency No.	Topics & Subtopics
1 **1.1** Describe the molecular and functional organization of a cell and its subcellular components.	**Basic Biochemistry** Molecular and functional organization of cell and its subcellular components
2	**Enzymes**
2.1 Explain fundamental concepts of enzyme, isoenzyme, alloenzyme, coenzyme & co-factors. Enumerate the main classes of IUBMB nomenclature.	Biochemical nature of enzyme, isoenzyme, alloenzyme, coenzyme & co-factors IUBMB enzyme classification
2.2 Observe the estimation of SGOT & SGPT	Estimation of SGOT (AST)& SGPT (ALT) with its normal range and clinical significance.
2.3 Describe and explain the basic principles of enzyme activity	Mechanism of enzyme action, factors affecting enzyme activity, brief concept of enzyme kinetics with special reference to V_{max} & k_m.
2.4	Enzyme inhibition. Various inhibitors as drugs and poisons

Competency No.	Topics & Subtopics
Describe and discuss enzyme inhibitors as poisons and drugs and as therapeutic enzymes	
2.5 Describe and discuss the clinical utility of various serum enzymes as markers of pathological conditions.	Diagnostic and therapeutic importance of various serum enzymes in various disorders
2.6 Discuss use of enzymes in laboratory investigations (Enzymebased assays) **2.7** Interpret laboratory results of enzyme activities & describe the clinical utility of various enzymes as markers of pathological conditions.	Analytical uses of Enzymes in laboratory investigations (enzyme based assays) Interpret various serum enzymes of liver & biliary tract, Pancreas, cardiac & skeletal muscle in various disorders
3	**Chemistry & Metabolism of Carbohydrates**
3.1 Discuss and differentiate monosaccharides, di-saccharides and polysaccharides giving examples of main carbohydrates as energy fuel, structural element and storage in the human body	Classification of carbohydrates with examples and functions of monosaccharides giving examples as energy fuel, glycosides and its therapeutic importance, disaccharides with examples and importance, polysaccharides with examples as storage form like glycogen, structural elements like glycosaminoglycan's in the human body, resistant starch, glycemic index, and dietary fiber. Clinical importance of dextran's

3.2 Describe the processes involved in digestion and assimilation of carbohydrates and storage. **3.3**	Digestion & absorption, transport and storage of carbohydrates, Lactose intolerance and sucrase deficiency disorders

Competency No.	**Topics & Subtopics**
Describe and discuss the digestion and assimilation of carbohydrates from food.	
3.4 Define and differentiate the pathways of carbohydrate metabolism(glycolysis, gluconeogenesis, glycogen metabolism, HMP shunt).	Pathway, energetics, regulation & clinical diseases / disorders of - Glycolysis including Rappaport Leubering cycle, Gluconeogenesis, Glycogenesis, Glycogenolysis , HMP pathway , Uronic acid pathway, Galactose & Fructose metabolism
3.5 Describe and discuss the regulation, functions and integration of carbohydrate along with associated diseases/disorders.	
3.6 Describe and discuss the concept of TCA cycle as a amphibolic pathway and its regulation.	TCA cycle Pathway,energetics, regulation & its concepts as amphibolic pathway
3.7 To be clubbed with 3.4 & 3.6 Describe the common poisons that inhibit crucial enzymes of carbohydrate metabolism (eg: fluoride, arsenate)	Common poisons that inhibit crucial enzymes of carbohydrate metabolism like: Iodoacetate, fluoride & arsenite as poisons that inhibit enzymes of glycolysis Fluoroacetate, arsenite & malonate as poisons that inhibit enzymes of TCA cycle

3.8 & 3.10 **3.8:** Discuss and interpret laboratory results of analytes associated with metabolism of carbohydrates. (to be clubbed with comp no 11.17- Diabetes Mellitus) **3.10** Interpret the results of blood glucose levels and other Laboratory investigations related to disorders of carbohydrate metabolism.	Interpretation of the results of blood glucose, Glycated hemoglobin & GTT as per WHO guidelines in Diabetes mellitus including gestational diabetes and other laboratory investigation like urinary glucose, urinary ketone bodies. Interpretation of the results of blood & urinary galactose levels in galactosemia. Interpretation of blood G6PD levels

Competency No.	**Topics & Subtopics**
3.9 Discuss the mechanism and significance of blood glucose regulation in health and disease.	Regulation of blood glucose in fed and fasting state in normal health & changes in diabetes mellitus.
4	**Chemistry & Metabolism of Lipids**
4.1 Describe and discuss main classes of lipids (Essential/nonessential fatty acids, cholesterol and hormonal steroids, triglycerides, major phospholipids and sphingolipids) relevant to human system and their major functions.	Definition & classification of lipids including classification of fatty acids, their nomenclature, numbering, functions & biological importance of various lipids like fatty acids, cholesterol , hormonal steroids, triglycerides, major phospholipids and sphingolipids

4.2 Describe the processes involved in digestion and absorption of dietary lipids and also the key features of their metabolism	Digestion, absorption and transport of lipids along with abnormalities like lipid malabsorption. Metabolism of fatty acids (β-oxidation of even and odd carbon fatty acids), regulation, energetics and disorders associated with oxidation of fatty acids, Formation & fate of ketone bodies, its significance, regulation and associated disorders like ketosis. In brief de novo fatty acid biosynthesis- site & organs, precursors, enzyme complex, product formed & regulatory steps. Biosynthesis of triacylglycerol and fate of triacylglycerol formed in liver & adipose tissue, its significance and regulation, Metabolic role of adipose tissue and disorders of lipid transport and storage like fatty liver. In brief Cholesterol biosynthesis- site & organs, precursors, key enzymes, product formed & regulatory step, metabolic fate & excretion

Competency No.	**Topics & Subtopics**
4.3 Explain the regulation of lipoprotein metabolism & associated disorders.	Metabolism of various lipoproteins and hyperlipoproteinemia's, hypolipoproteinemiasabetalipoproteinemias & Tangiers disease.
4.4 Describe the structure and functions of lipoproteins, their functions, interrelations & relations with atherosclerosis	Classification structure and functions of lipoproteins- (To be clubbed with 4.1) Metabolic interrelationship between various lipoproteins, Role of lipoproteins in transport of cholesterol and reverse cholesterol transport, atherosclerosis- (To be clubbed with 4.3)

4.5 & 4.7 Interpret laboratory results of analytes associated with metabolism of lipids	Various lipid profile tests with their biological reference intervals. Interpret lipid profile results in various disorders like hyper/hypolipoproteinemias, diabetes mellitus, nephrotic syndrome, disorders of thyroid etc.
4.6 Describe the therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis.	Various eicosanoid classes (prostaglandins, leukotrienes & thromboxanes), their functions. Key features of synthesis of eicosanoids and inhibitors of eicosanoid synthesis, therapeutic uses of prostaglandins
4.7 Interpret laboratory results of analytes associated with metabolism of lipids.	**Same as 4.5**
5 **5.1** Describe and discuss structural organization of proteins.	**Chemistry and Metabolism of Proteins** General nature of amino acid, classification and importance of amino acids with examples, peptide bond formation, biologically important peptides, different levels of protein structure including disulfide & weak bonds with examples and clinical significance.

Competency No.	**Topics & Subtopics**
5.2 Describe and discuss functions of proteins and structurefunction relationships in relevant areas e.g. hemoglobin and selected hemoglobinopathies	Definition, various classifications with examples and functions of proteins, plasma proteins, structure - function relationship of proteins like myoglobin, normal & abnormal hemoglobin

5.3 Describe the digestion and absorption of dietary proteins.	Digestion, absorption and transport of dietary proteins with related disorders like Hartnup disease, cystinuria & glycinuria.
5.4 Describe common disorders associated with protein metabolism.	Role of transamination & deamination reactions in metabolism of amino acids in the formation of ammonia with their clinical significance. Transport of ammonia, pathway of urea cycle, its significance, regulation and metabolic disorders associated with urea cycle. Metabolic pathways for Glycine, Phenylalanine & Tyrosine, Sulphur containing amino acids (Methionine, Cysteine & Cystine) and branch chain amino acids (Valine, Isoleucine & Leucine), their role in biosynthesis of variety of specialized biomolecules, associated metabolic disorders For Tryptophan- Only important biomolecules formed & clinical significance.
5.5 Interpret laboratory results of analytesassociated with metabolism of proteins.	Interpret laboratory results of protein metabolism for example: Levels of various metabolites in blood or urine in metabolic disorders like- urea cycle disorders, Phenylketonuria, Tyrosinemia, Alkaptonuria, Hartnups disease, MSUD, cystinuria & homocystinuria
6	**Metabolism and Homeostasis**
6.1 Discuss the metabolic processes that take place in specific organs in the body in the fed and fasting states.	Integration of carbohydrate, protein and lipid metabolism at cellular and tissue or organ level with its significance, Metabolic processes with role of specific organs in fed, fasting and starvation states.

Competency No.	**Topics & Subtopics**

6.2 Describe and discuss the metabolic processes in which nucleotides are involved.	Important steps in de novo biosynthesis of purine and pyrimidine nucleotides and their regulation, enzymes of the nucleotide biosynthesis that are inhibited by anticancer drugs, salvage pathway for the synthesis of purine nucleotides with its significance, catabolism of purine and pyrimidine nucleotides.
6.3 Describe the common disorders associated with nucleotide metabolism. **6.4** Discuss the laboratory results of analytes associated with gout & Lesch-Nyhan syndrome.	Disorder of nucleotide metabolism like gout, Lesch-Nyhan syndrome, orotic aciduria, with diagnostic tests & biochemical mechanism of nutritional & drug therapy. Lab results of analytes related with gout & Lesch-Nyhan syndrome. Levels of uric acid in blood & urine and presence of urate crystals in synovial fluid in gout, levels of uric acid in blood
6.5 Describe the biochemical role of vitamins in the body and explain the manifestations of their deficiency	Sources, biochemical functions, daily requirement and deficiency manifestations of fat soluble vitamins (Vitamin A, D, E & K). Sources, biochemical functions and deficiency manifestations of water soluble vitamins (Thiamine, Riboflavin, Niacin, Pantothenic acid, Pyridoxine, Biotin, Folic acid, Cobalamin and vitamin C)
6.6 Describe the biochemical processes involved in generation of energy in cells.	Electron transport chain, mechanism of oxidative phosphorylation (chemiosmotic theory), substrate level phosphorylation, Uncouplers & Inhibitors of electron transport chain , shuttle systems for transport of extra-mitochondrial NADH
6.7 Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these.	Acids, bases and buffers, mechanism of action of buffer, dietary sources of acids, bases, normal pH of body fluids. Role of blood buffers, respiratory system & kidney in regulation of blood pH. Disorders associated with blood pH (acidosis and alkalosis) & their compensatory mechanisms, anion gap & its clinical importance.

Competency No.	Topics & Subtopics
	Total body water and its compartmental distribution, various electrolytes- sodium, potassium and chloride, their distribution and clinical conditions related to their plasma level alterations, maintenance of normal water and electrolyte balance and disorders associated with water and electrolyte imbalance.
6.8 Discuss and interpret results of Arterial Blood Gas (ABG) analysis in various disorders.	Interpretation of results of arterial blood gas (ABG) analysis in acidosis and alkalosis.
6.9 Describe the functions of various minerals in the body, their metabolism and homeostasis.	Dietary food sources, daily requirement, biochemical functions, metabolism and homeostasis of: Calcium, phosphorus & magnesium, trace elements (copper, fluoride, iodine, iron, manganese, selenium & zinc)
6.10 Enumerate and describe the disorders associated with mineral metabolism.	Clinical conditions related to plasma level alterations of: Calcium, phosphorus & magnesium Trace elements (copper, fluoride, iodine, iron, manganese, selenium & zinc)
6.11 Describe the functions of heme in the body and describe the processes involved in its metabolism and describe porphyrin metabolism	Structure and functions of hemoglobin, role of 2,3-bisphosphoglycerate (BPG) in oxygen binding and delivery, biosynthesis of heme (iron containing porphyrin), its regulation, functions in the body, disorders of heme biosynthesis (various types of porphyria's), catabolism of heme, various types of jaundice

6.12 Describe the major types of hemoglobin and its derivatives found in the body and their physiological/ pathological relevance.	Types of normal human hemoglobin, types of normal & abnormal derivatives of hemoglobin, various hemoglobinopathies: Sickle cell anemia, Thalassemia

Competency No.	**Topics & Subtopics**
6.13 Describe the functions of the kidney, liver, thyroid and adrenal glands.	1. Functions of liver, disorders& liver function tests 2. Functions of kidney, disorders& kidney function tests 3.Functions of Thyroid, disorders& thyroid function tests 4.Functions of Adrenals , disorders& Adrenal function tests
6.14 Describe the tests that are commonly done in clinical practice to assess the functions of these organs (kidney, liver, thyroid and adrenal glands).	
6.15 Describe the abnormalities of kidney, liver, thyroid and adrenal glands.	
7	**Molecular Biology**
7.1 Describe the structure and functions of DNA and RNA and outline the cell cycle	Structure and functions of nucleotides, biologically important nucleotides and their importance, major types of synthetic analogs of nucleotides (antimetabolites) and their clinical significance, structure and functions of DNA and RNA, Phases of cell cycle

7.2 Describe the processes involved in replication & repair of DNA and the transcription & translation mechanisms.	Replication of DNA in Eukaryotes, inhibitors of DNA replication and different types of repair systems of DNA Transcription in Eukaryotes and posttranscriptional modifications, inhibitors, reverse transcription & its significance Genetic code and wobble hypothesis, Translation in Eukaryotes, inhibitors, chaperons , protein folding and posttranslational modifications
7.3	Causes and types of genetic mutations with examples. Regulation of Eukaryotic gene expression

Competency No.	**Topics & Subtopics**
Describe gene mutations and basic mechanism of regulation of gene expression **7.4** Describe applications of molecular technologies like Recombinant DNA technology, PCR in the diagnosis and treatment of diseases with genetic basis.	Recombinant DNA technology, restriction endonucleases, process of construction of recombinant DNA and its applications in medicine, DNA library, blot transfer techniques- southern blotting, northern blotting & western blotting, mechanism of polymerase chain reaction and its application in medical diagnosis and treatment of genetic diseases.
7.5 Describe the role of xenobiotics in disease	Mechanisms of biotransformation of xenobiotics & associated diseases.
7.6 Describe the anti-oxidant defense systems in the body.	Enzymatic and non-enzymatic antioxidant defense systems in the body.

7.7 Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis.	Free radical, biological sources of reactive oxygen species (ROS) and oxidative damage, oxidative stress, roll of oxidative stress in cancer, diabetes mellitus & atherosclerosis.
8	**Nutrition**
8.1 Discuss the importance of various dietary components and explain importance of dietary fiber.	Importance of carbohydrates, lipids, proteins & vitamins, quality of proteins, various types of dietary fibers and their importance in the diet.
8.2 Describe the types and causes of protein energy malnutrition and its effects.	Protein energy malnutrition, Kwashiorkor and Marasmus their causes and effects.

Competency No.	**Topics & Subtopics**
8.3 Provide dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy.	Balanced diet in adult, in childhood and in pregnancy for optimal health, dietary advice in diabetes mellitus & coronary heart disease
8.4 Describe the causes (including dietary habits), effects and health risks associated with being overweight/ obesity	Causes, effects and health risk associated with overweight/ obesity

8.5 Summarize the nutritional importance of commonly used items of food including fruits and vegetables (macro-molecules & its importance)	Nutritional importance of commonly used items of food like cereals, pulses, eggs, meat, fish, fruits and vegetables and their normal dietary requirements.
9	**Extracellular Matrix**
9.1 List the functions and components of the extracellular matrix (ECM).	Types & functions of the extracellular matrix (ECM), Components and functions of proteoglycans, glycoproteins & major proteins of ECM
9.2 Discuss the involvement of ECM components in health and disease.	Disorders associated with components of ECM like Osteogenesis imperfecta, Marfan's Syndrome , Mucopolysaccharidoses, Scurvy & Menkes Disease
9.3 Describe protein targeting & sorting along with its associated disorders(It is non-core: N)	Types of protein targeting and sorting, disorders due to defects in mitochondrial targeting signals and defects in peroxisomal matrix protein import.
10	**Oncogenesis and Immunity**

Competency No.	**Topics & Subtopics**
10.1 Describe the cancer initiation, promotion oncogenes & oncogene activation. Also focus on p53 & apoptosis	Characteristics of cancer cell, molecular basis of cancer (carcinogenesis) ,various carcinogens and initiator, promoter of carcinogens, oncogenes and proto-oncogenes, tumor suppressor genes (retinoblastoma, RB and p53), mechanisms of apoptosis in physiologic and pathologic conditions .

10.2 Describe various biochemical tumor markers and the biochemical basis of cancer therapy.	Biochemical tumor markers, biochemical basis of chemotherapy, radiotherapy, hormonal therapy, targeted drug therapy and immunotherapy.
10.3 Describe the cellular and humoral components of the immune system & describe the types and structure of antibody	Cells of the Immune System, types of immune systems (Innate &adaptive), cellular and humoral components of innate and adaptive immune systems, B cell development and the formation of antibodies, types, structure and mechanism of action of antibodies (Immunoglobulins), primary and secondary response
10.4 Describe & discuss innate and adaptive immune responses, self/non-self-recognition and the central role of T-helper cells in immune responses	Innate and adaptive immune systems, immunological memory, T lymphocytes development, role of helper T cells (CD4+ T cells) and cytotoxic T cells/killer cells/CD8+ T cells in immune responses, Brief concept of MHC Disorders – Immunodeficiency, autoimmunity & hypersensitivity.
10.5 Describe antigens and concepts involved in vaccine development.	Antigens, concept involved in vaccine development and their types.
11	**Biochemical Laboratory Tests**
11.1 Describe commonly used laboratory apparatus and equipments, good safe laboratory practice and waste disposal.	Common lab equipments and apparatus like test tubes, pipettes & other glassware , auto pipettes, centrifuge, balances, oven, water bath good safe laboratory practice , management of needle stick injury & latest guidelines of disposal of biomedical waste

Competency No.	**Topics & Subtopics**

11.2 Describe the preparation of buffers and estimation of pH.	Preparation of buffer –acidic and alkaline. Measurement of pH paper and pH meter
11.3 Describe the chemical components of normal urine.	Chemical constituents of normal urine
11.4 & 11.20 **11.4:** Perform urine analysis to estimate and determine normal and abnormal constituents. **11.20:** Identify abnormal constituents in urine; interpret the findings and correlate these with pathological states.	Physical characteristics and organic constituents of urine. Collection of random & 24 hour urine sample Urine Report: Physical characteristics and abnormal constituents, urine dipsticks Interpretation of Urine Abnormalities
11.5 Describe screening of urine for inborn errors & describe the use of paper chromatography. Club Paper chromatography of amino acid & TLC from competency no 11.16	Urine: Screening of inborn errors. Paper chromatography for diagnosis of inborn errors
11.6 Describe the principles of colorimetry. (Club spectrophotometry from competency no **11.18**)	Colorimeter- Principle, Beer and Lambert's law & applications. Principles of spectrophotometry.
11.7,11.8, 11.21 & 11.22 **11.7-** Demonstrate the estimation of serum creatinine and creatinine clearance **11.8**- Demonstrate estimation of serum proteins, albumin and A:G ratio **11.21**- Demonstrate estimation of glucose, creatinine, urea and total protein in serum. **11.22**- Calculate albumin: globulin A:G ratio and creatinine clearance	Estimation of serum creatinine, urine creatinine and calculation of creatinine clearance and their clinical interpretation. Estimation of serum proteins, albumin and calculation of A/G ratio and their clinical interpretation. Estimation of plasma glucose, serum urea and their clinical interpretation.
11.9	Estimation of serum total cholesterol and HDL cholesterol, their ratio their clinical interpretation.

Competency No.	Topics & Subtopics
Demonstrate the estimation of serum total cholesterol and HDL cholesterol **11.10** Demonstrate the estimation of triglycerides	Estimation of serum triglycerides and their clinical interpretation.
11.11 Demonstrate estimation of calcium and phosphorous	Estimation of serum calcium and phosphorus their clinical interpretation.
11.12 Demonstrate the estimation of serum bilirubin	Estimation of serum bilirubin: Total, direct and indirect, their clinical interpretation.
11.13 & 2.2 **11.13-** Demonstrate the estimation of SGOT/ SGPT	Estimation of SGOT (AST)/ SGPT(ALT) and their clinical interpretation.
11.14 Demonstrate the estimation of alkaline phosphatase	Estimation of serum ALP and their clinical interpretation.
11.15 Describe & discuss the composition of CSF	Physical characteristics and chemical composition of CSF

11.16 & 11.19 **11.16-** Observe use of commonly used equipment's/techniques in biochemistry laboratory including: • pH meter • Paper chromatography of amino acid • Protein electrophoresis • TLC, PAGE • Electrolyte analysis by ISE • ABG analyzer • ELISA • Immunodiffusion • Autoanalyser • Quality control	Principle, application and working of following lab equipment's/techniques: pH meter, paper chromatography of amino acids, protein electrophoresis, TLC, PAGE, Electrolyte analysis by ISE, ABG analyzer, ELISA, immunodiffusion, auto analyzer, quality control, DNA isolation from blood/tissue (Paper chromatography of amino acid ,TLC clubbed with 11.5)

Competency No.	**Topics & Subtopics**
•DNA isolation from blood/ tissue **11.19** Outline the basic principles involved in the functioning of instruments commonly used in a biochemistry laboratory and their applications.	

11.17 Explain the basis and rationale of biochemical tests done in the following conditions: - diabetes mellitus, - dyslipidemia, - myocardial infarction, - renal failure, gout, - proteinuria, - nephrotic syndrome, - edema, - jaundice, - liver diseases, pancreatitis, disorders of acid- base balance, thyroid disorders.	Basis and rational of biochemical tests required in the following Conditions: - Diabetes mellitus-blood & urine glucose, microalbumin, ketone bodies and glycated hemoglobin – (Club with 3.8 & 3.10) - Dyslipidemia-lipid profile (Club with 4.5 & 4.7) - Myocardial infarction –CK, LDH, Troponin (Club with 2.6 & 2.7) - Renal failure & nephrotic syndrome, – BUN, Creatinine, urinary protein, cholesterol (Club with 3.8 & 3.10) - Gout- serum uric acid, synovial fluid analysis (Club with 6.3 & 6.4) - liver diseases & Jaundice- LFTs (Club with 6.1) Pancreatitis- serum amylase and lipase (Club with 2.5& 7 2.7) Disorder of acid base balance- ABG analysis for pH, pO_2, O_2 saturation pCO_2, HCO3 and base excess (BE) (Club with 6.7,6.8) - Thyroid disorder – serum free and total T3 & T4 and serum TSH (Club with 6.1)
11.18 Discuss the principles of spectrophotometry. **(Clubbed with 11.6)**	Spectrophotometer –principle & use
Competency No.	**Topics & Subtopics**

11.19 Outline the basic principles involved in the functioning of instruments commonly used in a Biochemistry laboratory and their applications. **(Clubbed with & 11.6 & 11.16)**	Instruments commonly used in Biochemistry laboratory & their applications.
11.20 Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states. **(Clubbed with 11.4)**	
11.21 Demonstrate estimation of glucose, creatinine, urea and total protein in serum. **(Clubbed with 11.7, 11.8)**	
11.22 Calculate albumin: globulin (A/G)ratio and creatinine clearance **(Clubbed with 11.7, 11.8)**	
11.23 Calculate energy content of different food Items, identify food items with high and low glycemic index and explain the importance of these in the diet.	Energy contents of lipids, carbohydrates & proteins in common food items.
11.24 Enumerate advantages and/or disadvantages of use of unsaturated, saturated and trans fats in food.	Advantages of unsaturated fats, disadvantages of saturated and trans fats in food

Paper wise distribution of topics

Year: First MBBS Subject: Biochemistry

Paper	Section	Topics	Competency nos. BI
I	A	MCQs on all topics of the paper I	
	B & C	Basic Biochemistry	1.1
		Enzymes	2.1-2.7
		Chemistry & metabolism of carbohydrates	3.1-3.10
		Chemistry & metabolism of lipids	4.1-4.7
		Biological oxidation	6.6
		Xenobiotics	7.5
		Antioxidants &defence system	7.6-7.7
		Nutrition	8.1-8.5
		Extracellular matrix	9.1-9.3
		Oncology , oncogenesis & immunity	10.1-10.5
		Biomedical waste	11.1
		Physical characteristics and chemical composition of CSF	11.15
		Energy contents of lipids, carbohydrates & proteins in common food items, Advantages of unsaturated fats. Disadvantages of saturated and trans fats in food	11.23 & 11.24
		AETCOM- 1.4	
	For long answer question and scenario based / application questions, topics will not be repeated.		
II	A	MCQs on all topics of the paper II	
	B & C	Chemistry & metabolism of proteins	5.1-5.5
		Integration & starvation	6.1
		Nucleic acid metabolism	6.2-6.4

	Organ function test	6.13-6.15
	Molecular biology	7.1-7.3
	Genetic engineering	7.4
	Urine: Screening of inborn errors.	11.5
	Principle, application and working of following lab equipments/techniques: pH meter, paper chromatography of amino acids, protein electrophoresis, TLC, PAGE, Electrolyte analysis by ISE, ABG analyzer, ELISA, immunodiffusion, auto analyzer, quality control, DNA isolation from blood/tissue	11.16
For long answer question and scenario based / application questions, topics will not be repeated.		

Internal Assessment

Biochemisry

Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards

S	I-Exam (December)			II-Exam (March)		
	Theory	Practical (Including 05 marks For Journals And Log Book)	Total Marks	Theory	Practical (Including 05 marks For Journals And Log Book)	Total Marks
1	100	50	150	100	50	150

	Preliminary Examinations				Remedial internal assessment examination for **Non - eligible** students		
	III-Exam **(July)**				**October**		
	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks		Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks
	200	100	300		200	100	300

1. There will be 3 internal assessment examinations in the academic year. The structure of Preliminary examinations should be similar to the structure of University examination.
2. There will be only one additional examination for absent students (due to genuine reason) after approval by the Committee Constituted for the same. It should be taken after preliminary examination and before submission of internal assessment marks to the University.
3. First internal assessment examination will be held in December, second internal assessment examination will be held in March and third internal assessment examination will be held in July.
4. Internal assessment marks for theory and practical will be converted to out of 40. Internal assessment marks, after Conversion, should be submitted to university by 7th of August.
5. The student must secure at least 50% marks for total marks (combined in theory and practical / clinical: not less than 40% marks in theory and practical separately) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final university examination of that subject. Internal assessment marks will reflect as separate head of passing at the summative examination.
6. **Remedial internal assessment examination for Non - eligible students**: Student who were not eligible due to less than 50% combined or less than 40% in any theory or practical, will re appear as repeater student for Prelim exam which will be conducted before Supplementary Exam. His/her internal assessment will be calculated on the basis of this Examination marks only. Students who will not be eligible in this Examination will appear with regular batch as repeater student.
7. The internal assessment marks of the remedial examination alone shall be considered and converted into out of 40.

8. Conversion **Formula for calculation of marks in internal assessment examinations**

	First IA	Second IA	Third IA (Prelim)	Total	Internal assessment marks: Conversion formula (out of 40)	Eligibility to appear for final University examination (after conversion out of 40) (40% Separately in Theory and Practical, 50% Combined)	
Theory	100	100	200	400	*Total marks obtained* / *10*	16 (minimum)	Total of Theory + Practical Must be 40.
Practical	50	50	100	200	*Total marks obtained* / *5*	16 (minimum)	

9. Conversion formula for calculation of marks in Remedial internal assessment examination

	Remedial Exam (Prelim)	Int. Assess. marks conversion formula (out of 40)	Eligibility to appear for Supplementary Exam. (after conversion out of 40) (40% Separately in Theory and Practical, 50% Combined)	
Theory	200	*Total marks obtained* / *5*	16 (minimum)	Total of Theory + Practical Must be 40.
Practical	100	*Total marks obtained* / *2.5*	16 (minimum)	

While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table

Internal Assessment Marks	**Final rounded marks**
15.01 to 15.49	15
15.50 to 15.99	16

First Year MBBS Practical Mark's Structure Internal Assessment Examinations I & II (Applicable for batch admitted in M.B.B.S Course from Academic Year 2019-20 & onwards)

Biochemistry						
Practical					Oral/Viva	Total
Seat No.	Quantitative Experiment	Quantitative Experiment/Urine organic/Urine Report/Quality Control/Interpolation of lab Report /Interpolation of Special Technique	Spots	Journal/ Logbook		
	A	B	C	D	E	F
Max. Marks	15	15	5	5	10	50

First Year MBBS Practical Marks Structure (Prelim)

(Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards)

Biochemistry

Seat No	Case Based Quantitative Estimation	Urine Report/ Quantitative estimation	Quality Control	Interpretation of lab Reports & special techniques (Minimum 2 Interpretation)	Spots	Journal & Logbook	Practical Total	Viva Voce/ Oral	Practical/Viva Total Marks
	A	B	C	D	E	F	G	H	I
Max. Marks	25	15	10	20	10	10	90	10	100

(Please Note - The above examination pattern will be applicable to the students admitted from Academic Year 2019-20 and onwards, which is informed to all Medical Colleges vide University letter No MUHS /X-1 /UG /1692 /2020 Date: 28/02/2020)

First Year MBBS Practical Marks Structure (MUHS Exam)

(Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards)

Biochemistry

Seat No	Case Based Quantitative Estimation	Urine Report/ Quantitative estimation	Quality Control	Interpretation of lab Reports & special techniques (Minimum 2 Interpretation)	Spots	Practical Total	Viva Voce/ Oral	Practical/Viva Total Marks
	A	B	C	D	E	F	G	H
Max. Marks	25	15	10	20	10	80	20	100

(Please Note - The above examination pattern will be applicable to the students admitted from Academic Year 2019-20 and onwards, which is informed to all Medical Colleges vide University letter No MUHS /X-1 /UG /1692 /2020 Date: 28/02/2020)

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**First MBBS** *(applicable w.e.f. Sept. 2020& onwards examinations)*				2. Subject Code	: ***Appendix - a***
3. Subject (PSP)	:	**Anatomy / Physiology / Biochemistry**					
(TT)	:						
4. Paper :	: ***I***	5. Total Marks	: **100**	6. Total Time	: **3 Hrs.**	7. Remu. (PS)	: **Rs. 300/-**
						8. Remu. (PM)	: **Rs. 350/-**
9. Web Pattern	: [ ]	10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]	12. Web Old QP	: [ ]

Instructions:

SECTION "A" MCQ

1) *Fill ● (dark) the appropriate empty circle below the question number once only.*
2) *Use **blue/black** ball point pen only.*
3) *Each Question carries **One mark.***
4) *A student will not be allotted any marks if he/she overwrites, strikes out or puts white ink on the circle once filled (darkened)*
5) *Do not write anything on the blank portion of the question paper if written anything, such type of act will be considered as an attempt to resort to unfair means.*

SECTION "A" MCQ (20 Marks)

Q1. Multiple Choice Questions (Total 20 MCQ of One mark each) ***(4 MCQ Should be clinical application based)*** (20x1=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions: 1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B" (80 Marks)

2. Brief answer questions (Any Ten out of Eleven) (10x 2= 20)

a) b) c) d) e) f) g) h) i) j) k)

3. Short Answer Questions (Any Eight out of Nine) (8x5= 40)

One SAQ has to be on AETCOM Module ***(For Anatomy 1.1, 1.5, For Physiology 1.2.,1.3&For Biochemistry, 1.4) &*** Minimum 2 SAQs should be Case Based Questions/ Clinically applied Questions.

a) b) c) d) e) f) g) h) i)

4. Long Answer Questions (Any Two out of Three) (2x 10= 20)

a) b) c)

Note: All questions should be structured .Wherever necessary; split up of marks should be specified.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1.	Course and Year	:	**First MBBS** *(applicable w.e.f. Sept. 2020& onwards examinations)*					2. Subject Code	: ***Appendix - a***
3.	Subject (PSP)	:	**Anatomy / Physiology / Biochemistry**						
	(TT)	:							
4.	Paper :	:	***II***	5. Total Marks	: **100**	6. Total Time	: **3 Hrs.**	7. Remu. (PS)	: **Rs. 300/-**
								8. Remu. (PM)	: **Rs. 350/-**
9.	Web Pattern	: [ ]		10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]	12. Web Old QP	: [ ]

Instructions:

SECTION "A" MCQ

1) *Fill ● (dark) the appropriate empty circle below the question number once only.*
2) *Use **blue/black** ball point pen only.*
3) *Each Question carries **One mark.***
4) *A student will not be allotted any marks if he/she overwrites, strikes out or puts white ink on the circle once filled (darkened)*
5) *Do not write anything on the blank portion of the question paper if written anything, such type of act will be considered as an attempt to resort to unfair means.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) ***(4 MCQ Should be clinical application based)*** (20x1=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions: 1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answer book for all sections.*

SECTION "B" (80 Marks)

2. Brief answer questions (Any Ten out of Eleven) (10x 2= 20)

a) b) c) d) e) f) g) h) i) j) k)

3. Short Answer Questions (Any Eight out of Nine) (8x5= 40)

Minimum 2 SAQs should be Case Based Questions/ Clinically applied Questions.

4. a) b) c) d) e) f) g) h) i) (2x 10= 20)

Long Answer Questions (Any Two out of Three)

a) b) c)

Note: All questions should be structured .Wherever necessary, split up of marks should be specified.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

MARKLIST FOR PRACTICAL / ORAL / VIVA VOCE

(Summer / Winter – 20...Exam (MBBS UG Courses)

(Applicable for batch admitted in M.B.B.S Course from Academic Year 2019-20 & onwards)

Course : FIRST MBBS **Subject : Biochemistry**

CENTRE : **Marks : (Practical = Practical/Clinical + Viva) Min. 50 Max. 100**

Date : / /20 **Batch :**

Practical							Oral/Viva	Total
Seat No.	Case Based Quantitative Estimation	Urine Report/ Quantitative estimation	Quality Control	Interpretation of lab Report & special techniques (Minimum 2 interpretations)	Spots	Practical (Total)	Viva Voce/Oral Total	Practical/Viva Total Marks
	A	B	C	D	E	F	G	H
Max. Marks	25	15	10	20	10	80	20	100

Note : Both Examiners should jointly conduct practical examination for each student.

Verified above entries from Answerbooks and we hereby certify that the marks entered against each Seat Number are found correct.

NAME OF EXAMINER		COLLEGE	SIGNATURE WITH DATE	
1			Convenor	
2			Internal	
3			External	
4			External	

Biochemistry

BOOKS RECOMMENDED:

TEXT BOOKS:

1. Biochemistry by -Pankaja Naik
2. Biochemistry for Medical students by -D.M.Vasudevan & Shree Kumari S.
3. Medical Biochemistry - U.Satyanarayan.

REFERENCE BOOKS:

1. Integrated textbook of Biochemistry by- Indumati V and Sowbhagya Lakshmi.
2. Harper's Biochemistry.
3. Medical Biochemistry by -N.V.Bhagwan.
4. Biochemistry by- L.Stryer.

Course Content

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 2 ; page no.41-59)

Applicable for batch admitted in M.B.B.S Course from Academic Year 2019-20 & onwards

Subject: Community Medicine **Year: First MBBS**

Competency No. CM	Topics & subtopics
	Health care of the communtiy
17.1	Health care to community
	Visit to primary/secondary health facility
	Role of physician in health care delivery- Integration with AETCOM module 1.1 What does it mean to be doctor?
17.2	Community diagnosis
17.3	Primary Health Care- Def, Principles
17.4	National Health Policies , MDGs
	SDL- Current national / stale level status of health indicators
17.5	Health Care delivery in India
	Nutrition
5.1	Common sources of various nutrients

	Demonstration: Foods we eat & their nutritive values
	Special nutritional requirements according to age, sex, activity, physiological conditions
	SDL- Foods customs in our families for special groups such as children/ pregnant/lactating women/ill persons (data collection by interviewing 5 homemakers)
5.2	Nutritional assessment at individual level- DOAP
	Nutritional assessment at family and community level -DOAP
5.3	Common nutritional deficiency diseases- Epidemiology , prevention and control
5.4	Diet planning at individual level
	Diet planning at family level
5.5	Nutritional surveillance and rehabilitation
	Visit to Nutritional rehabilitation centre
	Nutrition education
5.6	National Nutritional Policy , National Nutritional Programs
5.7	Food hygiene , food adulteration
	Demonstration of simple tests to identify food adulteration
5.8	Food fortification , food additives
	Concept of Health and Disease
1.1	Concept of Public Health
1.2	Concept , definition , determinants of health
	Determinants of health- Group discussion
1.3	Epidemiological triad , multifactorial causation of disease
	SDL-Identification of multiple causative factors of 2 common diseases(interview in wards/ family visit)

1.4	Natural history of disease
1.5	Levels of Prevention
1.6	Health education , IEC, BCC
1.7	Indicators of health
	Exercise on calculation of indicators
1.8	Demographic profile of India
	Exercise on calculation of demographic indicators , fertility rates
	SDL- Demographic trends in India
1.9	Communication skills in Health
	DOAP-Verbal/non verbal communication
	Empathy- What does it mean to be patient? AETCOM module 1.2
1.10	Doctor patient relationship
	SDL- Determinants of doctor patient relationship(Collection of data from patients/ relatives)
	Case discussions – Integration with AETCOM module 1.3
	Principles of health promotion and education
4.1	Methods of health education
	Demonstration of various methods of health education
	Improving communication, barriers in communication- integration with AETCOM module 1.4
4.2	Organization of health educational and counselling activities for individual & family
	Organization of counselling activity in ward/OPDs
	Organization of community based health educational activity(community/school)

4.3	Evaluation of health education & promotion program
	SDL- Preparation of tool for evaluation
	Conducting evaluation of health education & promotion program

Note:

1. **The observations/ reflections of family / hospital visits , DOAP sessions , Self directed learning activities (SDL) , practicals should be entered in the log book immediately after the assignment.**
2. **The observer / facilitator / teacher will provide the written brief feedback in the log book for the learner related to the competencies.**

Course Content
Second Professional (from October 2020)
Subject: Community Medicine Theory / Practical

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 2; page nos. 41-59)

1. Total Teaching hours :60
2. **A**. Lectures(hours): 20 **B**. Self-directed learning (hours) :10

C. Clinical Postings (hours): 4 weeks (20 working days x 3)- 60 hours

D. Small group teachings/tutorials/Integrated teaching/Practicals (hours)**:** 30

Competency Nos.	**Topics Subtopics**
	Environmental Health Problems
CM3.1	Indicators of air pollution. Health hazards of air, water, noise, radiation and pollution. Prevention and control of environmental pollution.
CM3.2	Safe and wholesome water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting
CM3.3	Epidemilogy , prevention and control of water borne diseases /jaundice/hepatitis/ diarrheal diseases
CM3.4	Solid waste, human excreta , sullage and sewage disposal
CM3.5	Standards of housing and the effect of housing on health
CM3.6	Role of vectors in the causation of diseases. National Vector Borne Disease Control Program
CM3.7	Identifying features and life cycles of vectors of Public Health importance and their control measures
CM3.8	Mode of action, application cycle of commonly used insecticides and rodenticides
	Epidemiology of communicable diseases
CM 7.2	Modes of transmission and measures for prevention and control of communicable
CM8.1	**Epidemiological and control measures including the use of essential laboratory tests at the primary care level for communicable diseases**
	Epidemiological characteristics and control measures including the use of essential laboratory tests at the primary care level for Airborne infections &Exanthematous fevers e.g TB, Influenza, ARI, Measles,Mumps,Diptheria,Pertusis.
	Epidemiological characteristics and control measures including the use of essential laboratory tests at the primary care level for Faeco-oral diseases, Infective hepatitis e.g polio, AGE, Typhoid etc.
	Epidemiological characteristics and control measures including the use of essential laboratory tests at the

Competency Nos.	Topics Subtopics
	primary care level for zoonotic diseases e.g Rabies, Plague, Brucellosis, Leptospirosis etc
	Epidemiological characteristics and control measures including the use of essential laboratory tests at the primary care level for Arthropod borne diseases eg Malaria, Chikungunya, Filaria, JE etc
	Epidemiological characteristics and control measures including the use of essential laboratory tests at the primary care level for Surface infections and STDs eg HIV, Syphilis, Gonorrhea etc
	Epidemiological characteristics and control measures including the use of essential laboratory tests at the primary care level for Emerging and reemerging diseases eg Ebola virus disease, Nipah
CM8.2	Epidemiological characteristics and control measures including the use of essential laboratory tests at the primary care level for Non Communicable diseases (diabetes, Hypertension, Stroke, obesity and cancer etc.)
CM8.3	Disease specific National Health Programs including their prevention and treatment of a case
CM8.4	Principles and measures to control a disease epidemic
CM 7.7	Steps in the Investigation of an epidemic of communicable disease and the principles of control measures
CM8.5	Principles of planning, implementing and evaluating control measures for disease at community level bearing in mind the public health importance of the disease
CM8.6	Training of health workers in disease surveillance, control & treatment and health education
	Disaster Management
CM13.1	Concept of Disaster management
CM13.2	Disaster management cycle
CM13.3	Man made disasters in the world and in India
CM13.4	National Disaster management Authority
	Hospital waste management
CM14.1	Hospital waste- definition and classification
CM14.3	Laws related to hospital waste management
	Essential Medicine
CM19.1	Essential Medicine List (EML)
CM19.2	Essential medicine in primary health care
CM19.3	Counterfeit medicine and its prevention

Competency Nos.	Topics Subtopics
	Relationship of social and behavioural to health and disease
CM2.1	Clinico socio-cultural and demographic assessment of the individual, family and community
CM2.2	Socio-cultural factors, family (types), its role in health and disease & assessment of socio-economic status
CM2.3	Factors affecting health seeking behaviour and assessment of barriers for the same.
CM2.4	Social psychology, community behaviour and community relationship and their impact on health and disease
CM2.5	Indicators for assessment of poverty , social security measures and its relationship to health and d isease

Second Professional - Community Medicine : Proposed List of Practicals / DOAP/ SDL Activities

Competency no.	Practical / DOAP
CM3.2	Visit to water purification plant
	Visit to Dist Public Health Laboratory
	Exercise on interpretation of water analysis report
	DOAP- water collection , estimation of chlorine demand/ residual chlorine content of drinking water , OT test
CM 3.2-3.4SDL	Preparation of Proforma/ checklist for sanitary survey of the community
3.4	Visit to sewage purification plant
3.6	Visit to office of Dist Vector borne Diseases Control Program
3.7	Demonstration: Identifying characteristics of vectors of Public Health Importance – DOAP
SDL	Preparation of Proforma/ checklist for entomological survey of the community
8.1	Visits to the Dist Offices/ Units/ clinics related to implementation of Disease Control Measures of Communicable Diseases

8.1	Visit to Public Health Microbiology / Reference laboratories
8.1	DOAP- Methods of Specimen collection and transportation of various body specimens in various communicable diseases
CM 7.7	Describe and demonstrate the steps in the Investigation of an epidemic of communicable disease and describe the principles of control measures
8.4	DOAP- Analysis & interpretation of disease outbreak data
8.4	DOAP- Preparation of epidemic curve / spot map with the help of given data and its interpretation
8.6	Visit to Dist Training Centre / Dist Disease Surveillance Unit
13.2	DOAP- Preparation of Disaster Preparedness Plan for a Primary Health Centre
13.4	Visit to Civil Defence Dept / Dist Disaster Management Office
14.1 SDL	Conducting Survey of Hospital Wastes Segregation Practices
14.1	DOAP- Hospital waste segregation of various types of hospital wastes
19.2	Visit to hospital pharmacy

Second Professional - Proposed Activities in First Clinical Community Medicine Posting (4 weeks)

Week	Proposed Activities
First and second week	a. Clinico socio-cultural and demographic assessment of the individuals and allotted families, b. Sanitary survey of the allotted households c. Assessment of housing conditions in allotted families d. Entomological survey of the allotted households e. Analysis of survey findings of the allotted families and group discussion on important health related issues in the community. f. Organization of health educational activity for the allotted families and allotted community.
Third and fourth week	Epidemiological history taking of common communicable diseases admitted in hospital such as diarrhoeal diseases , jaundice , typhoid , food poisoning , measles , mumps , influenza, diphtheria , pertussis , tuberculosis, malaria, filarial , dengue fever , HIV / AIDS, STDs etc

Note:

1. **The observations/ reflections of family / hospital / community visits, DOAP sessions, Self directed learning activities (SDL), practicals should be entered in the log book immediately after the assignment.**
2. **The observer / facilitator / teacher will provide the written brief feedback in the log book for the learner related to the competencies.**

Course Content

Third Professional Part I (from October 2020)

Subject :Community Medicine Theory / Practical

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 2 ; page nos. 41-59)

1. Total Teaching hours : 105
2. **A**. Lectures(hours): 40 **B.** Self directed learning (hours) :5

C. Clinical Postings(hours): 6 weeks(30 working days x 3)- 90 hours

D. Small group teachings/tutorials/Integrated teaching/Practicals(hours)**:** 60

Competency Nos.	**Topics & Subtopics**
	Epidemiology
CM 7.1	Epidemiology- definition , principles, concepts and uses
CM 7.3	Sources of epidemiological data
CM 7.4	Morbidity and mortality indicators
CM 7.5	Epidemiological study designs
CM 7.6	Screening
CM 7.8	Principles of association, causation and biases in epidemiological studies
CM 7.9	Application of computers in epidemiology
	Basic statistics and its applications
CM6.1	Concepts of research problem ,Research question , research hypothesis for a study
CM6.2 **SGT**	Methods of collection, classification, analysis, interpretation and presentation of statistical data
CM6.3	Application of elementary statistical methods including test of significance in various study designs
CM6.4	Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion

Competency Nos.	Topics & Subtopics
	Epidemiology of non- communicable diseases
CM8.2	Epidemiological and control measures including the use of essential laboratory tests at the primary care level for Non Communicable diseases (diabetes, Hypertension, Stroke, obesity and cancer etc.)
CM8.3	National Health Programs
CM8.5	Principles of planning, implementing and evaluating control measures for disease at community level bearing in mind the public health importance of the disease
CM8.6	Education and training of health workers in disease surveillance, control & treatment and health education
CM8.7	Principles of management of information systems
	Demography and vital statistics
CM9.1	Principles of Demography, Demographic cycle, Vital statistics
CM9.2	Demographic indices including birth rate, death rate, fertility rates
CM9.3	Causes of declining sex ratio and its social and health implications
CM9.4	Causes and consequences of population explosion and population dynamics of India.
CM9.5	Methods of population control
CM9.6	National Population Policy
CM9.7	Sources of vital statistics including census, SRS, NFHS, NSSO etc
	Reproductive maternal and child health
CM10.1	Current status of Reproductive, maternal, newborn and Child Health
CM10.2	Methods of screening high risk groups and common health problems
	Population Genetics: Screening and counselling for genetic conditions
CM10.3	Local customs and practices during pregnancy, childbirth, lactation and child feeding practices
CM10.4	Reproductive, maternal, newborn & child health (RMCH); child survival and safe motherhood interventions

Competency Nos.	Topics & Subtopics
CM10.5	Universal Immunization Program; Integrated Management of Neonatal and Childhood Illness (IMNCI) and other existing Programs.
CM10.6	Family planning methods, their advantages and shortcomings
CM10.7	Basis and principles of the Family Welfare Program including the organization, technical and operational aspects
CM10.8	Physiology, clinical management and principles of adolescent health including ARSH
CM10.9	Gender issues and women empowerment
	Occupational Health
CM11.1	Occupational illnesses including diseases in agricultural workers.
CM11.2	Role, benefits and functioning of the employees state insurance scheme
CM11.3	Specific occupational health hazards, their risk factors and preventive measures Prevention & control of occupational diseases : Medical, Engineering and other legislative measures
CM11.4	Principles of ergonomics in health preservation
CM11.5	Occupational disorders of health professionals and their prevention & management and interpretation and interpretation
	Geriatric services
CM12.1	Concept of Geriatric services
CM12.2	Health problems of aged population
CM12.3	Prevention of health problems of aged population
CM12.4	Describe National program for elderly
	Mental Health
CM15.1	Concept of mental Health
CM15.1	Warning signals of mental health disorder
CM15.1	National Mental Health program
	Health planning and management
CM16.1	Concept of Health planning
CM16.2	Planning cycle
CM16.3	Health management techniques
CM16.4	Health planning in India and National policies related to health and health planning

Competency Nos.	Topics & Subtopics
	International Health
CM18.1	Concept of International health
CM18.2	Roles of various international health agencies
	Recent advances in Community Medicine
CM20.1	Important public health events of last five years
CM20.2	Various issues during outbreaks and their prevention
CM20.3	Describe any event important to Health of the Community
CM20.4	Laws pertaining to practice of medicine such as Clinical establishment Act and Human Organ Transplantation Act and its implications

Third Professional Part I - Community Medicine: List of Practicals / DOAP/ SDL Activities

Competency no.	Practicals / DOAP / SDL Activities
CM 7.4	Exercises on calculation of morbidity and mortality indicators based on given set of data and their interpretation
CM6.1	Demonstration and exercises on Formulation of a research problem , research question & research hypothesis for a study
CM 7.5	Exercise on developing appropriate epidemiological study design and method for a given public health problem.
CM 7.9	Demonstration and hands on training of application of computers in epidemiology. Demonstration and hands on exercises of application of MS- Excel , Epi Info etc.
CM6.2	Demonstration and exercises on the methods of data collection, classification, analysis, interpretation and presentation of statistical data
CM6.3	Demonstration and exercises on the application of elementary statistical methods including test of significance in various study designs and interpretation of statistical tests.
CM6.4	Demonstration and exercises on Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion
CM9.2	Calculation and interpretation of demographic indices including birth rate, death rate, fertility rates
CM9.2 SDL	A small scale survey of local customs and practices during pregnancy, childbirth, lactation and child feeding practices
CM 11.3	Visit to Industry- Assessment of occupational environment and preventive measures Exercise on occupational history taking
CM20.3 SDL	Describe any event important to Health of the Community

Third Professional Part I - Proposed Activities in Second Clinical Community Medicine Posting (6 weeks)

Duration(weeks)	Proposed Activities
Two weeks (Posting in Urban Health Centre / ANC/ FW clinic/ Obstetric wards)	**Preventive and Community Obstetrics (including Family Welfare)** a. Clinico social assessment of antenatal , postnatal cases b. Assessment of high risk mothers c. Neonatal assessment d. Assessment of eligible couples for family welfare services and health education e. Organization of community based maternal health services and health educational activity for mothers.
Two weeks (Posting in Urban Health Centre / Under five clinic / Immunization clinic / Paediatric wards)	**Preventive and Community Paediatrics . Adolescent Health Care** a. Health and Nutritional assessment of underfive child b. Clinico social case reviews of Nutritional Deficiency Diseases in children and childhood malnutrition c. Clinico social case reviews of common childhood infections such as ARI , fever with rash , acute GE , malarial fever etc d. Childhood immunization , organization of immunization session , assessment of cold chain etc e. School health examination , assessment of school environment , organization of health educational activity for school children
Two weeks (Posting in Urban Health Centre / Medicine wards)	**Non communicable diseases and Preventive Geriatrics** Clinico social case reviews of chronic non communicable diseases such as hypertension , diabetes mellitus , CHD , Stroke , COPD, Cancer , psychiatric disorders , geriatric health problems , occupational diseases etc.

Note:

1. **The observations/ reflections of family / hospital / community visits , DOAP sessions , Self directed learning activities (SDL) , practicals should be entered in the log book immediately after the assignment.**
2. **The observer / facilitator / teacher will provide the written brief feedback in the log book for the learner related to the competencies.**

Paper wise distribution of topics for Prelim & MUHS Annual Examination
Year: III-I MBBS Subject: Community Medicine

Paper	Section	Topics
I	A	MCQs on all topics of the paper I
		Concept of health and disease
		Epidemiology
		Screening for disease
		Communicable diseases & related NHP
		Emerging & Remerging diseases
		Sociology
		Environmental health
		Occupational Health
		Hospital waste management
		Biostatistics & Vital statistics
		AETCOM Module no. 3.1 & 3.3
II	A	MCQs on all topics of the paper II
		Demography & FP & NHP
		MCH, Geriatrics & related NHP
		Nutrition & related NHP
		Mental Health
		Health education & Communication
		Health planning & Management
		Health care delivery system
		Non communicable Diseases & related NHP
		International health
		Disaster Management

Internal Assessment
Subject: Community Medicine
Applicable w.e.f March 2020 onwards examination for batches admitted from June 2019 onwards

Phase	I-Exam (March)		
	Theory	Practical (Including 10 Marks for Journal- Nutrition & Log Book)	Total Marks
First MBBS	50	50	100

Phase	II-Exam			III-Exam		
	Theory (Jan)	Practical Two weeks after clinical posting (Mid Clinical Posting)	Total Marks	Theory **(May)**	Practical End of Clinical Posting	Total Marks
Second MBBS	50	50	100 s	50	50	100

Phase	IV-Exam (March)			V-Exam Preliminary examination-August		
	Theory	Practical End of Clinical Posting	Total Marks	Theory	Practical	Total Marks
III MBBS	50	50	100	200	100	300

1. Assessment in CBME is ONGOING PRCESS,

No Preparatory leave is permitted.

1. There shall be 5 internal assessment examinations in Community Medicine.
2. The suggested patterns of question paper for first three internal assessment theory examinations is given below. Pattern of the prelims examinations should be similar to the University examinations.
3. Internal assessment marks for theory and practical will be converted to out of 40 (theory) + 40 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University. **Conversion Formula for calculation of marks in internal assessment examinations.**

Phase	**Theory**	**Practical**
Phase I	**50**	**50**
Phase II	**100**	**100**
Phase III Part I	**250**	**150**
Total	**400**	**300**
Conversion out of	**40**	**40**
Conversion formula	**Total marks in 4 IA theory examinations /10**	**Total marks in 4 IA Practical examinations /7.5**
Eligibility criteria after conversion	**16**	**16**
	Combined theory + Practical = 40	

4. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
33.01 to 33.49	33
33.50 to 33.99	34

5. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.

6. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

7. <u>Remedial measures</u>

A. <u>Remedial measures for non-eligible students</u>

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically.

ii) Extra classes for such students may be arranged. If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students. Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.

iii) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. The pattern for this repeat internal assessment examination shall be similar to the final University examination. Only the marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	Practical
Remedial examination (pattern as per final examination)	**200**	**100**
Conversion out of	**40**	**40**
Conversion formula	**Marks in remedial theory examinations /5**	**Marks in remedial Practical examinations /2.5**
Eligibility criteria after conversion	**16**	**16**
	Combined theory + Practical = 40	

B. <u>Remedial measures for absent students:</u>

If any of the students is absent for any of the 5 IA examinations due to any reasons, following measures shall be taken.

i. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.

ii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.

iii. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator.

1st /2nd /3rdMBBS Practical Mark's Structure

Internal Assessment Examinations

(Applicable w.e.fOctober 2020 onwards examination for batches admitted from June 2019 onwards)

Seat No.	Subject :Community Medicine Practical – 1st Internal assessment -				
	Spotters marks	Log book	Skill assessment utrition exercises	Viva Voce	Practical Total
Max. Marks	10 marks	10-marks	10 marks	20 marks	50 marks

Seat No.	Subject :Community Medicine Practical – 2nd Internal assessment			
	Spotters	Log book	Viva Voce	Practical Total
Max. Marks	20 marks	10-marks	20 marks	50 marks

Seat No.	Subject :Community Medicine Practical – 3rd Internal assessment				
	Spotters marks	Log book	Clinico-epidemiological case	Viva Voce	Practical Total
Max. Marks	10 marks	10 marks	20 marks	10 marks	50 marks

Seat No.	Subject :Community Medicine Practical – 4th Internal assessment				
	Spotters marks	Log book	Clinico-epidemiological case	Viva Voce	Practical Total
Max. Marks	10 marks	10 marks	20 marks	10 marks	50 marks

Method of Clinico epidemiological Case evaluation

Sr.no.	Head	Marks allotted
01	Identifying and socio demographic information (with house landmark, facilities for health care)	05
02	Present and past illness history (with risk factors , exposures) Environmental , behavioural and family information	05
03	Demonstration of relevant clinical signs/skills	05
05	Management plan and relevant control measures at individual, family and community level	05
	Total	20

III-I MBBS Practical Mark's Structure (Prelim exam)

Applicable w.e.f October 2021onwards examination for batches admitted from June 2019 onwards

Subject: Community Medicine						
Practical					Oral/Viva	Total
Seat No.	Spotters	Statistical Ex	Clinicoepidemilogical case	Skill assessment (10 skills) *	Viva/ voce	Practical &Oral
Max. Marks	20	20	20	20	20	100

- As per MCI competency based document

Method of Clinico epidemiological Case evaluation

Sr.no.	Head	Marks allotted
	Identifying and socio demographic information (with house landmark, facilities for health care)	05
	Present and past illness history (with risk factors , exposures) Environmental , behavioural and family information	05
	Demonstration of relevant clinical signs/skills	05
	Management plan and relevant control measures at individual, family and community level	05
	Total	20

III-I MBBS Practical Mark's Structure (University exam)

Applicable w.e.f October 2022onwards examination for batches admitted from June 2019 onwards

Subject: Community Medicine						
Practical					Oral/Viva	Total
Seat No.	Spotters	Statistical Ex	Clinicoepidemilogical case	Skill assessment (10 skills) *	Viva/ voce	Practical &Oral
Max. Marks	20	20	20	20	20	100

Format for Internal Assessment Theory Paper
IA – 1, IA – 2, IA – 3 & IA - 4

Question No.	Type of Question	No. of Questions	Max. Marks
1.	MCQ	10	10 (1 marks each)
2.	SAQ	5 (Any four out of 5)	28 (7 marks each)
3.	LAQ	1 (Compulsory)	12
		Total	50

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER-1

1. Course and Year	:	**III-I- MBBS** *(applicable w.e.f. October 2022 & onwards examinations)*						2. Subject Code	:		
3. Subject (PSP)	:	**Community Medicine**									
(TT)	:										
4. Paper :	:	**I**	5. Total Marks	:	**100**	6. Total Time	:	**3** Hrs.	7. Remu. (Rs)	:	Rs. 300/-
									8. Remu. (Rs)	:	Rs. 350/-
9. Web Pattern	:	[ ]	10. Web Skeleton	:	[ ]	11. Web Syllabus	:	[ ]	12. Web Old QP	:	[ ]

Instructions:

SECTION "A" MCQ

1) *Put ☒ in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (20 x1 = 20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B"

2.	Short Answer Questions	(One Question AETCOM(3.1 and 3.3)(compulsory)	(7x1=07)
	a)		
3.	Short Answer Questions	(Answer Any 3 out of 4)	(7x3=21)
	a) b) c) d)		
4.	Structured Long Answer Questions	(Compulsory)	(12x1=12)
	a)		
5.	Short Answer Questions	(Answer Any 4 out of 5)	(7x4=28)
	a) b) c) d) e)		
6.	Structured Long Answer Questions	(Compulsory)	(12x1=12)
	a)		

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER-

1. Course and Year	:	**III-I- MBBS** *(applicable w.e.f. October 2022& onwards examinations)*						2. Subject Code	:		
3. Subject (PSP)	:	**Community Medicine**									
(TT)	:										
4. Paper :	:	**II**	5. Total Marks	:	**100**	6. Total Time	:	**3** Hrs.	7. Remu. (Rs)	:	Rs. 300/-
									8. Remu. (Rs)	:	Rs. 350/-
9. Web Pattern	:	[ ]	10. Web Skeleton	:	[ ]	11. Web Syllabus	:	[ ]	12. Web Old QP	:	[ ]

Instructions:

SECTION "A" MCQ

1) ☒ *in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries* ***One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (20 x1 = 20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

Instructions:

SECTION "B"

1) *Use* ***blue/black*** *ball point pen only.*
2) ***Do not*** *write anything on the* ***blank portion of the question paper****. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All*** *questions are* ***compulsory****.*
4) *The number to the* ***right*** *indicates* ***full*** *marks.*
5) *Draw diagrams* ***wherever*** *necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B"

2. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)

a) b) c) d) e)

3. Structured Long Answer Questions (Compulsory) (12x1=12)

a)

4. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)

a) b) c) d) e)

5. Structured Long Answer Questions (Compulsory) (12x1=12)

a)

BOOKS RECMMENDED.

1. Text book of Community Medicine, Kulkarni A.P. and Baride J.P.
2. Park "s Textbook of Preventive and Social Medicine,
3. Principles of Preventive and Social Medicine, K. Mahajan
4. Textbook of Community Medicine, B. Shridhar Rao.
5. Essentials of Community Medicine, Suresh Chandra.
6. Textbook of Biostatistics, B. K. Mahajan
7. Review in Community Medicine, V.R. Sheshu Babu.
8. Reference Book for Community Medicine: "Principles and practice of Biostatistics", Author: Dr. J.V. Dixit

FURTHER READINGS.

Epidemiology and Management for health care for all P.V. Sathe and A.P. Sathe. Essentials of Preventive Medicine O.P. Ghai and Piyush Gupta.

Maharashtra University of Health Sciences Nashik



COMMUNITY MEDICINE LOGBOOK

For

1st, 2nd&3rd PROFESSIONAL MBBS

STUDENTS AS PER COMPETENCY

BASED CURRICULUM

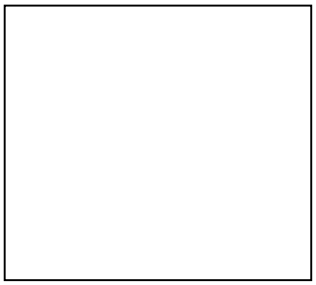
First Edition:2020

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Logo of college

Name of the College:……

Personal details:  Paste recent self attested photo here	
Name of the student:	
Date of admission to MBBS Course:	
College Roll No:	
Permanent Address:	
E mail ID:	
Mobile Number: Self: Parent:	

Preface

The Medical Council of India has revised the undergraduate medical education curriculum so that the Indian Medical Graduate (IMG) is able to recognize **"Health for all"** as a national goal. He/she should also be able to fulfil his/her societal obligations. The revised curriculum has specified the competencies that a student must attain and clearly defined teaching learning strategies for the same. With this goal in mind, integrated teaching, skill development, AETCOM and self-directed learning have been introduced. There would be emphasis on communication skills, basic clinical skills and professionalism. There is a paradigm shift from the traditional didactic classroom-based teaching to learning environments where there is emphasis on learning by exploring, questioning, applying, discussing, analysing, reflecting, collaborating and doing. The recognition of this need is enshrined by a greatly enhanced allocation of time to these methods and also the assessment techniques. With this view in mind the log book has been designed as per the guidelines of competency Based curriculum.

Instructions

1) This logbook is prepared as per the guidelines of MCI for implementation of Competency based curriculum for 1st, 2nd& 3rd Professional MBBS students in the subject of Community Medicine.
2) Students are instructed to keep their logbook entries up to date.
3) Students are expected to write their reflections on all activities of Self-Directed Learning (SDL) and Visits.
4) Students also have to write reflections on AETCOM Module **3.1 and3.3**
5) Reflections should be structured using the following guiding questions:
    - What happened? (What did you learn from this experience)
    - So what? (What are the applications of this learning)
    - What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)
6) The logbook assessment will be based on multiple factors like
    - Attendance
    - Active participation in the sessions,
    - Timely completions
    - Quality of write up of reflections
    - Overall presentation

INDEX

Sr. No	Description	Page No.	Status	Signature of Teacher
			Complete/ Incomplete	
1.	**1st Professional**			
	a. Competencies			
	b. Self-Directed Learning (Seminars, Projects, Quizzes)			
	c. Certificate			
2.	**2nd Professional**			
a.	a. Competencies			
	b. Self-Directed Learning			
	c. Clinical posting - Cases			
	d. Visit			
	e. Certificate			
3.	**3rd Professional**			
	a. Competency			
	b. Self-Directed Learning			
	c. Clinical posting - Cases			
	d. Visit			
	e. Certificate			
4.	**AETCOM module**			
5.	**Attendance Record**			
6.	**Final certificate**			
7.	**Records of Internal Assessment**			

- AETCOM – Competencies for IMG, 2018, Medical Council of India.

FIRST PROFESSIONAL

List of Competencies

Competency No	COMPETENCY - The student should be able to
CM1.9	Demonstrate the role of effective Communication skills in health in a simulated environment
CM 1.10	Demonstrate the important aspects of the doctor patient relationship in a simulated environment
CM4.3	Demonstrate and describe the steps in evaluation of health promotion and education program
CM5.2	Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method
CM5.4	Plan and recommend a suitable diet for the individuals and families based on local availability of foods and economic status, etc in a simulated environment
CM9.2	Define, calculate and interpret demographic indices including birth rate, death rate, fertility rates

Competencies Sub Item:

Competency # addressed	**Name of Activity**	**Date completed: dd-mm-yyyy**	**Attempt at activity** First or Only (F) Repeat (R) Remedial (Re)	**Rating** Below(B) expectations Meets(M) expectations Exceeds (E) expectations OR Numerical Score	**Decision of faculty** Completed (C) Repeat (R) Remedial (Re)	**Initial of faculty and date**	**Feedback Receive**d Initial of learner

Competencies Sub Item:

Competency # addressed	**Name of Activity**	**Date completed: dd-mm-yyyy**	**Attempt at activity** First or Only (F) Repeat (R) Remedial (Re)	**Rating** Below(B) expectations Meets(M) expectations Exceeds (E) expectations OR Numerical Score	**Decision of faculty** Completed (C) Repeat (R) Remedial (Re)	**Initial of faculty and date**	**Feedback Receive**d Initial of learner

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Self Directed Learning, (Seminars, Tutorials, Projects, Quizzes, small group discussions)

Sr. No	Self Directed Learning (Seminars, Tutorials, Projects, Quizzes, Group discussions etc.)	Date	Signature of Teacher

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

College Name: ……..

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No._____has satisfactoril y attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for First Professional MBBS Competency Based Curriculum in the subject of Community Medicine.

Teacher- Incharge

Professor and Head
Department of Community Medicine

Date:_____/____/_____

Place:_____

SECOND PROFESSIONAL

List of Competencies

Competency No	COMPETENCY The student should be able to
CM2.1	Describe the steps and perform clinico-socio-cultural and demographic assessment of the individual, family and community
CM2.2	Describe the socio-cultural factors, family (types), its role in health and disease & demonstrate in a simulated environment the correct assessment of socio-economic status
CM2.3	Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior

Competencies Sub Item:

Competency # addressed	**Name of Activity**	**Date completed: dd-mm-yyyy**	**Attempt at activity** First or Only (F) Repeat (R) Remedial (Re)	**Rating** Below(B) expectations Meets(M) expectations Exceeds (E) expectations OR Numerical Score	**Decision of faculty** Completed (C) Repeat (R) Remedial (Re)	**Initial of faculty and date**	**Feedback Receive**d Initial of learner

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Self Directed Learning, (Seminars, Tutorials, Projects, Quizzes)

Sr. No	Self Directed Learning (Seminars, Tutorials, Projects, Quizzes, Group discussions etc.)	Date	Signature of Teacher

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

CLINICAL POSTING: ……..……..

from……..to……..….

S.NO.	DATE	FAMILY VISIT/ CLINICAL DIAGNOSIS	TEACHER'S SIGN

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

VISIT:

COMPETENCY No.	VISIT	DATE	TEACHER'S SIGN.
3.2	Visit to water purification plant		
	Visit to Dist Public Health Laboratory		
	Exercise on interpretation of water analysis report		
3.4	Visit to sewage purification plant		

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

College name: ……..

CERTIFICATE

This is to certify that,

Mr /Ms._____

Roll No._____has satisfactoril y attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for Second Professional Competency Based Curriculum in the subject of Community Medicine.

Teacher- Incharge

Professor and Head
Department of Community Medicine

Date:_____/____/_____

Place:_____

SECOND PROFESSIONAL

List of competencies

Competency No	COMPETENCY The student should be able to
CM3.7	Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures
CM8.6	Educate and train health workers in disease surveillance, control & treatment and health education

Competencies Sub Item:

Competency # addressed	**Name of Activity**	**Date completed: dd-mm-yyyy**	**Attempt at activity** First or Only (F) Repeat (R) Remedial (Re)	**Rating** Below(B) expectations Meets(M) expectations Exceeds (E) expectations OR Numerical Score	**Decision of faculty** Completed (C) Repeat (R) Remedial (Re)	**Initial of faculty and date**	**Feedback Receive**d Initial of learner

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Self Directed Learning (Seminars, Tutorials, Projects, Quizzes)

Sr. No	Self Directed Learning (Seminars, Tutorials, Projects, Quizzes, Group discussions etc.)	Date	Signature of Teacher

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

CLINICAL POSTING: ……..

From ……to…….

S.NO.	DATE	FAMILY VISIT/ CLINICAL DIAGNOSIS	TEACHER'S SIGN

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

VISIT:

COMPETENCY No.	VISIT	DATE	TEACHER'S SIGN.
3.6	Visit to office of Dist Vector borne Diseases Control Program		
8.1	Visits to the Dist Offices/ Units/ clinics related to implementation of Disease Control Measures of Communicable Diseases		
8.1	Visit to Public Health Microbiology / Reference laboratories		
8.6	Visit to Dist Training Centre / Dist Disease Surveillance Unit		
13.4	Visit to Civil Defence Dept / Dist Disaster Management Office		
19.2	Visit to hospital pharmacy		

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

THIRD PROFESSIONAL

List of competencies

Competency No	COMPETENCY The student should be able to
CM6.2	Describe and discuss the principles and demonstrate the methods of collection, classification, analysis, interpretation and presentation of statistical data
CM6.3	Describe, discuss and demonstrate the application of elementary statistical methods including test of significance in various study designs
CM6.4	Enumerate, discuss and demonstrate Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion
CM7.4	Define, calculate and interpret morbidity and mortality indicators based on given set of data
CM7.6	Enumerate and evaluate the need of screening tests
CM7.7	Describe and demonstrate the steps in the Investigation of an epidemic of communicable disease and describe the principles of control measures
CM9.2	Define, calculate and interpret demographic indices including birth rate, death rate, fertility rates

Competencies Sub Item:

Competency # addressed	**Name of Activity**	**Date completed: dd-mm-yyyy**	**Attempt at activity** First or Only (F) Repeat (R) Remedial (Re)	**Rating** Below(B) expectations Meets(M) expectations Exceeds (E) expectations OR Numerical Score	**Decision of faculty** Completed (C) Repeat (R) Remedial (Re)	**Initial of faculty and date**	**Feedback Receive**d Initial of learner

Competencies Sub Item:

Competency # addressed	**Name of Activity**	**Date completed: dd-mm-yyyy**	**Attempt at activity** First or Only (F) Repeat (R) Remedial (Re)	**Rating** Below(B) expectations Meets(M) expectations Exceeds (E) expectations OR Numerical Score	**Decision of faculty** Completed (C) Repeat (R) Remedial (Re)	**Initial of faculty and date**	**Feedback Receive**d Initial of learner

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Reflection on Competencies

Topic: Date:

Signature of Teacher-in- charge

Self Directed Learning (Seminars, Tutorials, Projects, Quizzes)

Sr. No	Self Directed Learning (Seminars, Tutorials, Projects, Quizzes, Group discussions etc.)	Date	Signature of Teacher

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

CLINICAL POSTING: ……..

From ……to…….

S.NO.	DATE	CLINICAL DIAGNOSIS	TEACHER'S SIGN

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

Reflections

Topic: **Date:**

Signature of Teacher-in- charge

VISIT:

COMPETENCY No.	VISIT	DATE	TEACHER'S SIGN.
CM 9.2	A small scale survey of local customs and practices during pregnancy, childbirth, lactation and child feeding practices		
CM 11.3	Visit to Industry- Assessment of occupational environment and preventive measures Exercise on occupational history taking		
CM 8.1	Visit to Public Health Microbiology / Reference laboratories		
CM 8.6	Visit to Dist Training Centre / Dist Disease Surveillance Unit		
CM 13.4	Visit to Civil Defence Dept / Dist Disaster Management Office		
CM 19.2	Visit to hospital pharmacy		

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on visit:

Topic: **Date:**

Signature of Teacher-in- charge

College Name: ……

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No._____has satisfactoril y attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for Third Professional Competency Based Curriculum in the subject of Community Medicine.

Teacher- Incharge

Professor and Head
Department of Community Medicine

Date:_____/____/_____

Place:_____

4. AETCOM Module

Module 3.1: Clinician who understands and provides preventive, promotive, palliative and holistic care with compassion.

List of competencies

S. No	The student should be able to
1.	Demonstrate ability to communicate to patients in a patient, respectful, nonthreatening, non-judgmental and empathetic manner

Module 3.3: Communicator with patients, family, colleagues and community.

List of competencies

S. No	The student should be able to
1.	Administer informed consent and appropriately address patient queries to a patient undergoing a surgical procedure in a simulated environment

Competencies Sub Item:

Competency # addressed	**Name of Activity**	**Date completed: dd-mm-yyyy**	**Attempt at activity** First or Only (F) Repeat (R) Remedial (Re)	**Rating** Below(B) expectations Meets(M) expectations Exceeds (E) expectations OR Numerical Score	**Decision of faculty** Completed (C) Repeat (R) Remedial (Re)	**Initial of faculty and date**	**Feedback Receive**d Initial of learner

Reflection on AETCOM MODULE

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM MODULE

Topic: **Date**

Signature of Teacher-in- charge

College Name: ……..

FINAL CERTIFICATE (before prelims)

This is to certify that,

Mr/Ms._____

Roll No._____has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for First, Second and Third Professional MBBS Competency Based Curriculum in the subject of Community Medicine.

Teacher- In charge

Professor and Head
Department of Community Medicine

Date:_____/____/_____ Place:_____

7. Record of Internal Assessment Examinations

Sr. No	Exam no	Theory	Practical including Viva	Signature of student	Signature of Teacher
1	I Internal Assessment	/50	/50		
2	II Internal Assessment	/50	/50		
3	III Internal Assessment	/50	/50		
4	IV Internal Assessment	/50	/50		
5	PRELIMS	/200	/100		
6	TOTAL				

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

Course Content

PHASE II

Subject: Forensic Medicine & Toxicology

Second Professional

Theory / Practical

(Based on **National Medical Commission, India**, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 1; page nos. 228 -251)

FORENSIC MEDICINE AND TOXICOLOGY

1. Goals

The broad goal of the teaching of undergraduate students in Forensic Medicine is to produce a physician who is well informed about medicolegal responsibilities in practice of medicine. He /She will also be capable of making observations and inferring conclusions by logical deductions to set enquiries on the right track in criminal matters and connected medicolegal problems. He /She acquires knowledge of law in relation to medical practice, medical negligence and respect for codes of medical ethics

2. Objectives

2. (a) KNOWLEDGE:

At the end of the course, the student should be able to:

1. Identify the basic medicolegal aspects of hospital and general practice.
2. Define the medicolegal responsibilities of a general physician while rendering community service either in a rural primary health center or an urban health center.
3. Appreciate the physician's responsibilities in criminal matters and respect for the codes of medical ethics.
4. Diagnose, manage and identify also legal aspects of common acute and chronic poisonings.
5. Describe the medicolegal aspects and findings of post-mortem examination in case of death due to common unnatural conditions & poisonings.
6. Detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen's Compensation Act.
7. Describe the general principles of analytical toxicology.
8. Medical jurisprudence in view of the Consumer Protection Act – wherein doctors have been covered under its ambit. They have both rights as well as responsibilities. Under medical insurance acts of negligence covered as well as rights for effective service delivery.

2. (b) SKILLS

At the end of the course, the student should be able to: -

1. Make observations and logical inferences in order to initiate enquiries in Criminal matters and medicolegal problems.
2. Diagnose and treat common emergencies in poisoning and manage chronic toxicity.
3. Make observations and interpret findings at postmortem examination.
4. Observe the principles of medical ethics in the practice of his profession.

2. (c) INTEGRATION

Department shall provide an integrated approach towards allied disciplines like Pathology, Radiology, Forensic Sciences, Hospital Administration etc. to impart training regarding medicolegal responsibilities of physicians at all levels of health care. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g., medicine, pharmacology etc.

3. Total duration for Forensic Medicine and Toxicology

a) Semesters: Total 4 Semesters

b) Teaching hours: 125

c) Phase (II): 50 hours

i. Lectures: 15 hours

ii. Self-Directed learning (SDL): 5 hours

iii. Small group teachings/tutorials/Integrated teaching/Practical: 30 hours

d) Phase (III/I): 75 hours

i. Lectures: 25 hours

ii. Self-Directed learning (SDL): 5 hours

iii. Small group teachings/tutorials/Integrated teaching/Practical: 45 hours

4. Syllabus

4. (a) Learning methods:

Lectures, tutorials, practical demonstrations, Small group teachings, integrated teaching, Self-Directed learning (SDL), ATECOM

4. (b)Distribution of teaching hours

Didactic lectures should not exceed one third of the time schedule; two third schedule should include practical, clinicals or/and small group discussions. Learning process should include living experiences, problem-oriented approach, case studies and community health care activities.

5. Topic wise distribution

1. Total Teaching hours : **50**
2. A. Lectures(hours): **15** B. Self-directed learning (hours) : **05**

C. Clinical Postings (hours): Nil.

D. Small group teachings/tutorials/Integrated teaching/Practical's (hours)**: 30**

Competency Nos.	**Topics & Subtopics-**	**TL Methods**
	PHASE II	
FM 1.1, 1.3, 1.4	**Topic: General Information** FM 1.1 Demonstrate knowledge of basics of Forensic Medicine like definitions of Forensic medicine, Clinical Forensic Medicine, Forensic Pathology, State Medicine, Legal Medicine and Medical Jurisprudence FM1.3 Describe legal procedures including Criminal Procedure Code, Indian Penal Code, Indian Evidence Act, Civil and Criminal Cases, Inquest (Police Inquest and Magistrate's Inquest), Cognizable and Non-cognizable offences FM1.4 Describe Courts in India and their powers: Supreme Court, High Court, Sessions court, Magistrate's Court, Labour Court, Family Court, Executive Magistrate Court and Juvenile Justice Board	**Lecture-01**
FM 1.2	FM1.2 Describe history of Forensic Medicine	**SDL-01**

Competency Nos.	Topics & Subtopics-	TL Methods
FM 1.5, 1.6, 1.7, 1.8, 1.9	**Topic: General Information** FM1.5 Describe Court procedures including issue of Summons, conduct money, types of witnesses, recording of evidence oath, affirmation, examination in chief, cross examination, re-examination and court questions, recording of evidence & conduct of doctor in witness box FM1.6 Describe Offenses in Court including Perjury; Court strictures vis-a- vis Medical Officer FM1.7 Describe Dying Declaration & Dying Deposition	**Lecture-02**
FM 1.8, 1.9	**Topic: General Information** FM1.8 Describe the latest decisions/notifications/resolutions/ circulars/standing orders related to medico-legal practice issued by Courts/Government authorities etc. F.M1.9 Describe the importance of documentation in medical practice in regard to medicolegal examinations, Medical Certificates and medicolegal reports	**Lecture-03**
FM 14.20	**Skills in Forensic Medicine & Toxicology** FM14.20 To record and certify dying declaration in a simulated/ supervised environment	**Small group- 1 teachings/tutorials/ Integrated teaching/Practical's**
FM 2.29, 14.22	**Topic: General Information** FM 2.29 Demonstrate respect to the directions of courts, while appearing as witness for recording of evidence under oath or affirmation, examination in chief, cross examination, re-examination and court questions, recording of evidence **Skills in Forensic Medicine & Toxicology** FM14.22 To give expert medical/ medico-legal evidence in Court of law	**Small group-2 teachings/tutorials/ Integrated teaching/Practical's**
FM 3.1	**Clinical Forensic Medicine** **IDENTIFICATION** FM 3.1 Define and describe Corpus Delicti, establishment of identity of living persons including race, Sex, religion, complexion, stature, age determination using morphology, teeth-eruption, decay, bite marks, bones-ossification centres, medico-legal aspects of age-**Part 1**	**Lecture-04**
	IDENTIFICATION FM 3.1 Define and describe Corpus Delicti, establishment of identity of living persons including race, Sex, religion, complexion, stature, age determination using morphology, teeth-eruption, decay, bite marks, bones-ossification centres, medico-legal aspects of age-**Part 2**	**Lecture-05**
FM 3.1	**IDENTIFICATION** FM 3.1 age determination using morphology, teeth-eruption, bones-ossification centres, medico-legal aspects of age	**Small group- 3 teachings/tutorials/ Integrated teaching**

Competency Nos.	Topics & Subtopics-	TL Methods
		/Practical's
FM 3.2	**IDENTIFICATION** FM 3.2 Describe and discuss identification of criminals, unknown persons, dead bodies from the remains-hairs, fibers, teeth, anthropometry, dactylography, foot prints, scars, tattoos, poroscopy and superimposition	**Lecture-06**
FM 3.2	**IDENTIFICATION** FM 3.2 Dactylography, foot prints, scars, tattoos, poroscopy and superimposition	**Small group- 4 teachings/tutorials/ Integrated teaching /Practical's**
FM 2.1,2.2,2.3	**Forensic Pathology** FM2.1 Define, describe and discuss death and its types including somatic/clinical/cellular, molecular and brain-death, Cortical Death and Brainstem Death FM2.2 Describe and discuss natural and unnatural deaths FM2.3 Describe and discuss issues related to sudden natural deaths	**Lecture-07**
FM 2.5, 2.6. 2.7 2.8	**Forensic Pathology** FM2.5 Discuss moment of death, modes of death - coma, asphyxia and syncope FM2.6 Discuss presumption of death and survivorship FM2.7 Describe and discuss suspended animation FM 2.8 Describe and discuss postmortem changes including signs of death, cooling of body, post-mortem lividity, rigor mortis, cadaveric spasm, cold stiffening and heat stiffening	**Lecture-08**
FM 2.9	**Forensic Pathology** FM2.9 Describe putrefaction, mummification, adipocere and maceration	**Lecture-09**
FM 2.10	**Forensic Pathology** FM2.10 Discuss estimation of time since death	**Lecture-10**
FM 2.11, 2.12, 2.13, 2.14	**Forensic Pathology** FM2.11 Describe and discuss autopsy procedures including post-mortem examination, different types of autopsies, aims and objectives of post-mortem examination FM2.12 Describe the legal requirements to conduct post-mortem examination and procedures to conduct medico-legal post-mortem examination FM2.13 Describe and discuss obscure autopsy FM2.14 Describe and discuss examination of clothing, preservation of viscera on post-mortem examination for chemical analysis and other medico-legal purposes, post-mortem artefacts	**Small group- 5 teachings/tutorials/ Integrated teaching/Practical's**
FM 2.15, 2.16,	**Forensic Pathology** FM 2.15 Describe special protocols for conduction of medico-legal	**Small group- 6 teachings/tutorials/**

Competency Nos.	Topics & Subtopics-	TL Methods
2.17, 2.18	autopsies in cases of death in custody or following violation of human rights as per National Human Rights Commission Guidelines FM2.16 Describe and discuss examination of mutilated bodies or fragments, charred bones and bundle of bones. FM2.17 Describe and discuss exhumation. FM2.18 Crime Scene Investigation:- Describe and discuss the objectives of crime scene visit, the duties & responsibilities of doctors on crime scene and the reconstruction of sequence of events after crime scene investigation	**Integrated teaching/Practical's**
FM 1.10 1.11	**Forensic Pathology** FM1.10 Select appropriate cause of death in a particular scenario by referring ICD 10 code FM1.11Write a correct cause of death certificate as per ICD 10 document	**Small group- 7 teachings/tutorials/ Integrated teaching/Practical's**
FM 2.19	**Forensic Pathology** FM 2.19 Investigation of anaesthetic, operative deaths: Describe and discuss special protocols for conduction of autopsy and for collection, preservation and dispatch of related material evidences	**Lecture-11**
FM 2.30	**Forensic Pathology** FM 2.30 Have knowledge/awareness of latest decisions/notifications/ resolutions/circulars/standing orders related to medico-legal practice issued by Courts/Government authorities etc	**SDL-2**
FM 2.33, 2.34, 2.35	**Forensic Pathology** FM 2.33 Demonstrate ability to use local resources whenever required like in mass disaster situations FM 2.34 Demonstrate ability to use local resources whenever required like in mass disaster situations FM 2.35 Demonstrate professionalism while conducting autopsy in medicolegal situations, interpretation of findings and making inference/opinion, collection preservation and dispatch of biological or trace evidences	**Small group- 8 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.9	**Skills in Forensic Medicine & Toxicology** FM14.9 Demonstrate examination of & present an opinion after examination of skeletal remains in a simulated/ supervised environment	**Small group- 9 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.4	**Skills in Forensic Medicine & Toxicology** FM14.4 Conduct and prepare report of estimation of age of a person for medico-legal and other purposes & prepare medico-legal report in a simulated/ supervised environment	**Small group- 10 teachings/tutorials/ Integrated teaching/Practical's**

Competency Nos.	Topics & Subtopics-	TL Methods
FM 14.21	**Skills in Forensic Medicine & Toxicology** FM14.21 To collect, preserve, seal and dispatch exhibits for DNA-Finger printing using various formats of different laboratories.	**Small group- 11 teachings/tutorials/ Integrated teaching/Practical's**
FM 8.1	**Toxicology: General Toxicology** FM8.1 Describe the history of Toxicology	**SDL-3**
FM 8.2, 8.3, 8.6, 8.7, 8.8	**Toxicology: General Toxicology** FM8.2 Define the terms Toxicology, Forensic Toxicology, Clinical Toxicology and poison FM8.3 Describe the various types of poisons, Toxicokinetics, and Toxicodynamics and diagnosis of poisoning in living and dead FM 8.6 Describe the general symptoms, principles of diagnosis and management of common poisons encountered in India FM 8.7 Describe simple Bedside clinic tests to detect poison/drug in a patient's body fluids FM 8.8 Describe basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination	**Lecture-12**
FM 8.4	**Toxicology: General Toxicology** FM8.4 Describe the Laws in relations to poisons including NDPS Act, Medico-legal aspects of poisons	**SDL-4**
FM 8.9	**Toxicology: General Toxicology** FM 8.9 Describe the procedure of intimation of suspicious cases or actual cases of foul play to the police, maintenance of records, preservation and dispatch of relevant samples for laboratory analysis.	**Small group-12 teachings/tutorials/ Integrated teaching/Practical's**
FM 8.10	**Toxicology: General Toxicology** FM8.10 Describe the general principles of Analytical Toxicology and give a brief description of analytical methods available for toxicological analysis: Chromatography – Thin Layer Chromatography, Gas Chromatography, Liquid Chromatography and Atomic Absorption Spectroscopy	**Small group-13 teachings/tutorials/ Integrated teaching/Practical's**
FM 9.1	**Toxicology : Chemical Toxicology** FM9.1 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to: Caustics Inorganic – sulphuric, nitric, and hydrochloric acids; Organic- Carbolic Acid (phenol), Oxalic and acetylsalicylic acids	**Small group-14 teachings/tutorials/ Integrated teaching/Practical's**
FM 9.2	**Toxicology : Chemical Toxicology** FM9.2 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard	**Small group-15 teachings/tutorials/ Integrated teaching/Practical's**

Competency Nos.	Topics & Subtopics-	TL Methods
	to Phosphorus, Iodine, Barium	
FM 9.3	**Toxicology : Chemical Toxicology** FM9.3 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Arsenic, lead, mercury, copper, iron, cadmium and thallium	**Small group-16 teachings/tutorials/ Integrated teaching/Practical's**
FM 9.4	**Toxicology : Chemical Toxicology** FM9.4 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ethanol, methanol, ethylene glycol	**Lecture-13**
FM 9.4	**Toxicology : Chemical Toxicology** FM9.4 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ethanol, methanol, ethylene glycol	**Small group-17 teachings/tutorials/ Integrated teaching/Practical's**
FM 9.5	**Toxicology : Chemical Toxicology** FM9.5 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Organophosphates, Carbamates, Organochlorines, Pyrethroids, Paraquat, Aluminium and Zinc phosphide	**Small group-18 teachings/tutorials/ Integrated teaching/Practical's**
FM 9.6	**Toxicology : Chemical Toxicology** FM9.6 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ammonia, carbon monoxide, hydrogen cyanide & derivatives, methyl isocyanate, tear (riot control) gases	**Small group-19 teachings/tutorials/ Integrated teaching/Practical's**
FM 10.1	**Pharmaceutical Toxicology** FM10.1 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to: i. Antipyretics – Paracetamol, Salicylates ii. Anti-Infectives (Common antibiotics – an overview) iii. Neuropsychotoxicology Barbiturates, benzodiazepins phenytoin, lithium, haloperidol, neuroleptics, tricyclics	**Lecture-14**
FM 10.1	**Pharmaceutical Toxicology** FM10.1 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to:	**Small group-20 teachings/tutorials/ Integrated teaching/Practical's**

Competency Nos.	Topics & Subtopics-	TL Methods
	iv .Narcotic Analgesics, Anaesthetics, and Muscle Relaxants v. Cardiovascular Toxicology Cardiotoxic plants – oleander, odollam, aconite, digitalis vi.Gastro- Intestinal and Endocrinal Drugs – Insulin	
FM 11.1	**Toxicology : Biotoxicology** FM11.1 Describe features and management of Snake bite, scorpion sting, bee and wasp sting and spider bite	**Lecture-15**
FM 12.1	**Toxicology : Sociomedical Toxicology** FM12.1 Describe features and management of abuse/poisoning with following chemicals: Tobacco, cannabis, amphetamines, cocaine, hallucinogens, designer drugs & solvent	**Small group-21 teachings/tutorials/ Integrated teaching/Practical's**
FM 13.1	**Topic: Toxicology : Environmental Toxicology** FM13.1 Describe toxic pollution of environment, its medico-legal aspects & toxic hazards of occupation and industry	**SDL-5**
FM 13.2	**Topic: Toxicology : Environmental Toxicology** FM13.2 Describe medico-legal aspects of poisoning in Workman's Compensation Act	**Small group-22 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.2	**Skills in Forensic Medicine & Toxicology** FM 14.2 Demonstrate the correct technique of clinical examination in a suspected case of poisoning & prepare medico-legal report in a simulated/ supervised environment	**Small group-23 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.3	**Skills in Forensic Medicine & Toxicology** FM14.3 Assist and demonstrate the proper technique in collecting, preserving and dispatch of the exhibits in a suspected case of poisoning, along with clinical examination	**Small group-24 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.6	**Skills in Forensic Medicine & Toxicology** FM14.6 Demonstrate and interpret medico-legal aspects from examination of hair (human & animal) fibre, semen & other biological fluids	**Small group-25 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.7, 14.8	**Skills in Forensic Medicine & Toxicology** FM14.7 Demonstrate & identify that a particular stain is blood and identify the species of its origin FM14.8 Demonstrate the correct technique to perform and identify ABO & RH blood group of a person	**Small group-26 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.16	**Skills in Forensic Medicine & Toxicology** FM14.16 To examine & prepare medico-legal report of drunk person in a simulated/ supervised environment	**Small group- 27 teachings/tutorials/ Integrated teaching/Practical's**

Competency Nos.	Topics & Subtopics-	TL Methods
FM 14.17	**Skills in Forensic Medicine & Toxicology** FM14.17 To identify & draw medico-legal inference from common poisons e.g. dhatura, castor, cannabis, opium, aconite copper sulphate, pesticides compounds, marking nut, oleander, Nux vomica, abrus seeds, Snakes, capsicum, calotropis, lead compounds & tobacco.	**Small group- 28 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.17	**Skills in Forensic Medicine & Toxicology** FM14.17 To identify & draw medico-legal inference from common poisons e.g. dhatura, castor, cannabis, opium, aconite copper sulphate, pesticides compounds, marking nut, oleander, Nux vomica, abrus seeds, Snakes, capsicum, calotropis, lead compounds & tobacco.	**Small group- 29 teachings/tutorials/ Integrated teaching/Practical's**
FM 14.17	**Skills in Forensic Medicine & Toxicology** FM14.17 To identify & draw medico-legal inference from common poisons e.g. dhatura, castor, cannabis, opium, aconite copper sulphate, pesticides compounds, marking nut, oleander, Nux vomica, abrus seeds, Snakes, capsicum, calotropis, lead compounds & tobacco.	**Small group- 30 teachings/tutorials/ Integrated teaching/Practical's**

Course Content

Phase III-Part ONE

Subject: Forensic Medicine & Toxicology

Theory / Practical

(Based on **National Medical Commission, India** Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 1; page nos. 228 -251)

1. Total Teaching hours **: 75**
2. A. Lectures(hours)**:25** B. Self-directed learning (hours) **:5**
   C. Clinical Postings (hours):
   D. Small group teachings/tutorials/Integrated teaching/ Practicals (hours**): 45**

AETCOM Modules-3.3-Foundation of Communication and 3.4-Confidentiality

Competency Nos.	Topics & Subtopics-	TL Methods
FM 4.2, 4.3, 4.4, 4.5, 4.22	**Medical Jurisprudence (Medical Law and ethics)** FM 4.2 Describe the Code of Medical Ethics 2002 conduct, Etiquette and Ethics in medical practice and unethical practices & the dichotomy FM 4.3 Describe the functions and role of Medical Council of India and State Medical Councils FM 4.4 Describe the Indian Medical Register FM 4.5 Rights/privileges of a medical practitioner, penal erasure, infamous conduct, disciplinary Committee, disciplinary procedures, warning notice and penal erasure 4.22 Explain Oath – Hippocrates, Charaka and Sushruta and procedure for administration of Oath.	**Lecture-1**
FM 4.1	**Medical Jurisprudence (Medical Law and ethics)** FM4.1 Describe Medical Ethics and explain its historical emergence	**SDL-1**
FM 4.7, 4.8, 4.9	**Medical Jurisprudence (Medical Law and ethics)** FM4.7 Describe and discuss the ethics related to HIV patients FM4.8 Describe the Consumer Protection Act-1986 (Medical Indemnity Insurance, Civil Litigations and Compensations), Workman's Compensation Act & ESI Act FM4.9 Describe the medico - legal issues in relation to family violence, violation of human rights, NHRC and doctors	**Small group- 1 teachings/tutorials/ Integrated teaching/ Practical's**
FM 4.6, 4.24, 4.28	**Medical Jurisprudence (Medical Law and ethics)** FM4.6 Describe the Laws in Relation to medical practice and the duties of a medical practitioner towards patients and society	**Lecture-2**

	FM4.24 Enumerate rights, privileges and duties of a Registered Medical Practitioner. Discuss doctor- patient relationship: professional secrecy and privileged communication FM4.28 Demonstrate respect to laws relating to medical practice and Ethical code of conduct prescribed by Medical Council of India and rules and regulations prescribed by it from time to time	
FM 4.10, 4.11	**Medical Jurisprudence (Medical Law and ethics)** FM4.10 Describe communication between doctors, public and media FM4.11 Describe and discuss euthanasia	**Small group- 2 teachings/tutorials/ Integrated teaching/ Practical's**
FM 4.12, 4.16, 4.17	**Medical Jurisprudence (Medical Law and ethics)** FM4.12 Discuss legal and ethical issues in relation to stem cell research FM4.16 Describe and discuss Bioethics FM4.17 Describe and discuss ethical Principles: Respect for autonomy, non- malfeasance, beneficence & justice	**Small group-3 teachings/tutorials/ Integrated teaching/ Practical's**
FM 4.18	**Medical Jurisprudence (Medical Law and ethics)** FM4.18 Describe and discuss medical negligence including civil and criminal negligence, contributory negligence, corporate negligence, vicarious liability, Res Ipsa Loquitor, prevention of medical negligence and defenses in medical negligence litigations	**Lecture-3**
FM 4.19	**Medical Jurisprudence (Medical Law and ethics)** FM4.19 Define Consent. Describe different types of consent and ingredients of informed consent. Describe the rules of consent and importance of consent in relation to age, emergency situation, mental illness and alcohol intoxication	**Lecture-4**
FM 4.20, 4.21	**Medical Jurisprudence (Medical Law and ethics)** FM4.20 Describe therapeutic privilege,Malingering, Therapeutic Misadventure, Professional Secrecy, Human Experimentation FM4.21 Describe Products liability and Medical Indemnity Insurance	**Lecture-5**
FM 4.23	**Medical Jurisprudence (Medical Law and ethics)** FM 4.23 Describe the modified Declaration of Geneva and its relevance	**SDL-2**
FM 4.25, 4.26, 4.27	**Medical Jurisprudence (Medical Law and ethics)** FM4.25 Clinical research & Ethics Discuss human experimentation including clinical trials FM4.26 Discuss the constitution and functions of ethical committees FM4.27 Describe and discuss Ethical Guidelines for Biomedical Research on Human Subjects & Animals	**Small group-4 teachings/tutorials/ Integrated teaching/ Practical's**

FM 2.4	**Forensic Pathology** FM 2.4 Describe salient features of the Organ Transplantation and The Human Organ Transplant (Amendment) Act 2011 and discuss ethical issues regarding organ donation	**Lecture-6**
FM 2.31	**Forensic Pathology** FM2.31 Demonstrate ability to work in a team for conduction of medico-legal autopsies in cases of death following alleged negligence medical dowry death, death in custody or following violation of human rights as per National Human Rights Commission Guidelines on exhumation	**Small group-5 teachings/tutorials/ Integrated teaching/ Practical's**
FM 4.14	**Medical Jurisprudence (Medical Law and ethics)** FM 4.14 Describe & discuss the challenges in managing medico-legal cases including development of skills in relationship management – Human behaviour, communication skills, conflict resolution techniques	**Small group- 6 teachings/tutorials/ Integrated teaching/ Practical's**
FM 4.15	**Medical Jurisprudence (Medical Law and ethics)** Describe the principles of handling pressure – definition, types, causes, sources and skills for managing the pressure while dealing with medico-legal cases by the doctor	**Small group- 7 teachings/tutorials/ Integrated teaching/ Practical's**
FM 4.29	**Medical Jurisprudence (Medical Law and ethics)** FM4.29 Demonstrate ability to communicate appropriately with media, public and doctors	**Small group- 8 teachings/tutorials/ Integrated teaching/ Practical's**
FM 4.30	**Medical Jurisprudence (Medical Law and ethics)** FM4.30 Demonstrate ability to conduct research in pursuance to guidelines or research ethics	**Small group- 9 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.4, 3.3	**Mechanical injuries and wounds:** FM 3.4 Define injury, assault & hurt. Describe IPC pertaining to injuries FM 3.3 Define, describe and classify different types of mechanical injuries, abrasion, bruise, laceration, stab wound, incised wound, chop wound, defense wound, self-inflicted/fabricated wounds and their medico-legal aspects	**Lecture-7**
FM 3.3	**Mechanical injuries and wounds:** FM 3.3 Define, describe and classify different types of mechanical injuries, abrasion, bruise, laceration, stab wound, incised wound, chop wound, defense wound, self-inflicted/fabricated wounds	**Lecture-8**
FM 3.3	**Mechanical injuries and wounds:** FM 3.3 Define, describe and classify different types of mechanical injuries, abrasion, bruise, laceration, stab wound, incised wound, chop wound, defense wound, self-inflicted/fabricated wounds	**Lecture-9**
FM 3.3	**Mechanical injuries and wounds:** FM 3.3 Define, describe and classify different types of mechanical injuries, abrasion, bruise, laceration, stab wound, incised wound, chop wound, defense wound, self-inflicted/fabricated wounds	**Lecture-10**

FM 3.5	**Mechanical injuries and wounds:** FM3.5 Describe accidental, suicidal and homicidal injuries. Describe simple, grievous and dangerous injuries. Describe ante-mortem and post-mortem injuries	**Small group-10 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.6	**Mechanical injuries and wounds:** FM3.6 Describe healing of injury and fracture of bones with its medico-legal importance	**Small group-11 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.7	**Mechanical injuries and wounds:** FM3.7 Describe factors influencing infliction of injuries and healing, examination and certification of wounds and wound as a cause of death: Primary and Secondary	**Small group-12 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.8	**Mechanical injuries and wounds:** FM3.8Describe and discuss different types of weapons including dangerous weapons and their examination	**Small group-13 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.9	**Firearm injuries:** FM3.9 Describe different types of firearms including structure and components. Along with description of ammunition propellant charge and mechanism of fire-arms, different types of cartridges and bullets and various terminology in relation of firearm – caliber, range, choking	**Lecture-11**
FM 3.10	**Firearm injuries:** FM3.10 Describe and discuss wound ballistics-different types of firearm injuries, blast injuries and their interpretation, preservation and dispatch of trace evidences in cases of firearm and blast injuries, various tests related to confirmation of use of firearms	**Lecture-12**
FM 3.10	**Firearm injuries:** FM3.10 Describe and discuss wound ballistics-different types of firearm injuries, blast injuries and their interpretation, preservation and dispatch of trace evidences in cases of firearm and blast injuries, various tests related to confirmation of use of firearms	**Lecture-13**
FM 3.11	**Regional Injuries:** FM3.11 Describe and discuss regional injuries to head (Scalp wounds, fracture skull, intracranial haemorrhages, coup and contrecoup injuries), neck, chest, abdomen, limbs, genital organs, spinal cord and skeleton	**Lecture-14**
FM 3.12	**Regional Injuries** FM3.12 Describe and discuss injuries related to fall from height and vehicular injuries – Primary and Secondary impact, Secondary injuries, crush syndrome, railway spine	**Small group-14 teachings/tutorials/ Integrated teaching/ Practical's**
FM 2.24	**Forensic Pathology**	**Lecture-15**

	FM2.24 Thermal deaths: Describe the clinical features, post-mortem finding and medicolegal aspects of injuries due to physical agents like heat (heat-hyper-pyrexia, heat stroke, sun stroke, heat exhaustion/prostration, heat cramps [miner's cramp] or cold (systemic and localized hypothermia, frostbite, trench foot, immersion foot)	
FM 2.25	**Forensic Pathology** FM2.25 Describe types of injuries, clinical features, patho-physiology, post- mortem findings and medico-legal aspects in cases of burns, scalds, lightening, electrocution and radiations	**Lecture-16**
FM 2.26	**Forensic Pathology** FM 2.26 Describe and discuss clinical features, post-mortem findings and medico-legal aspects of death due to starvation and neglect	**SDL-3**
FM 14.1	**Skills in Forensic Medicine and Toxicology** FM14.1 Examine and prepare Medico-legal report of an injured person with different etiologies in a simulated/ supervised environment	**Small group-15 teachings/tutorials/ Integrated teaching/ Practical's**
FM 14.10	**Skills in Forensic Medicine and Toxicology** FM14.10 Demonstrate ability to identify & prepare medicolegal inference from specimens obtained from various types of injuries e.g. contusion, abrasion, laceration, firearm wounds, burns, head injury and fracture of bone	**Small group-16 teachings/tutorials/ Integrated teaching/ Practical's**
FM 14.11	**Skills in Forensic Medicine and Toxicology** FM14.11 To identify & describe weapons of medicolegal importance which are commonly used e.g. lathi, knife, kripan, axe, gandasa, gupti, farsha, dagger, bhalla, razor & stick. Able to prepare report of the weapons brought by police and to give opinion regarding injuries present on the person as described in injury report/ PM report so as to connect weapon with the injuries. (Prepare injury report/ PM report must be provided to connect the weapon with the injuries)	**Small group-17 teachings/tutorials/ Integrated teaching/ Practical's**
FM 14.12	**Skills in Forensic Medicine and Toxicology** FM14.12 Describe the contents and structure of bullet and cartridges used & to provide medico-legal interpretation from these	**Small group-18 teachings/tutorials/ Integrated teaching/ Practical's**
FM 2.20, 2.21	**Mechanical asphyxia:** FM2.20 Define, classify and describe asphyxia and medico-legal interpretation of post-mortem findings in asphyxial deaths	**Lecture-17**
	Mechanical asphyxia: FM2.21 Describe and discuss different types of hanging and strangulation including clinical findings, causes of death, post-mortem findings and medico-legal aspects of death due to hanging and strangulation including examination, preservation	

	and dispatch of ligature material	
FM 2.21	**Mechanical asphyxia:** FM2.21 Describe and discuss different types of hanging and strangulation including clinical findings, causes of death, post-mortem findings and medico-legal aspects of death due to hanging and strangulation including examination, preservation and dispatch of ligature material	**Lecture-18**
FM 2.22	**Mechanical asphyxia:** FM 2.22 Describe and discuss patho-physiology, clinical features, post- mortem findings and medico-legal aspects of traumatic asphyxia, obstruction of nose & mouth, suffocation and sexual asphyxia	**Lecture-19**
FM 2.23	**Mechanical asphyxia:** FM2.23 Describe and discuss types, patho-physiology, clinical features, post mortem findings and medico-legal aspects of drowning, diatom test and, gettler test.	**Lecture-20**
FM 3.18, 3.13	**SEXUAL OFFENCES** FM3.18 Describe anatomy of male and female genitalia, hymen and its types. Discuss the medico-legal importance of hymen. Define virginity, defloration, legitimacy and its medicolegal importance FM3.13 Describe different types of sexual offences. Describe various sections of IPC regarding rape including definition of rape (Section 375 IPC), Punishment for Rape (Section 376 IPC) and recent amendments notified till date	**Lecture-21**
FM 3.14	**SEXUAL OFFENCES** FM3.14 Describe and discuss the examination of the victim of an alleged case of rape, and the preparation of report, framing the opinion and preservation and dispatch of trace evidences in such cases	**Small group-19 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.15	**SEXUAL OFFENCES** FM3.15 Describe and discuss examination of accused and victim of sodomy, preparation of report, framing of opinion, preservation and dispatch of trace evidences in such cases	**Small group-20 teachings/tutorials/ Integrated teaching/ Practical's**
FM 4.13	**Medical Jurisprudence (Medical Law and ethics)** FM 4.13 Describe social aspects of Medico-legal cases with respect to victims of assault, rape, attempted suicide, homicide, domestic violence, dowry- related cases	**Small group-21 teachings/tutorials/ Integrated teaching/ Practical's**
FM 14.14	**Skills in Forensic Medicine and Toxicology** FM14.14 To examine & prepare report of an alleged accused in rape/unnatural sexual offence in a simulated/ supervised environment	**Small group-22 teachings/tutorials/ Integrated teaching/ Practical's**
FM 14.15	**Skills in Forensic Medicine and Toxicology** FM14.15 To examine & prepare medico-legal report of a victim of	**Small group-23 teachings/tutorials/**

	sexual offence/unnatural sexual offence in a simulated/ supervised environment	**Integrated teaching/ Practical's**
FM 3.16	**SEXUAL OFFENCES** **SEXUAL OFFENCES** FM3.16 Describe and discuss adultery and unnatural sexual offences- sodomy, incest, lesbianism, buccal coitus, bestiality, indecent assault and preparation of report, framing the opinion and preservation and dispatch of trace evidences in such cases	**Small group-24 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.17	**SEXUAL OFFENCES** FM3.17 Describe and discuss the sexual perversions fetishism, transvestism, voyeurism, sadism, necrophagia, masochism, exhibitionism, frotteurism, Necrophilia	**SDL-4**
FM 3.19	**SEXUAL OFFENCES** FM3.19 Discuss the medicolegal aspects of pregnancy and delivery, signs of pregnancy, precipitate labour superfoetation, superfecundation and signs of recent and remote delivery in living and dead	**Lecture-22**
FM 14.13	**SEXUAL OFFENCES** FM14.13 To estimate the age of foetus by post-mortem examination	**Small group-25 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.20	**SEXUAL OFFENCES** FM 3.20 Discuss disputed paternity and maternity	**Small group-26 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.21	FM 3.21 Discuss Pre-conception and Pre Natal Diagnostic Techniques (PC&PNDT) - Prohibition of Sex Selection Act 2003 and Domestic Violence Act 2005	**Small group-27 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.22, 3.23	**SEXUAL OFFENCES** FM 3.22 Define and discuss impotence, sterility, frigidity, sexual dysfunction, premature ejaculation. Discuss the causes of impotence and sterility in male and female FM 3.23 Discuss Sterilization of male and female, artificial insemination, Test Tube Baby, surrogate mother, hormonal replacement therapy with respect to appropriate national and state laws	**Small group-28 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.24, 3.25, 3.26	**SEXUAL OFFENCES** FM 3.24 Discuss the relative importance of surgical methods of contraception (vasectomy and tubectomy) as methods of contraception in the National Family Planning Programme FM 3.25 Discuss the major results of the National Family Health Survey FM 3.26 Discuss the national Guidelines for accreditation,	**Small group-29 teachings/tutorials/ Integrated teaching/ Practical's**

	supervision & regulation of ART Clinics in India	
FM 3.27, 3.28	FM 3.27 Define, classify and discuss abortion, methods of procuring MTP and criminal abortion and complication of abortion. MTP Act 1971 FM 3.28 Describe evidences of abortion - living and dead, duties of doctor in cases of abortion, investigations of death due to criminal abortion	**Lecture-23**
FM 3.29	**Torture and Human rights** FM3.29 Describe and discuss child abuse and battered baby syndrome	**Small group-30 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.30	**Torture and Human rights** FM3.30 Describe and discuss issues relating to torture, identification of injuries caused by torture and its sequalae, management of torture survivors	**Small group-31 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.31	**Torture and Human rights** FM3.31 Describe and discuss guidelines and Protocols of National Human Rights Commission regarding torture	**Small group-32 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.32	FM3.32 Demonstrate the professionalism while preparing reports in medicolegal situations, interpretation of findings and making inference/opinion, collection preservation and dispatch of biological or trace evidences	**Small group-33 teachings/tutorials/ Integrated teaching/ Practical's**
FM 3.33	**SEXUAL OFFENCES** FM3.33 Should be able to demonstrate the professionalism while dealing with victims of torture and human right violations, sexual assaults- psychological consultation, rehabilitation	**Small group-34 teachings/tutorials/ Integrated teaching/ Practical's**
FM 5.1, 5.2	**Forensic Psychiatry** FM5.1 Classify common mental illnesses including post-traumatic stress disorder (PTSD) FM5.2 Define, classify and describe delusions, hallucinations, illusion, lucid interval and obsessions with exemplification	**Lecture-24**
FM 5.3, 5.4	**Forensic Psychiatry** FM 5.3 Describe Civil and criminal responsibilities of a mentally ill person FM 5.4 Differentiate between true insanity from feigned insanity	**Lecture-25**
FM 5.5, 5.6	**Forensic Psychiatry** FM5.5 Describe & discuss Delirium tremens FM5.6 Describe the Indian Mental Health Act, 1987 with special	**Small group-35 teachings/tutorials/ Integrated teaching/**

	reference to admission, care and discharge of a mentally ill person	**Practical's**
FM 6.1	**Forensic Laboratory investigation in medical legal practice** FM 6.1 Describe different types of specimen and tissues to be collected both in the living and dead: Body fluids (blood, urine, semen, faeces saliva), Skin, Nails, tooth pulp, vaginal smear, viscera, skull, specimen for histo-pathological examination, blood grouping, HLA Typing and DNA Fingerprinting.	**Small group-36 teachings/tutorials/ Integrated teaching/ Practical's**
FM 6.1	**Forensic Laboratory investigation in medical legal practice** Describe Locard's Exchange Principle	**SDL-5**
FM 6.1	**Forensic Laboratory investigation in medical legal practice** FM 6.1 Describe different types of specimen and tissues to be collected both in the living and dead: Body fluids (blood, urine, semen, faeces saliva), Skin, Nails, tooth pulp, vaginal smear, viscera, skull, specimen for histo-pathological examination, blood grouping, HLA Typing and DNA Fingerprinting.	**Small group-37 teachings/tutorials/ Integrated teaching/ Practical's**
FM 6.2	**Forensic Laboratory investigation in medical legal practice** FM6.2Describe the methods of sample collection, preservation, labelling, dispatch, and interpretation of reports	**Small group-38 teachings/tutorials/ Integrated teaching/ Practical's**
FM 6.3	**Forensic Laboratory investigation in medical legal practice** FM6.3 Demonstrate professionalism while sending the biological or trace evidences to Forensic Science laboratory, specifying the required tests to be carried out, objectives of preservation of evidences sent for examination, personal discussions on interpretation of findings	**Small group-39 teachings/tutorials/ Integrated teaching/ Practical's**
FM 7.1	**Emerging technologies in Forensic Medicine** FM7.1 Enumerate the indications and describe the principles and appropriate use for: - DNA profiling - Facial reconstruction - Polygraph (Lie Detector) - Narcoanalysis, - Brain Mapping, - Digital autopsy, - Virtual Autopsy, - Imaging technologies	**Small group-40 teachings/tutorials/ Integrated teaching/ Practical's**
FM 7.1	**Emerging technologies in Forensic Medicine** FM7.1 Enumerate the indications and describe the principles and appropriate use for: - DNA profiling - Facial reconstruction - Polygraph (Lie Detector)	**Small group-41 teachings/tutorials/ Integrated teaching/ Practical's**

	- Narcoanalysis, - Brain Mapping, - Digital autopsy, - Virtual Autopsy, - Imaging technologies	
FM 14.21	**Skills in Forensic Medicine & Toxicology** FM14.21 To collect, preserve, seal and dispatch exhibits for DNA-Finger printing using various formats of different laboratories.	**Small group-42 teachings/tutorials/ Integrated teaching/ Practical's**
FM 14.18	**Skills in Forensic Medicine & Toxicology** FM14.18 To examine & prepare medico-legal report of a person in police, judicial custody or referred by Court of Law and violation of human rights as requirement of NHRC, who has been brought for medical examination	**Small group-43 teachings/tutorials/ Integrated teaching/ Practical's**
FM 14.19	**Skills in Forensic Medicine & Toxicology** FM14.19 To identify & prepare medico-legal inference from histo-pathological slides of Myocardial Infarction, pneumonitis, tuberculosis, brain infarct, liver cirrhosis, brain haemorrhage, bone fracture, Pulmonary oedema, brain oedema, soot particles, diatoms & wound healing	**Small group-44 teachings/tutorials/ Integrated teaching/ Practical's**
FM 14.5	**Skills in Forensic Medicine & Toxicology** FM14.5 Conduct & prepare post-mortem examination report of varied etiologies (at least 15) in a simulated/ supervised environment Journal and logbook checking-	**Small group-45 teachings/tutorials/ Integrated teaching/ Practical's** **It can be scheduled at any small groups as per availability of Post Mortem examination.**

MBBS

PHASE II& PHASE III Part -I

Internal Assessment

Subject: Forensic Medicine & Toxicology

Phase	I-Exam (After 3 months from start of II Phase-Jan in case phase II started in Oct.)			II-Exam (After three months of I Interna assessment Examination- Apr.)		
	Theory	Practical (Including 10 Marks for Journal & Log Book)	Total Marks	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks
II MBBS	**50**	**40+10=50**	**100**	**50**	**40+10=50**	**100**

Phase	I-Exam (After 3 months from start of III Phase- Jan/Feb in case phase III started in Oct.)			II-Exam (June/July-Preliminary)		
	Theory	Practical (Including 10 Marks for Journal & Log Book)	Total Marks	Theory	Practical	Total Marks
III/PART-I MBBS	**50**	**40+10=50**	**100**	**100**	**100**	**200**

1. There will be **4** internal assessment examinations in Forensic medicine. The structure of the Preliminary internal assessment theory examinations should be similar to the structure of University examination.
2. It is mandatory for the students to appear for all the internal assessment Examinations in the respective phases. A student who has not taken minimum required number of tests for Internal Assessment each in theory and practical will not be eligible for University examinations.

3. There will be only one additional examination for absent students (due to genuine reason) after approval by the Institutional Grievances Committee. It should be taken after preliminary examination and before submission of internal assessment marks to the University.
4. Internal assessment marks for theory will be out of 250 and practical will be out of 250.
5. Reduce total theory internal assessment to 40 marks and total practical internal assessment to 40 marks. Students must secure at least 50% marks of the total marks (combined in theory and practical; not less than 40 % marks in theory and practical separately) to be eligible for appearing University examination

6. **Conversion Formula for calculation of marks in internal assessment examinations**

	First IA II Phase	Second IA II Phase	Third IA III Phase Part -I	(Prelim) III Phase Part -I	Total	Internal assessment marks: Conversion formula (out of 40)	Eligibility to appear for final University examination (after conversion out of 40) (40% separately in Theory & Practical, 50% Combined)	
Theory	50	50	50	100	250	Total marks obtained / 6.25	16 (Minimum)	Total of Theory + Practical Must be 40.
Practical	50	50	50	100	250	Total marks obtained / 6.25	16 (Minimum)	

7. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table

Internal Assessment Marks	Final rounded marks
15.01 to 15.49	15
15.50 to 15.99	16

8. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical
Separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject. Internal assessment marks will reflect as separate head of passing at the summative examination.

9. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

Second & Third part I MBBS Practical Mark's Structure

Internal Assessment Examinations

INTERNAL ASSESSMENT EXAMINATION-AS PER THE SYLABUS OF THEORY AND PRACTICAL COVERED IN THAT SPECIFIC DURATION OF PHASE-AUTONOMY AT INSTITUTE LEVEL.

Theory Internal Assessment Pattern

Total marks-50

Section A-MCQ's-10 Marks

Section-B- Short Answer Questions-30 Marks (6 out 0f 7)-5 Marks Each

Section-C-Long Answer Questions-10 Marks (1 out of 2)-10 Marks each.

Practical Internal Assessment Pattern

Total Marks-50.

Exercises taught in that particular term-30 Marks

(Each Exercise marks should be as per University Exam pattern)

Viva-10 Marks

Journal and Log book-10 marks

Paper wise distribution of topics for Prelim & MUHS Annual Examination

Year: PHASE III,PART I , Subject: Forensic Medicine

Paper	Section	Topics
Only one paper	**Section A**	**MCQs on all topics of the paper I**
	Section B	**1Court Procedures**
		2.Identity
		3.Death and it's changes
		4.Toxicology
		5. Forensic Laboratory investigation in medical legal practice
	Section C	**1.Medical Jurisprudence**
		2.Injury-Mechanical,regional,thermal,lightning,electrical etc.
		3.Voilent Asphyxial deaths
		4.Sexual offences **5.Forensic Psychiatry** **6. AETCOM Modules.**
II Not applicable	A	

PHASE III PART I-MBBS Practical Mark's Structure MUHS

Subject: Forensic Medicine & Toxicology													
Practical										Oral/ Viva			Total
Seat No.	Medical Certificate of Cause of Death (MCCD)	Injury report	Survivor/ Accused of Sexual Assault report	Alcohol Intoxication Drunkenness report	Sickness/ Fitness certificate	Age/ Potency/ Foetus Report	Weapon Report	Spots- • Bone-1 • Specimen-1 • Poison-2 • X-ray/ Photograph/ Instrument/ Document-1	Total	Forensic Pathology, Clinical Forensic Medicine	Medical Jurisprudence and Toxicology	Total	Practical & Oral (I + L)
	A	B	C	D	E	F	G	H	I	J	K	L	M
Max. Marks	10	10	10	10	10	10	5	3 X 5= 15	80	10	10	20	100

Suggestions:

1. It is suggested that 2 exercises can be kept as actual case or in simulated environment.
2. In the spots -2 spots can be kept as **OSPE stations.**

Phase III Part I MBBS Practical Mark's Structure Preliminary Examination

Subject: Forensic Medicine & Toxicology													
Practical										Oral/ Viva			Total
Seat No.	Medical Certificate of Cause of Death (MCCD)	Injury report	Survivor/ Accused of Sexual Assault report	Alcohol Intoxication Drunkenness report	Sickness/ Fitness certificate	Age/ Potency/ Foetus Report	Weapon Report	Spots- • Bone-1 • Specimen-1 • Poison-2 • X-ray/ Photograph/ Instrument/ Document-1	Total	Forensic Pathology, Clinical Forensic Medicine	Medical Jurisprudence and Toxicology	Total	Practical & Oral (I + L)
	A	B	C	D	E	F	G	H	I	J	K	L	M
Max. Marks	10	10	10	10	10	10	5	3 X 5= 15	80	10	10	20	100

Suggestions:

1. It is suggested that 2 exercises can be kept as actual case or in simulated environment.
2. In the spots - 2 spots can be kept as **-OSPE stations.**

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**MBBS –PHASE III Part -I** *(applicable w.e.f. OCT 2022 & onwards examinations)*				2. Subject Code	:
3. Subject (PSP)	:	**Forensic Medicine & Toxicology**					
(TT)	:						
4. Paper :	: --	5. Total Marks	: **100**	6. Total Time	: **3 Hrs.**	7. Remu. (Rs)	: Rs. 300/-
						8. Remu. (Rs)	: Rs. 350/-
9. Web Pattern	: [ ]	10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]	12. Web Old QP	: [ ]

Instructions:

SECTION "A" MCQ

1) *Put ☒ in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (20 x 1=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B" & "C"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answer book for all sections.*

SECTION "B" (40 Marks)

2 Short Answer Questions (Any 6 out of 7) (6x5=30)

a) b) c) d) e) f) g)

3 Long Answer Questions (Any 1 out of 2) (1x10=10)

a) b)

SECTION "C" (40Marks)

4. Short answer questions (One short note should be from AETCOM 3.3 and 3.4 is compulsory) (Any 6 out of 7) (6x5=30)

a) b) c) d) e) f) g)

5. Long Answer Questions (Any 1 out of 2) (1x10=10)

a) b)

Maharashtra University of Health Sciences, Nashik



FORENSIC MEDICINE AND TOXICOLOGYLOGBOOK for

PHASE II and PHASE III (Part 1) MBBS STUDENTS AS PER COMPETENCY BASED CURRICULUM

First Edition: 2021

Preface

The National Medical Commission has revised the undergraduate medical education curriculum so that the Indian Medical Graduate (IMG) is able to recognize **"Health for all"** as a national goal. He/she should also be able to fulfil his/her societal obligations. The revised curriculum has specified the competencies that a student must attain and clearly defined teaching learning strategies for the same. With this goal in mind, integrated teaching, skill development, AETCOM and self-directed learning have been introduced. There would be emphasis on communication skills, basic clinical skills and professionalism. There is a paradigm shift from the traditional didactic classroom-based teaching to learning environments where there is emphasis on learning by exploring, questioning, applying, discussing, analysing, reflecting, collaborating and doing. The recognition of this need is enshrined by a greatly enhanced allocation of time to these methods and also the assessment techniques. With this view in mind the log book has been designed as per the guidelines of Competency Based Curriculum.

Name of the College

_____

_____

Admission Year: _____

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No. _____ has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by **National Medical Commission, India** for Phase II & Phase III (Part 1) MBBS Competency Based Curriculum in the subject of **FORENSIC MEDICINE & TOXICOLOGY**.

Date: ___/___/_____

Place: _____

Teacher In-charge **Professor and Head**

Department of FORENSIC MEDICINE & TOXICOLOGY

Instructions

1) This logbook is prepared as per the guidelines of NMC for implementation of Competency based curriculum for Phase II MBBS and Phage III Part one students in the subject of Forensic Medicine & Toxicology.

2) Students are instructed to keep their logbook entries up to date.

3) Students are expected to write minimum 2 reflections on any two activities each of Clinical Forensic Medicine skills & Self-Directed Learning (SDL).

4) Students also have to write reflections on AETCOM Module - Reflections should be structured using the following guiding questions:

- What happened? (What did you learn from this experience)
- So what? (What are the applications of this learning)
- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

5) The logbook assessment will be based on multiple factors like

- Attendance
- Active participation in the sessions
- Timely completions
- Quality of write up of reflections
- Overall presentation

INDEX

Sr. No	Description	Page No's	Status Complete/ Incomplete	Signature of Teacher
1	Clinical Forensic Medicine Skills			
2	Self-Directed Learning, Seminars, Projects, Quizzes			
3	AETCOM Module			
4	Attendance Records			
5	Records of Internal Assessment			

* AETCOM – Competencies for IMG, 2018, Medical Council of India.

Record of Clinical Forensic Medicine & Toxicology Skills

Subject: Forensic Medicine & Toxicology **Phase II & Phase III part I MBBS**

Sub Item: Practicals (Student Lab.) / Practicals(Forensic Medicine & Toxicology) / Vertical Integration / Early Clinical Exposure / Seminar / Self Directed Learning

Competency # addressed	Name of Activity	Date completed : dd-mmyyyy	Attempt at activity First or Only (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty and date	Feedback Received Initial of learne
FM 14.20	To record and certify dying declaration in a simulated/ supervised environment						
FM 14.22	To give expert medical/ medico-legal evidence in Court of law						
FM 14.9	Demonstrate examination of & present an opinion after examination of skeletal remains in a simulated/ supervised environment						
FM 14.4	Conduct and prepare report of estimation of age of a person for medico-legal and other purposes & prepare medico-legal report in a simulated/ supervised environment						
FM 14.2	Demonstrate the correct						

	technique of clinical examination in a suspected case of poisoning & prepare medico-legal report in a simulated/ supervised environment						
FM 14.3	Assist and demonstrate the proper technique in collecting, preserving and dispatch of the exhibits in a suspected case of poisoning, along with clinical examination						
FM 14.6	Demonstrate and interpret medico-legal aspects from examination of hair (human & animal) fibre, semen & other biologicalfluids						
FM 14.7	Demonstrate & identify that a particular stain is blood and identify the species of itsorigin						
FM 14.8	Demonstrate the correct technique to perform and identify ABO &RH blood group of aperson						
FM 14.21	To collect, preserve, seal and dispatch exhibits for DNA-Finger printing using various formats of different laboratories.						
FM	To examine &						

14.16	prepare medico-legal report of drunk person in a simulated/ supervised environment						
FM 14.17	To identify & draw medico-legal inference from common poisons e.g. dhatura, castor, cannabis, opium, aconite copper sulphate, pesticides compounds, marking nut, oleander, Nux vomica, abrus seeds, Snakes, capsicum, calotropis, lead compounds & tobacco.						
FM 14.1	Examine and prepare Medico-legal report of an injured person with different etiologies in a simulated/ supervised environment						
FM 14.5	Conduct & prepare post-mortem examination report of varied etiologies (at least 15) in a simulated/ supervised environment						
FM 14.10	Demonstrate ability to identify & prepare medicolegal inference from specimens obtained from various types of injuries e.g. contusion, abrasion,						

	laceration, firearm wounds, burns, head injury and fracture ofbone						
FM 14.11	To identify & describe weapons of medicolegal importance which are commonly used e.g. lathi, knife, kripan, axe, gandasa, gupti, farsha, dagger, bhalla, razor &stick. Able to prepare report of the weapons brought by police and to give opinion regarding injuries present on the person as described in injury report/ PM report so as to connect weapon with the injuries. (Prepare injury report/ PM report must be provided to connect the weapon with the injuries)						
FM 14.12	Describe the contents and structure of bullet and cartridges used & to provide medico-legal interpretation from these						
FM 14.13	To estimate the age of foetus by post-mortem examination						
FM 14.14	To examine & prepare report of an alleged accused in						

	rape/unnatural sexual offence in a simulated/ supervised environment						
FM 14.15	To examine & prepare medico-legal report of a victim of sexual offence/unnatural sexual offence in a simulated/ supervised environment						
FM 14.18	To examine & prepare medico-legal report of a person in police, judicial custody or referred by Court of Law and violation of human rights as requirement of NHRC, who has been brought for medical examination						
FM 14.19	To identify & prepare medico-legal inference from histo pathological slides of Myocardial Infarction, pneumonitis, tuberculosis, brain infarct, liver cirrhosis, brain haemorrhage, bone fracture, Pulmonary oedema, brain oedema, soot particles, diatoms & wound healing						

Reflection on Clinical FORENSIC MEDICINE Skills

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

Reflection on Clinical FORENSIC MEDICINE Skills

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

Reflection on Clinical FORENSIC MEDICINE Skills

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

2. Self-Directed Learning (SDL), Seminars, Tutorials, Projects, Quizzes

Sr.No	Self-Directed Learning, Seminars, Tutorials, Projects, Quizzes	Date	Signature of Teacher

Reflection on Self- Directed Learning (SDL) activities

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

Reflection on Self- Directed Learning (SDL) activities

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

Reflection on Self- Directed Learning (SDL) activities

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

3: AETCOM Module

Reflection on AETCOM module

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

Reflection on AETCOM module

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

Reflection on AETCOM module

Name of the session:

Name of the faculty member/ presenter:

Date: **Time:** **Duration:**

Specific learning objectives of the session:

1)

2)

3)

Teaching Learning Methods:

- What happened? (What did you learn from this experience)

- So what? (What are the applications of this learning)

- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

Signature of Teacher-in- charge

4A: Attendance Record of the Student

Sr. No	Phase	Theory (%)	Practical (%)	Signature of the Student	Signature of the Teacher
A	Phase II				
B	Phase III – Part - I				
C	OVER ALL ATTENDANCE				

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

SECTION 4B: Details of attending extra classes [For poor attendance (if any)]

Sr.No	Date	Period	Total hrs	Signature of student	Signature of Teacher
Total hours					

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

Section 5. Records of Internal Assessment Examinations

Records of Internal Assessment examinations

Sr.No	Exam	Theory	Practical including viva	Signature of student	Signature of Teacher
1	I Internal Assessment	/ 50	/ 50		
2	II Internal Assessment	/ 50	/ 50		
3	III Internal Assessment	/ 50	/ 50		
4	IV Internal Assessment (Prelim)	/100	/100		
4	Internal Assessment marks	/ 250	/ 250		
5	Betterment exam	/ 100	/ 100		
6	Final Internal Assessment	/ 250	/ 250		
7	Final Internal Assessment (After Conversion)				

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

Maharashtra University of Health Sciences, Nashik

Practical Journal

Forensic Medicine and Toxicology

Name of Institute: _____

_____

University Roll No: _____

Name of Student: _____

Roll No: _____ Batch: _____

Session From: _____to_____

CERTIFICATE

Certified that this is the Bonafide Record of the practical work done by Mr. / Miss _____

in the Department of Forensic Medicine and Toxicology, _____

_____

during the session from _____ to _____ and his / her work is satisfactory / not satisfactory.

University Roll No. _____

Phase	**Remark**	**Signature of In-charge with Date**
Phase II		
Phase III – Part I		

In-charge Practical Programme Professor & Head

Sign/s of University Examiner/s & Date

Code of Medical Ethics

1. I solemnly pledge myself to consecrate my life to the service of humanity.
2. Even under threat, I will not use my medical knowledge contrary to the laws of humanity.
3. I will maintain the utmost respect for human life from the time of conception.
4. I will not permit consideration of religion, nationality, race, party politics or social standing to intervene between my duty and my patient.
5. I will practice my profession with conscience and dignity.
6. The health of my patient is my first consideration.
7. I will respect the secrets, which are confided in me.
8. I will give my teachers the respect and gratitude, which is their due.
9. I will maintain in my power, the honour and the noble tradition of medical profession.
10. My colleagues will be my brothers.

I make these promises solemnly, freely and upon my honour.

Signature

Place: -

Name _____

Seal: -

Address _____

_____

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Instructions to the students for Practical work

1. Punctuality in attending practical classes should be maintained, as 80 % attendance in practical is mandatory to appear for university examinations.

2. Silence and discipline should be observed during practical work.

3. Clean apron should be worn before entering the practical hall.

4. Every student should bring the practical record, a piece of clean linen, a measuring tape, stethoscope, torch, hammer and a hand lens and coloured pencils.

5. Listen carefully to the instructions given by the teacher for the day's work.

6. After finishing the practical work, complete them in the record book, get the record checked by the teacher on the same day.

Part- I

Medico-legal and Medical Certificates

01. Examination of Skeletal Remains (Bones) For Medicolegal Purpose

1) **List of Bones received** (Name of Bone):--
   a. Gross anatomical characteristic

2) **Condition of Bone**: --
   Brittle, Soiled, Stained, Damaged, Partly Burnt

3) **Human or not:** --
   a. Gross anatomical characteristic b. Microscopic examination,
   c. Chemical analysis of bone ash d. Precipitin test or Antihuman Immunoglobulin

4) **Belong to one individual or more?**
   a. Number, side and size of the bones b. Age and Sex
   c. Morphological similarities d. Use of short wave ultra violet light
   e. X-ray comparison or trabecular pattern f. Neutron activation analysis

5) **Stature:** --(body Height/ length)
   a. Use of multiplication Factor/Regression equation

6) **Race of Individual:** --
   a. Racial peculiarities in the individual bones (various indices)

7) **Age of Individual:** -
   a. Dental status if skull or mandible is available b. Ossification status
   c. Secondary changes in the bones like closure of skull sutures, bony joint surface etc

8) **Sex of Individual:** --
   a. General Characteristic b. Specific Changes in the individual bone
   c. Examination of soft parts if available

9) **Injuries:**
   Ante mortem or Post-mortem or Could not be determined

10) **Manner of Separation:** -
   a. State of soft tissue if available with marks of bite/cut etc.
   b. Changes due to putrefaction

11) **Cause of Death:** -
   a. Any injuries/ fracture b. Foreign body –bullet, pellets or any piece of weapon
   c. Chemical analysis for poisoning d. Neutron activation analysis

12) **Time since Death:** -
   a. State of soft tissue if available b. Changes due to putrefaction
   c. Immunological test d. Precipitin test
   e. Nitrogen content test.

13) **Identification of Subject:** -
   a. Congenital abnormalities or deformities
   b. Acquired peculiarities –injuries fractures etc.
   c. Determination of the blood group from the marrow/ tooth pulp
   d. Age, sex/ Race and stature of the individual
   e. Radiological examination.

Examination of Skeletal Remains (Bones) For Medicolegal Purpose

To,
The Investigating Officer
_____Police Station_____

Subject: - Regarding Examination of Bones (Skeletal remains)
Reference: Your letter No._____ Dated_____ received on Date_____
ADR No/ C.R. No._____ u/s_____

Here with forwarding opinion regarding Skeletal remains Brought by PC_____B.No._____
_____Police Station_____.

Bones / Skeletal remains received in sealed /not sealed condition. Seal verified and found intact.

Observation / Examination Finding

1) List of Bones received: --(Name of Bone)

2) Condition of Bone: --

(Brittle, Soiled, Stained, Damaged, Intact)

3) Human or not: --

4) Belong to one individual or more?

5) Stature: -- (Multiplication factor/Regressive equation)

6) Race: --

7) Age: - A) Ossification Status
B) Secondary Changes
C) Dental Status (Skull, Mandible, Face)

8) Sex: -- A) General Characteristic
B) Specific Changes

9) Injuries: --

10) Manner of Separation:-

11) Cause of Death: -

12) Time since Death: -

13) Identification of Subject: -

Opinion: -

i) From the above finding, I am of opinion that the bone(s) belong to _____
origin of _____Sex and aged about_____
ii.) Cause of death _____
iii) Time since death _____

Signature
Place:- Name of Doctor _____
Seal:- Designation _____

Examination of Skeletal Remains (Bones) For Medicolegal Purpose

To,
The Investigating Officer
_____Police Station_____

Subject: - Regarding Examination of Bones (Skeletal remains)
Reference: Your letter No._____ Dated_____ received on Date_____
ADR No/ C.R. No._____ u/s_____

Here with forwarding opinion regarding Skeletal remains Brought by PC_____B.No._____
_____Police Station_____.

Bones / Skeletal remains received in sealed /not sealed condition. Seal verified and found intact.

Observation / Examination Finding

1) List of Bones received: --(Name of Bone)

2) Condition of Bone: --

(Brittle, Soiled, Stained, Damaged, Intact)

3) Human or not: --

4) Belong to one individual or more?

5) Stature: -- (Multiplication factor/Regressive equation)

6) Race: --

7) Age: - A) Ossification Status
B) Secondary Changes
C) Dental Status (Skull, Mandible, Face)

8) Sex: -- A) General Characteristic
B) Specific Changes

9) Injuries: --

10) Manner of Separation: -

11) Cause of Death: -

12) Time since Death: -

13) Identification of Subject: -

Opinion: -

i) From the above finding, I am of opinion that the bone(s) belong to _____
origin of _____Sex and aged about_____
ii.) Cause of death _____
iii) Time since death _____

Signature
Place:- Name of Doctor _____
Seal:- Designation _____

02. Age Estimation Report

Dental eruption and age-

Temporary Teeth	Eruption Time	Permanent Teeth	Eruption Time
Central incisors (Lower)	6-8 months	First molars	6-7 years
Central incisors (Upper)	7-9 months	Central incisors	6-8 years
Lateral incisors (Upper)	7-9 months	Lateral incisors	8-9 years
Lateral incisors (Lower)	10-12 months	First Bicuspid	9-11 years
first molars	12-14 months	Second Bicuspid	10-12 years
Canines	17-18 months	Canines	11-12 years
Second molars	20-30 months	Second molars	12-14 years
		Third molars	17-25 years

Development of hairs-

A) Axillary hair –

- 14 - 15 years : Brownish, soft space growth
- 16 –17 years : Thick, black, well grown

B) Beard and moustaches –

- 15 – 16 years – Begins to appear as downy, brown hair over chin.
  Moustaches appear earlier than beard.
  1-2 year after eruption hair became blackish and thick.

C) Pubic hairs –

- Stage I – Few brownish, downy hair (12-14 years)
- Stage II – darken and more curled pubic hair (14-16 years)
- Stage III - Darker, thicker, curly adult hair but no hair over medial surface of thigh (16-18 years)
- Stage IV – Thick, black curly pubic hair spread both over Mons pubis and medial surface of thighs (>18 years)

Ossification centres-

Joint	Bone	Appearance of Ossification centres	Fusion of ossification centres
Elbow	Humerus	**Lower end-** Capitulum-1 year Trochlea- 10 yrs Lateral epicondyle- 11 yrs Medial epicondyle- 6 to 7 yrs	Lower end of humerus complete fusion- 14 to 16 yrs
	Radius	Upper end (head) - 5 yrs	16 yrs
	Ulna	Upper end (Olecranon)- 9 yrs	16 yrs
Wrist	Radius	Lower end- 2 yrs	18-19 yrs
	Ulna	Lower end- 6 yrs	17-18 yrs
	Carpals	Pisiform-11 yrs, Trapezoid, Scaphoid-5yrs	Base of first metacarpal- 15 yrs
Pelvis	Tri-radiate cartilage	Separate centre in acetabulum-13 yrs	Fuses in acetabulum- 15 yrs
	Ischio-Pubic rami	---	Unites with each other- 6 yrs
	Femur	Lesser trochanter – 12 to 14 yrs	Head and both trochanters-17-18 yrs
		Iliac crest- 14 yrs	20-21 yrs
		Ischial tuberosity- 16 yrs	20-21 yrs

Tanner staging- sexual maturity

MALE (Genital development)

Stage 1: Pre-adolescent stage. Testis, penis, scrotum about same size as childhood. No pubic hair.

Stage 2: Enlargement of scrotum and testis. Skin of scrotum reddens and changes in texture. Scanty light pubic hair mainly at base of penis. Little enlargement of penis.

Stage 3: Further growth of scrotum. Pubic hair darkens and begins to curl. Penis enlarges mainly in length.

Stage 4: Increase in breadth of penis. Development of glans. Scrotum enlarges and darkens. Adult type of pubic hair but does not spread to medial part of thigh.

Stage 5: Genitalia adult type. (Penis-10-12cm, Volume of testis-20cc, length of testis-4cm or more) Pubic hair spreads to medial part of thigh.

FEMALE (Breast / Pubic hair development)

Stage1: Preadolescent; breast shows elevation of papilla only. No pubic hair

Stage2: Breast bud stage. Elevation of breast and papilla as a small mound. Enlargement of areola diameter. Scanty lightly pigmented pubic hair, mainly at labia.

Stage3: Further enlargement of breast and areola, no separation at contours. Pubic hair becomes darker and begins to curl.

Stage4: Projection of areola and papilla to form a secondary mound above the level of breast. Adult type of pubic hair less in amount and no spread to medial surface of thigh.

Stage5: Mature stage. Projection of nipple only; recession of areola to the level of general contour of breast. Adult feminine triangular type of pubic hair, may spread to medial side of thigh.

Age Estimation Report

A. Preliminary Information- Name: Shri/ Smt/ Kum. _____

Age as stated- _____ Sex- _____ Address- _____

Brought by: _____

Date: _____ Time: _____ MLC No: _____ Dated: _____

Consent: I am willing to get examined physically and radiologically for estimation of age.

(*This consent is explained to patient in _____ language*)

Signature/Thumb impression

(Subject/Guardian)

Examined in presence of-

Signature/Thumb impression

Identification Marks:

1. _____

   _____

2. _____

   _____

B. Clinical Examination:

Physical development _____ Height_____ Weight _____

Secondary Sexual Characters:

Male moustaches _____ Female Breast development _____

Beard_____ Menarche _____

Voice_____ Last Menstrual period (LMP)_____

Axillary hair_____ Axillary hair _____

Pubic hair_____ Pubic hair _____

External genitalia_____ External genitalia_____

C. Dental status-

Spacing behind second molar- _____ Abnormality if any-_____

D. Radiological Examination: Reference: x-ray plate no._____ Date- _____

1.

2.

3.

4.

<u>Conclusion</u>: From clinical, dental and radiological examinations, the age of the subject on date _____ is between _____ to_____ including margins of errors.

Date: -

Place: -

Seal

Signature

Name of Doctor _____

Designation _____

Age Estimation Report

A. Preliminary Information- Name: Shri/ Smt/ Kum. _____

Age as stated- _____ Sex- _____ Address- _____

Brought by: _____

Date: _____ Time: _____ MLC No: _____ Dated: _____

Consent: I am willing to get examined physically and radiologically for estimation of age.

(*This consent is explained to patient in _____ language*)

Signature/Thumb impression
(Subject/Guardian)

Examined in presence of-

Signature/Thumb impression-

Identification Marks:

1. _____
   _____
2. _____
   _____

B. Clinical Examination:

Physical development _____ Height_____ Weight _____

Secondary Sexual Characters:

Male moustaches _____ Female Breast development _____

Beard_____ Menarche _____

Voice_____ Last Menstrual period (LMP)_____

Axillary hair_____ Axillary hair _____

Pubic hair_____ Pubic hair _____

External genitalia_____ External genitalia_____

C. Dental status-

Spacing behind second molar- _____ Abnormality if any-_____

D. Radiological Examination: Reference: x-ray plate no._____ Date- _____

1.
2.
3.
4.

<u>Conclusion</u>: From clinical, dental and radiological examinations, the age of the subject on date _____ is between _____ to_____ including margins of errors.

Date: -
Place: -

Seal

Signature
Name of Doctor _____
Designation _____

03. Examination of Foetus for Age

To

The Investigating Officer

_____ Police Station _____

Subject: Submission of Report of Examination of Foetus for Age.
Reference: Your letter No._____ _____ Dated _____ _____ _____

Sir,

I am sending to you the Report of Examination of Foetus for Age.

Observations-

I. External Examination:

1. Length:
2. Weight:
3. Lanugo:
4. Scalp Hair:
5. Eyes:
6. Pupillary Membrane:
7. Nails:
8. Vernix Caseosa:
9. Umbilicus:
   position & status
10. Genitalia:
11. Any other finding:

II. Internal Examination:

1. Ossification centres:
2. Meconium:
3. Any other findings:

Opinion about the age of foetus: _____

_____

_____

_____

_____

Place:
Date and Time:

Signature
Name of Doctor _____
Designation _____

Receipt: Received original copy of the report, the new-born,
_____ & its belongings. Name & Signature of I.O.

Table: Age-related Changes in the Foetus

Parameter	Age in Lunar Months							
	3rd	4th	5th	6th	7th	8th	9th	10th
Length	About 9 cm	About 16 cm	About 25 cm	About 30 cm	About 35 cm	About 40 cm	About 45 cm	About 45-50 cm
Weight	About 30gm	About 120gm	About 400gm	About 700gm	About 1kg	About 1.5kg	About 2-2.5kg	About 3-3.5kg
Nails	In membra-nous form	-	Nearing tips of fingers	-	Thicker but do not reach ends of fingers	Reach tips of fingers	Beyond tips of fingers	Beyond tips of fingers but reach only the tips of toes
Lanugo	-	First exhibited between 13 and 16 weeks	Covers face and body	-	Greatest between 28 and 30 weeks	Dis-appeared from the face	Around shoulders only	-
Scalp Hair	-	-	Appear	Appreciable	About 1.0 cm long	About 1.5 cm long	About 2 cm long	About 2-3 cm long
Sex	Indisting uishable	Differen-tiable	-	-	-	-	-	-
Eyes	-	-	-	Eyelids adherent. Eyelashes Appear	Eyelids non–adherent. Eyelashes Present	Well–Formed	-	-
Pupil Membrane	Appears	Visible	Present	Present	Disappears	-	-	-
Vernix Caseosa	-	-	Appears	Present	-	-	Present over flexures of joints and neck folds	Present over flexures of joints and neck folds
Meconium	-	In the upper part of small intestine	In the beginning of large intestine	In the upper part of large intestine	In the whole of large intestine	-	In the Rectum	-
Testicles	-	-	-	Lie close to respective kidneys	Lt—near the external inguinal ring; Rt—near the internal inguinal ring	Lt—in the scrotum Rt—near the external inguinal ring	Both testicles in the scrotum	
Centres of ossification	-	-	For calcaneum and ischium	For manubrium & 1st segment of sternum	For talus, 2nd & 3rd segment of sternum	-	For lower end of femur	For cuboid upper end of tibia, etc.

04. Medical Certificate of Cause of Death (MCCD)

The data on cause of death contained in the certificate serve many purposes: they help in assessing the effectiveness of public health programmes and provide a feed-back for future policy and implementation. They are essential for better health planning and management and for deciding priorities of health and medical research programmes.

- Legal Provisions: Registration of Birth & Deaths Act (RBD), 1969 for certification by a medical practitioner who has attended the deceased during the latter's last illness. The relevant sections of the Act are: **Section 10(2)**, **Section 10(3), Section 17(1) (b)**

2. SPECIFIC INSTRUCTIONS

2.1 Name of the deceased

To be given in full. Do not use initials. Also give name of father (or husband in case of married female) after the name of the deceased, using appellation S/o or D/o or W/o. In case of infants not yet named, write son (or daughter) of, followed by names of mother and father.

2.2 Age

If more than a year old, give age in years last birthday (completed number of years). If under one year, give age in months and days. If under 24 hours, give in hours and minutes. 2.3 Method of certification of cause of death 2.3.1 The medical part of the certificate is designed by the WHO to facilitate reporting the underlying cause of death and to obtain information of the causal and pathological sequence of events leading to death. It consists of two parts, the first relating to the sequence of events leading to death, and the second to other significant conditions that contributed to the death.

2.3.2 This part should be written by the attending physician or a physician having personal knowledge of the case history. The names of the diseases should be written in full and legibly to avoid the risk of their being misread. Abbreviations and short form of disease condition should not be used. He should avoid indefinite or inadequate terms. Inadequate descriptions may put the statistical office in difficulty at the time of classification of the data. Mention of terminal events or mode of dying as the only entry in the statement leaves the certificate incomplete. Similarly, symptomatic remarks will not suffice. A properly completed certificate will show the underlying cause on the lowest used line of part I and the conditions if any, as a consequence thereof will have been entered above it in ascending casual order of sequence.

2.3.3 PART – I OF THE CAUSE OF DEATH STATEMENT

Only one cause is to be entered on each line of Part I. The underlying cause of death should be entered on the lowest line used in this part. The underlying cause of death is the condition that started the sequence of events between normal health and the (direct) immediate cause of death.

Line (a): Immediate cause

The direct or immediate cause of death is reported on line (a). This is the disease, injury or complication that directly preceded death. It can be the sole entry in the statement if only one condition was present at death. There must always be an entry on line (a). The mode of dying (e.g., heart failure, respiratory failure) should not be stated at all since it is no more than a symptom of the fact that death occurred and provides no useful information. In the case of a violent death, enter the result of the external cause (e.g., fracture of vault or skull, crushed chest).

Line (b): Due to (or as a consequence of) If the condition on line (a) was the consequence of another condition, record that in line (b). This condition must be antecedent to the immediate cause of death, both with respect to time and etiological or pathological violence or circumstances of accident is antecedent to an injury entered on line (a) and should be entered on line (b), although the two events are almost simultaneous (e.g., automobile accident, fall from tree). An antecedent condition might have just prepared the way for the immediate cause of death, by damage to tissues or impairment of function, even after a long interval.

Line (c): The condition, if any which gave rise to the antecedent condition on line (b) is to be reported here. The remarks given for line (b) apply here also. If the condition on line (b) is the underlying cause, nothing more be entered on this line. However, if the sequence of events comprises more than three stages, extra line (and entries) may be made in part I. However, many conditions are involved; write the full sequence, one condition per line, with the most recent condition (immediate cause) at the top, and the earliest (the condition that started the sequence of event between normal health and death) last. Normally the condition or circumstance on the lowest line used in part I will be taken as the basis for underlying cause statistics, though classification of it may be modified to take account of complications or other conditions entered by special provisions of the ICD.

2.3.4 PART-II OTHER SIGNIFICANT CONDITIONS

Enter, in order of significance, all other diseases or conditions believed to have unfavourably influenced the course of the morbid process and thus contributed to the total outcome but which were not related to the disease or condition directly causing death. There will be cases where it will be difficult to decide whether a condition relevant to death should be recorded as part of the fatal sequence in part I or as a contributory condition in part II. Conditions in part I should represent a distinct sequence so that each condition may be regarded as being the consequence of the condition entered immediately below it. Where a condition does not seem to fit into such a sequence, consider whether it belongs to part II. In certifying the causes of death for Part II, any disease, abnormality, injury or late effects of poisoning, believed to have adversely affected the decedent should be reported, including: • Use of alcohol and/or other substances. • Smoking history. • Environmental factors, such as exposure to toxic fumes, history of working in some specific industry, professional exposure to toxins, specific animals etc. • Recent pregnancy, if believed to have contributed to the death. • Late effects of injury, including head injury sequelae • Surgical information, if applicable. • Any iatrogenic underlying cause.

2.3.5 INTERVAL BETWEEN ONSET AND DEATH

Space is provided, against each condition recorded on the certificate for the interval between the presumed onset of morbid condition and the date of death. Exact period should be written when it is known; in other cases, approximate periods like “from birth”, “several years” or “unknown” should be indicated. This provides a useful check on the sequence of causes as well as useful information about the duration of illness in certain diseases.

2.4 Accidents or suicide or homicide is ruled out, how the fatal injury occurred should be explained indicating briefly the circumstances or cause of the accident. In case of medico-legal cases, the certificate has to be given by the police authorities. However, the Registrar should be informed of such cases, by the hospital.

2.5 Female death Information on pregnancy and delivery is needed in case of death of women in the childbearing age (15 to 49 years) even though the pregnancy may have had nothing to do with the death. 2.6 Ensuring completeness of information

2.6.1 While giving the casual chain of events in the statement of cause of death, a complete case history is not required but, if information is available, enough details may be given to enable proper classification of the underlying cause. The certifier cannot always be certain as to what details are required and therefore, a list giving examples of incomplete descriptions and what additional information are required is included in the annexure for guidance.

The terms included in the annexure are those employed usually and are of the following types: - (i) A symptom that may arise from different group of diseases. (ii) A morbid condition that could result from several types of infection, known or unknown. (iii) With connotation of any of several morbid conditions having distinctive categories in the classification list like acute, sub-acute, chronic, simple etc. (iv) Mention of a disease which is generally localised, without indicating the organ or part of the body affected. (v) A morbid condition that requires for its classification, a knowledge of the circumstances in which it arose.

2.6.2 As a general rule, record diagnoses as precisely as the information permits, incorporating relevant details from histological or autopsy reports. Where an important detail is unknown the fact should be stated.

2.6.3 The following gives the pertinent details required to be spelt out in the medical part of the certificate corresponding to the major cause group of mortality;

1. Infections: Acute, sub-acute or chronic, name of the disease and/or infecting organism, the site if localised; mode of transmission, where relevant.
2. Neoplasms: The morphological type if known; malignant, benign etc., site of origin of primary growth and sites of secondary growths.
3. Endocrine disorders: Nature of disease process or disturbance of function: For thyroid diseases, whether toxic: for diabetes, nature of complication or manifestation in particular site.
4. Nutritional disorders: Type of deficiency, etc., and severity.
5. Blood disorders: Nature of disease process; type and nature of any deficiency for anaemias; whether hereditary (where relevant)
6. Nervous system disorders: Disease process; infecting organism (where relevant) whether hereditary (where relevant).
7. Circulatory diseases: Nature of disease process; site, if localized; acute or chronic where relevant, specify rheumatic or other aetiology for valvular heart conditions; any complications.
8. Respiratory diseased: Nature of disease process; acute or chronic; infecting organism, any external cause.
9. Digestive diseased: Nature of disease process; site of ulcers, hernias, diverticula, etc. Acute or chronic where relevant, nature of any complication for ulcers, appendicitis, hernias.
10. Genitourinary disorders: Acute or chronic, clinical syndrome and pathological lesions; site of calculi, infecting organism and site of infections; nature of complications.
11. Maternal deaths: Nature of complication: whether obstruction occurred during labour; timing of death in relation to delivery; for abortions, whether spontaneous or induced, legal or illegal, if induced.
12. Musculoskeletal disorders: Nature of disease process, infecting organism, underlying systemic diseases (where relevant); site; complication, whether congenital or acquired for deformities.
13. Congenital anomalies: Site and type, complications.

14. Perinatal deaths: Condition in foetus or infant; conditions in mother or of placenta, cord or membranes, if believed to have affected the foetus or infant; for deaths associated with immaturity, state length of gestation and/or birth weight; type of birth trauma; and complications, etc.
15. Injuries: Type, site, complications.
16. Poisoning: Substance involved; whether accidental (if suicide or homicide is ruled out). 17. Adverse effects of drugs in therapeutic use: State this fact and name or drug, nature of adverse effect, complications; condition treated.
17. External cause of accidents: For transport accidents, state vehicle involved, whether deceased was driver, passenger, etc. Description of accident place of occurrence, for other accidents, specifies circumstances and place of occurrence.
18. Old age or senility: This should not be given if a more specific cause is known. If old age was a contributory factor it should be entered in part II only.

ICD classification of diseases

The International Classification of Diseases (ICD) is the standard classification system for epidemiology, health management and clinical purposes. It contains a finite number of mutually exclusive code categories, describing all disease conditions. The classification is hierarchical in structure with subdivisions to identify broad groups and specific entities.

There are 3 key elements to the structure of ICD-10:

1. It has 3 volumes
    i. Volume 1 -- a tabular listing of diseases
    ii. Volume 2 -- an instruction manual
    iii. Volume 3 -- the comprehensive alphabetical index of diseases
2. It has 22 chapters
3. The structure of the ICD code is alphanumeric

Filling ICD code on a death certificate

The ICD code should be coded for all causes of death (immediate, intermediate and underlying causes) on a death certificate. ICD code for each cause of death should be filled against the particular cause of death in the death certificate.

Example: Patient XYZ is admitted with Acute Gastroenteritis and Dehydration & then dies in the ward.

Name of the Deceased					For use of Statistical office
Sex	Age at Death: If 1 year or more, age in years	If less than 1 year, age in Months	If less than one month, age in days	If less than one day, age in hours	
1. Male 2.Female 3.Transgender					
CAUSE OF DEATH				Interval between on set & death approx	
I					
Immediate Cause	(a) **Dehydration**				**E86**
State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc...	Due to (or consequences of)			.....	.....
	Acute Gastroenteritis				**A09**
Antecedent Cause	(b).....			.....	.....
Morbid conditions, if any, giving rise To the above Cause, stating underlying conditions last	Due to (or consequences of) (c).....				
II					
Other significant conditions contributing to the death but not related to the disease or conditions causing it	....			....	....

ANNEXURE-II
For **Hospital Events**

FORM NO. 4
(*See Rule 7*)

MEDICAL CERTIFICATE OF CAUSE OF DEATH
(Hospital In-patients. Not to be used for still births)

To be sent to Registrar along with Form No. 2 (Death Report)

Name of the Hospital _____
I hereby certify that the person whose particulars are given below died in the hospital in Ward No._____ On_____ At _____ AM/PM.

Name of the deceased					For use of statistical purpose
Sex	Age at death				
	If 1 year or more, age in years	If less than 1 year, age in month	If less than one month, age in days	If less than one day, age in hours	
1, Male 2.Female					
CAUSE OF DEATH				Interval between onset and death approx.	
I. Immediate cause: State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc.	a) ……..… due to (or as a consequence of)				
Antecedent cause: Morbid conditions, if any, giving rise to the above cause, stating the underlying conditions last.	b) …… due to (or as a consequence of)				
II. Other significant conditions contributing to the death, but not related to the diseases or conditions causing it.	c) …… …… ……				

Manner of Death How did the injury occur?
1. Disease 2. Accident 3. Assault 4. Intentional self-harm 5. Legal intervention 6. War
7. Pending investigation 8. Could not be determined.

If deceased was a female, was pregnancy the death associated with? 1. Yes 2. No
If yes, was there a delivery? 1. Yes 2. No

Name and signature of the Medical Attendant certifying the cause of death
Date of verification _____

(*To be detached and handed over to the relative of the deceased*)

Certified that Shri/Smt/Kum_____S/W/D of Shri _____
R/O _____ was admitted to this hospital on _____
and expired on _____.

Doctor_____
(Medical Superintendent & Name of Hospital)

ANNEXURE-II

For **Hospital Events**

FORM NO. 4

(*See Rule 7*)

MEDICAL CERTIFICATE OF CAUSE OF DEATH

(Hospital In-patients. Not to be used for still births)

To be sent to Registrar along with Form No. 2 (Death Report)

Name of the Hospital _____

I hereby certify that the person whose particulars are given below died in the hospital in Ward No._____ On_____ At _____ AM/PM.

<table>
<tr><td colspan="5">Name of the deceased</td><td rowspan="2">For use of statistical purpose</td></tr>
<tr><td>Sex</td><td colspan="4">Age at death</td></tr>
<tr><td></td><td>If 1 year or more, age in years</td><td>If less than 1 year, age in month</td><td>If less than one month, age in days</td><td>If less than one day, age in hours</td><td></td></tr>
<tr><td>1, Male
2.Female</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">CAUSE OF DEATH

I. Immediate cause:
State the disease, injury or complication
which caused death, not the mode of dying
such as heart failure, asthenia, etc.
a) …… …
due to (or as a consequence of)

Antecedent cause:
Morbid conditions, if any, giving rise to the above cause, stating the underlying conditions last.
b) ……
due to (or as a consequence of)

II. Other significant conditions contributing to the death, but not related to the diseases or conditions causing it.
c) ……
……
……</td><td colspan="2">Interval between onset and death approx.</td><td></td></tr>
</table>

Manner of Death — How did the injury occur?

1. Disease 2. Accident 3. Assault 4. Intentional self-harm 5. Legal intervention. 6. War
7. Pending investigation 8. Could not be determined.

If deceased was a female, was pregnancy the death associated with? 1. Yes 2. No

If yes, was there a delivery? 1. Yes 2. No

Name and signature of the Medical Attendant certifying the cause of death

Date of verification _____

(To be detached and handed over to the relative of the deceased)

Certified that Shri/Smt/Kum_____S/W/D of Shri _____

R/O _____ was admitted to this hospital on _____

and expired on _____.

Doctor_____

(Medical Superintendent & Name of Hospital)

For **Non-Hospital** Events

FORM NO. 4 A

(*See Rule 7*)

MEDICAL CERTIFICATE OF CAUSE OF DEATH

(For non-institutional deaths. Not to be used for still births)

To be sent to Registrar along with Form No. 2 (Death Report)

Name of the Hospital_____

I hereby certify that the person whose particulars are given below died in the hospital in Ward No._____ On_____ At _____AM/PM.

<table>
<tr><td colspan="5">Name of the deceased</td><td rowspan="2">For use of statistical purpose</td></tr>
<tr><td>Sex</td><td colspan="4">Age at death</td></tr>
<tr><td></td><td>If 1 year or more, age in years</td><td>If less than 1 year, age in month</td><td>If less than one month, age in days</td><td>If less than one day, age in hours</td><td></td></tr>
<tr><td>1, Male
2.Female</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">CAUSE OF DEATH

I. Immediate cause:
State the disease, injury or complication
which caused death, not the mode of dying
such as heart failure, asthenia, etc.
a) …… …
due to (or as a consequence of)

Antecedent cause:
Morbid conditions, if any, giving rise to the above cause, stating the underlying conditions last.
b) ……
due to (or as a consequence of)

II. Other significant conditions contributing to the death, but not related to the diseases or conditions causing it.
c) ……
……
……</td><td>Interval between onset and death approx.</td><td></td></tr>
</table>

If deceased was a female, was pregnancy the death associated with? 1. Yes 2. No

If yes, was there a delivery? 1. Yes 2. No

Name and signature of the Medical Attendant certifying the cause of death

Date of verification_____

(To be detached and handed over to the relative of the deceased)

Certified that Shri/Smt/Kum _____ S/W/D of Shri _____

R/O_____ was under my treatment from _____ to _____

and expired on _____at _____ AM/PM.

Doctor _____

Signature and address of Medical Practitioner/

Medical attendant with Registration No.

For **Non-Hospital** Events

FORM NO. 4 A

(*See Rule 7*)

MEDICAL CERTIFICATE OF CAUSE OF DEATH

(For non-institutional deaths. Not to be used for still births)

To be sent to Registrar along with Form No. 2 (Death Report)

Name of the Hospital_____ I hereby certify that the person whose particulars are given below died in the hospital in Ward No._____ On_____ At _____AM/PM.

<table>
<tr><td colspan="5">Name of the deceased</td><td rowspan="2">For use of statistical purpose</td></tr>
<tr><td>Sex</td><td colspan="4">Age at death</td></tr>
<tr><td></td><td>If 1 year or more, age in years</td><td>If less than 1 year, age in month</td><td>If less than one month, age in days</td><td>If less than one day, age in hours</td><td></td></tr>
<tr><td>1, Male
2.Female</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">CAUSE OF DEATH

I. Immediate cause:
State the disease, injury or complication
which caused death, not the mode of dying
such as heart failure, asthenia, etc. a) …… …
due to (or as a consequence of)

Antecedent cause:
Morbid conditions, if any, giving rise to the above cause, stating the underlying conditions last. b) ……
due to (or as a consequence of)

II. Other significant conditions contributing to the death, but not related to the diseases or conditions causing it. c) ……
……
……</td><td>Interval between onset and death approx.</td><td></td></tr>
</table>

If deceased was a female, was pregnancy the death associated with? 1. Yes 2. No

If yes, was there a delivery? 1. Yes 2. No

Name and signature of the Medical Attendant certifying the cause of death

Date of verification_____

(To be detached and handed over to the relative of the deceased)

Certified that Shri/Smt/Kum _____ S/W/D of Shri _____

R/O_____ was under my treatment from _____ to _____

and expired on _____at _____ AM/PM.

Doctor _____

Signature and address of Medical Practitioner/

Medical attendant with Registration No.

05. Medical Sickness / Under Treatment Certificate

Recent Passport size photo

Name of Patient: _____

Age: _____ Sex : _____

Address : _____

OPD/IPD No._____

ID Proof & No. (Any Govt ID) : _____

Identification Marks:

1. _____

_____

2. _____

_____

Signature & Thumb Impression of the Applicant: _____

I, Dr_____ after careful personal examination of the case hereby certify that _____ whose signature is given above is suffering from _____.

He/she is under my treatment for the same as outdoor/indoor patient and I consider that a period of absence from duty with effect from _____ to _____ (_____Days) is absolutely necessary for the restoration of his/her health.

Place:

Date and Time:

Signature

Name of Doctor _____

Designation _____

06. Medical Fitness Certificate

Recent Passport size photo

Name of Patient: _____

Age: _____ Sex: _____

Address: _____

OPD/IPD No._____

ID Proof & No. (Any Govt ID) : _____

Identification Marks:

1. _____

_____

2. _____

_____

Signature & Thumb Impression of the Applicant: _____

I, Dr _____ after careful personal examination of the case hereby certify that _____ on restoration of his/her health is now fit to resume service from _____.

Place:

Date and Time:

Signature

Name of Doctor _____

Designation _____

07. Fitness Certificate for Employment

Recent Passport size photo

We hereby certify that, we have examined Shri/Smt. _____ a candidate for employment in the _____ Department and cannot discover that he/she has any disease, constitutional weakness or bodily infirmity except _____ _____ _____.

Fit:

*He / She is Temp. Unfit:

Unfit:

We do not consider this is a disqualification for employment in the Office of _____ _____. His / Her age is according to his/her own statement _____ years and by appearance about _____ years.

Identification Marks:

1. _____ _____

2. _____ _____

Signature/Thumb impression of the Candidate

Place: _____

Date: _____

Member	Member	Chairman
Medical Board	Medical Board	Medical Board

08. Examination \ Certificate of the injured (Injury Report)

1. Medico-legal injury cases should be examined without delay after adopting the lifesaving procedure.
2. Valid consent for examination must be obtained from the injured or the competent authority.
3. All observation should be entered at once in the accident register with appropriate sketches and diagrams. Injury should be photographed whenever possible.
4. Relevant information should always be entered in injury certificate or report and be prepared in duplicate.
5. Whenever there is apprehension of death of the injured person *or* he is likely to die from the effect of the injury, arrangement should be made for recording dying declaration.

Definitions:

Injury: Legal definition as per sec. 44 IPC.

Hurt: Legal definition as per sec. 319 IPC.

Simple injury:

Grievous hurt: Legal definition as per sec. 320 IPC.

Examination / Certification of Injured. [Injury Report]

To,
The Investigating Officer,
_____ Police Station _____

Subject: Submission of report of examination of injured person
Reference: Your letter No. _____ Dated _____

Sir,

I am forwarding herewith the report of examination of:

Name of Injured: _____ Son/Wife/Daughter/Widow of _____
Surname _____ resident of _____
Brought by PC _____NO._____P.S. _____

Consent:

(*This consent is explained to patient in* _____*language*). Signature/LTI
Examined in presence of- (Subject/Guardian)
Signature/Thumb impression-
Identification marks: 1. _____
2. _____

History: History narrated by_____

Sr. No.	Nature of injury	Size in cms	Situation over the body	Type of injury	Possible/ Kind of weapon	Age of injury	Remarks / Investigation done, *if any*

Opinion:

Place:
Date and Time:

Signature
Name of Doctor _____
Designation _____

To,
The Investigating Officer,
_____ Police Station _____

Subject: Submission of report of examination of injured person
Reference: Your letter No. _____ Dated _____

Sir,

I am forwarding herewith the report of examination of:

Name of Injured: _____ Son/Wife/Daughter/Widow of _____
Surname _____ resident of _____
Brought by PC _____NO._____P.S. _____

Consent:

(*This consent is explained to patient in* _____*language*). Signature/LTI
Examined in presence of- (Subject/Guardian)
Signature/Thumb impression-
Identification marks: 1. _____
2. _____

History: History narrated by_____

Sr. No.	Nature of injury	Size in cms	Situation over the body	Type of injury	Possible/ Kind of weapon	Age of injury	Remarks / Investigation done, *if any*

Opinion:

Place:
Date and Time:

Signature
Name of Doctor _____
Designation _____

To,
The Investigating Officer,
_____ Police Station _____

Subject: Submission of report of examination of injured person
Reference: Your letter No. _____ Dated _____

Sir,

I am forwarding herewith the report of examination of:

Name of Injured: _____ Son/Wife/Daughter/Widow of _____
Surname _____ resident of _____
Brought by PC _____NO._____P.S. _____

Consent:

(*This consent is explained to patient in* _____*language*). Signature/LTI
Examined in presence of- (Subject/Guardian)
Signature/Thumb impression-
Identification marks: 1. _____
2. _____

History: History narrated by_____

Sr. No.	Nature of injury	Size in cms	Situation over the body	Type of injury	Possible/ Kind of weapon	Age of injury	Remarks / Investigation done, *if any*

Opinion:

Place:
Date and Time:

Signature
Name of Doctor _____
Designation _____

To,
The Investigating Officer,
_____ Police Station _____

Subject: Submission of report of examination of injured person
Reference: Your letter No. _____ Dated _____

Sir,

I am forwarding herewith the report of examination of:

Name of Injured: _____ Son/Wife/Daughter/Widow of _____
Surname _____ resident of _____
Brought by PC _____NO._____P.S. _____

Consent:

(*This consent is explained to patient in* _____*language*). Signature/LTI
Examined in presence of- (Subject/Guardian)
Signature/Thumb impression-
Identification marks: 1. _____
2. _____

History: History narrated by_____

Sr. No.	Nature of injury	Size in cms	Situation over the body	Type of injury	Possible/ Kind of weapon	Age of injury	Remarks / Investigation done, *if any*

Opinion:

Place:
Date and Time:

Signature
Name of Doctor _____
Designation _____

To,
The Investigating Officer,
_____ Police Station _____

Subject: Submission of report of examination of injured person
Reference: Your letter No. _____ Dated _____

Sir,

I am forwarding herewith the report of examination of:

Name of Injured: _____ Son/Wife/Daughter/Widow of _____
Surname _____ resident of _____
Brought by PC _____NO._____P.S. _____

Consent:

(*This consent is explained to patient in* _____*language*). Signature/LTI
Examined in presence of- (Subject/Guardian)
Signature/Thumb impression-
Identification marks: 1. _____
2. _____

History: History narrated by_____

Sr. No.	Nature of injury	Size in cms	Situation over the body	Type of injury	Possible/ Kind of weapon	Age of injury	Remarks / Investigation done, *if any*

Opinion:

Place:
Date and Time:

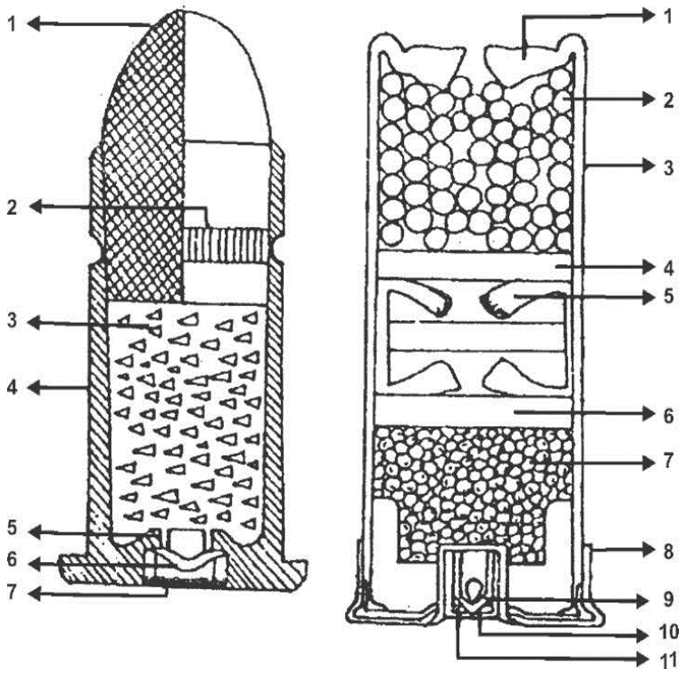
Signature
Name of Doctor _____
Designation _____

09. Examination of Weapon

Definition:

Dangerous Weapon as per sec 324 & 326 IPC.:

Label various parts of ammunition of fire arm.



Draw & label Weapon	Describe Weapon
	Kind of Weapon- Type of Weapon- Injuries Possible-
	Kind of Weapon- Type of Weapon- Injuries Possible-
	Kind of Weapon- Type of Weapon- Injuries Possible-
	Kind of Weapon- Type of Weapon- Injuries Possible-

Draw & label Weapon	Describe Weapon
	Kind of Weapon- **Type of Weapon-** **Injuries Possible-**
	Kind of Weapon- **Type of Weapon-** **Injuries Possible-**
	Kind of Weapon- **Type of Weapon-** **Injuries Possible-**
	Kind of Weapon- **Type of Weapon-** **Injuries Possible-**

Draw & label Weapon	Describe Weapon
	Kind of Weapon- Type of Weapon- Injuries Possible-
	Kind of Weapon- Type of Weapon- Injuries Possible-
	Kind of Weapon- Type of Weapon- Injuries Possible-
	Kind of Weapon- Type of Weapon- Injuries Possible-

1) Examination of the Weapon in Cases of Injuries (Sharp Edge Weapon)

To,
The Investigating Officer

_____Police Station _____

Sub: Submission of report of examination of weapon in connection with _____
_____

Reference:
1) Your letter No._____ Dated _____ with sealed packed weapon.

2) Injury Report / MLPM No.: _____ issued by _____Date: _____

Sir,

With reference to the above letter, I am sending the report about the weapon sent in sealed condition in connection with the injuries of _____

Name of weapon _____

Kind of weapon _____

Type of weapon _____

Description of the weapon:

Weight of weapon: _____(gm)

Total length of weapon: _____(cms)

Blade: is of _____, Texture: _____

Length: _____, Breadth: _____, Thickness: _____

Edges / Margins: _____ Point: _____

Stains / Foreign body if any: _____

Joint: Type: _____, Hilt: Size: _____

Handle: is of, _____ Texture: _____

Length: _____ , Breadth/ Maximum Circumference: _____

Stains / Foreign body if any: _____

Opinion:

Injuries possible by above weapon:

Identification marks if any on the weapon.
(*Put the signature on the weapon*)

The weapon was packed, sealed and handed over to _____of police station_____ for forwarding to FSL for chemical analysis.

Place: _____ Signature
Date & Time: _____ (Impression of seal) Name of Doctor _____
Receipt of weapon and report Designation _____

2) Examination of the Weapon in Cases of Injuries (Hard & Blunt weapon)

To,
The Investigating Officer

_____Police Station _____

Sub: Submission of report of examination of weapon in connection with _____
_____

Reference:
1) Your letter No._____ Dated _____ with sealed packed weapon.

2) Injury Report / MLPM No.: _____ issued by _____Date: _____

Sir,

With reference to the above letter, I am sending the report about the weapon sent in sealed condition in connection with the injuries of _____

Name of weapon: _____

Kind of weapon: _____

Type of weapon: _____

Description of the weapon:

Weight of weapon: _____(gm)

Length: _____Breadth / Maximum circumference: _____

Thickness: _____

Surface: _____

Texture: _____

Stains / Foreign body if any: _____

Opinion:

Injuries possible by above weapon:

Identification marks if any on the weapon.
(*Put the signature on the weapon*)

The weapon was packed, sealed and handed over to _____of police station_____ for forwarding to FSL for chemical analysis.

Place: _____ Signature
Date & Time: _____ (Impression of seal) Name of Doctor _____
Receipt of weapon and report Designation _____

10. Medico-legal Examination of Survivors / Victims of Sexual Violence

Definition of Rape:

CONFIDENTIAL

Medico-legal Examination Report of Sexual Violence

1. Name of the Hospital _____ OPD No. _____ Inpatient No. _____
2. Name _____ D/o or S/o (where known) _____
3. Address _____
4. Age (as reported) _____ Date of Birth (if known) _____
5. Sex (M/F/Others) _____
6. Date and Time of arrival in the hospital _____
7. Date and Time of commencement of examination _____
8. Brought by_____ (Name & signatures)
9. MLC No. _____Police Station_____
10. Whether conscious, oriented in time and place and person _____
11. Any physical/intellectual/psychosocial disability _____

(Interpreters or special educators will be needed where the survivor has special needs such as hearing/speech disability, language barriers, intellectual or psychosocial disability.)

12. Informed Consent/refusal

I_____D/o or S/o _____

hereby give my consent for:

a) Medical examination for treatment Yes/No

b) This medico-legal examination Yes/No

c) Sample collection for clinical & forensic examination Yes/No

I also understand that as per law the hospital is required to inform police and this has been explained to me. I want the information to be revealed to the police Yes/No

I have understood the purpose and the procedure of the examination including the risk and benefit, explained to me by the examining doctor. My right to refuse the examination at any stage and the consequence of such refusal, including that my medical treatment will not be affected by my refusal, has also been explained and may be recorded. Contents of the above have been explained to me in_____ language with the help of a special educator/interpreter/support person (circle as appropriate) _____.

If special educator/interpreter/support person has helped, then his/her name and signature_____

Name & signature/thumb impression of Witness

_____

_____

With Date, time and place

Name & signature of survivor or parent/Guardian/person in whom the child reposes trust in case of child (<12 yrs)

_____

_____

With Date, time and place

13. Marks of identification (Any scar/mole):

(1) _____

_____

(2) _____

_____



Left Thumb impression

14. Relevant Medical/Surgical history

Onset of menarche (in case of girls) – Yes/No Age of onset _____
Menstrual history – Cycle length and duration _____Last menstrual period_____
Menstruation at the time of incident -Yes/No, Menstruation at the time of examination - Yes/ No
Was the survivor pregnant at time of incident - Yes/No, If yes duration of pregnancy _____ weeks
Contraception use: Yes/No_____ If yes – method used:_____
Vaccination status – Tetanus (vaccinated/not vaccinated), Hepatitis B (vaccinated/not vaccinated)

15A. History of Sexual Violence

(i)Date of incidents being reported (ii)Time of incidents/s (iii)Location/s
(iv)Estimated duration: 1-7 days_____ 1 week to 2 months _____2-6 months _____ >6 months_____ Episode: One _____ Multiple _____Chronic (>6 months) _____ Unknown _____
(v) Number of assailants and name/s _____ (vi)Sex of Assailant(s) _____ Approx. Age of assailant (s) _____ If known to the survivor- relationship with the survivor _____
(vii) Description of incident in the words of the narrator: narrator of the incident: Survivor/informant(specify name and relation to survivor)_____ _____ _____

15C.

i. Emotional abuse or violence if any (insulting, cursing, belittling, terrorizing) _____
ii. Use of restraints if any _____
iii. Used or threatened the use of weapon(s) or objects if any_____
iv. Verbal threats (for example, threats of killing or hurting survivor or any other person in whom the survivor is interested; use of photographs for blackmailing, etc.) if any: _____
_____
v. Luring (sweets, chocolates, money, job) if any _____
vi. Any other: _____

15D.

i. Any H/O drug/alcohol intoxication: _____
ii. Whether sleeping or unconscious at the time of incident: _____

15E. If survivor has left any marks of injury on assailant/s, enter details: _____

15F. Details regarding sexual violence:

Was penetration by penis, fingers or object or other body parts (Write Y=Yes, N=No, DNK=Don't know) Mention and describe body part/s and/or object/s used for penetration.

	Penetration			Emission of semen		
Orifice of victim	By penis	By body part of self or assailant or third-party finger, tongue or any other)	By object	Yes	No	Don't know
Genitalia (vagina and/ or urethra)						
Anus						
Mouth						

Oral sex performed by assailant on survivor	Y	N	DNK
Forced masturbation of self by survivor	Y	N	DNK
Masturbation of assailant by survivor, forced manipulation of genitals of assailant by survivor	Y	N	DNK
Exhibitionism (perpetrator displaying genitals)	Y	N	DNK
Did ejaculation occur outside body orifice (Vagina/anus/mouth/urethra)?	Y	N	DNK
If yes, describe where on body			
Kissing, licking or sucking any part of survivor's body	Y	N	If yes, describe
Touching/ fondling	Y	N	If yes, describe
Condom used*	Y	N	DNK
If yes, status of condom	Y	N	DNK
Lubricant used*	Y	N	DNK
If yes, describe kind of lubricant used			
If object used, describe object:			
Any other form of sexual violence			

*Explain what condom and lubricant is to the survivor

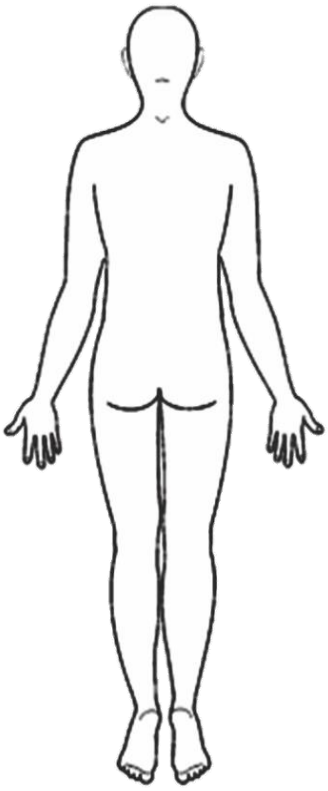
Post incident has the survivor	Yes/No/Do not know	Remarks
Changed clothes		
Changed undergarments		
Cleaned/washed clothes		
Cleaned/washed clothes undergarments		
Bathed		
Douched		
Passed urine		
Passed stools		
Rinsing of mouth/brushing/vomiting (circle any or all as appropriate)		

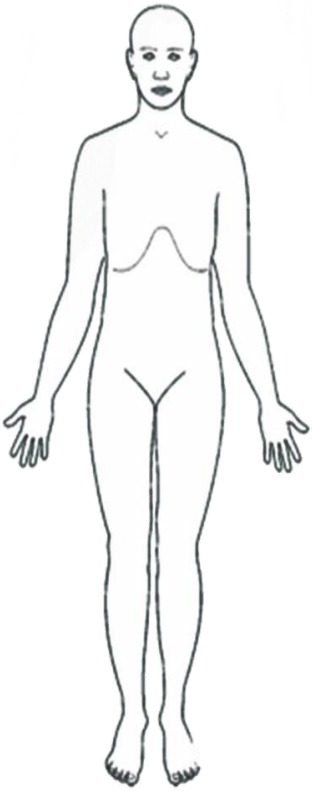
Time since incident _____
H/o vaginal/anal/oral bleeding/discharge prior to the incident of sexual violence _____
H/o vaginal/anal/oral bleeding/discharge since the incident of sexual violence _____
H/o painful urination/ painful defecation/ fissures/ abdominal pain/pain in genitals or any other part since the incident of sexual violence _____
_____
_____

16. General Physical Examination-
i. Is this the first examination _____
ii. Pulse _____ BP _____
iii. Temp _____Resp. Rate _____
iv. Pupils _____
v. Any observation in terms of general physical wellbeing of the survivor _____

17. Examination for injuries on the body if any
The pattern of injuries sustained during an incident of sexual violence may show considerable variation. This may range from complete absence of injuries (more frequently) to grievous injuries (very rare).
(Look for bruises, physical torture injuries, nail abrasions, teeth bite marks, cuts, lacerations, fracture, tenderness, any other injury, boils, lesions, discharge specially on the scalp, face, neck, shoulders, breast, wrists, forearms, medial aspect of upper arms, thighs and buttocks) Note the Injury type, site, size, shape, colour, swelling signs of healing simple/grievous, dimensions.)

Scalp examination for areas of tenderness, if hair pulled out/ dragged by hair)	
Facial bone injury: Orbital blackening, tenderness	
Petechial haemorrhages in eyes and other places	
Lips and Buccal mucosa/ gums	
Behind the ears	
Ear drum	
Neck, Shoulders and Breast	
Upper limb	
Inner aspect of upper arms	
Inner aspect of thighs	
Lower limb	
Buttocks	
Other, please specify	





18. Local examination of genital parts/other orifices*

A. External genitalia: record finding and state NA where not applicable.

Body parts to be examined	Findings
Urethral meatus and vestibule	
Labia majora	
Labia minora	
Fourchette and introitus	
Hymen	
Perineum	
External urethral meatus	
Penis	
Scrotum	
Testes	
Clitoropenis	
Labioscrotum	
Any other	

B. Per Vaginum /Per Speculum examination should not be done unless required for detection of injuries or for medical treatment.

P/S findings if performed _____

P/V findings if performed _____

Record reasons if P/V of P/S examination performed_____

C. Anus and Rectum (encircle the relevant)
Bleeding/tear/discharge/oedema/tenderness

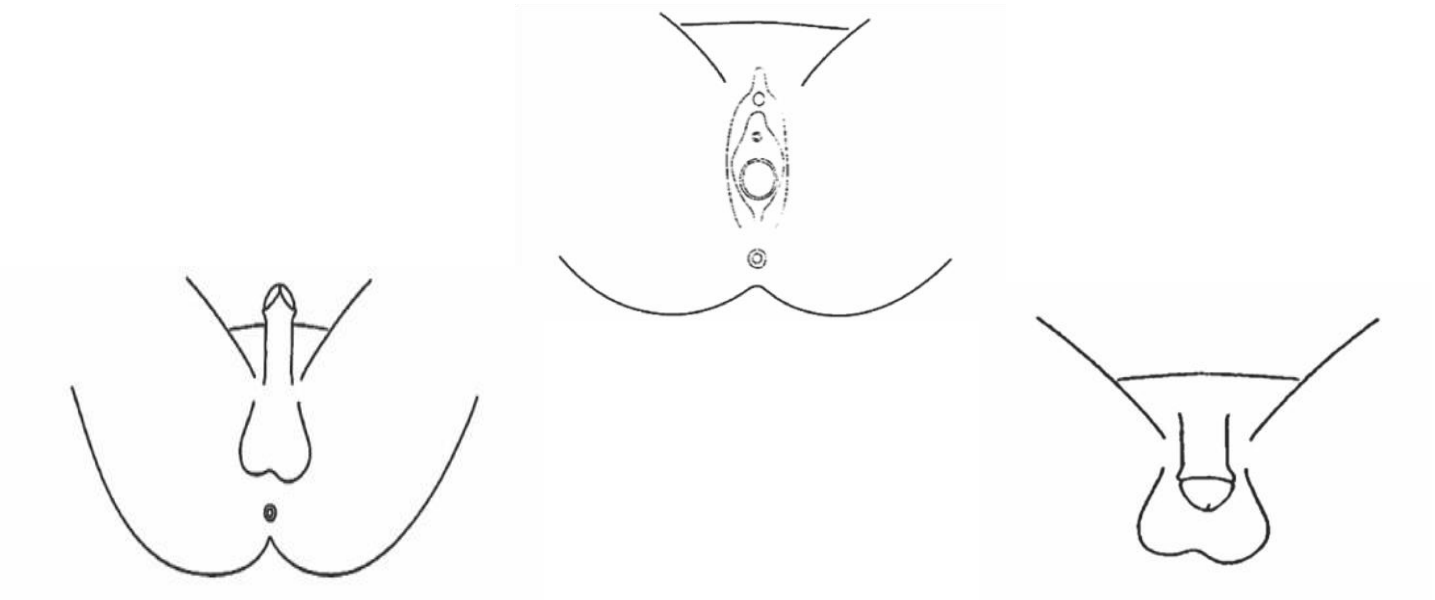
_____

_____

D. Oral Cavity - (encircle the relevant)
Bleeding/ discharge/ tear/oedema/ tenderness

_____

_____



19. Systemic examination:

1) Central Nervous System: _____

2) Cardio Vascular System: _____

3) Respiratory System: _____

4) Chest: _____

5) Abdomen: _____

20. Sample collected/ Investigations for hospital laboratory/ clinical laboratory:

1. Blood for HIV, VDRL, HbsAg _____

2. Urine test for pregnancy _____

3. Ultrasound for pregnancy/ internal injury _____

4. X-ray for injury _____

21. samples collection for central /state forensic laboratory.

1. Debris collection paper _____

2. Clothing evidence where available-(to be packed in separate paper bags after air drying)

List of Details of clothing worn by the survivor at time of incident of sexual violence

3. Body evidence samples as appropriate (duly labelled and packed separately)

	Collected/ Not collected	Reason for not collecting
Swabs from stains on the body (Blood, semen, foreign material, others)		
Scalp hairs (10-15 strands)		
Head hair combing		
Nail scrapings (Both hands separately)		
Nail clippings (Both hands separately)		
Oral swab		
Blood for grouping, testing drug/ alcohol intoxication (plain vial)		
Blood for alcohol levels (Sodium fluoride vial)		
Blood for DNA analysis (EDTA vial)		
Urine (drug testing)		
Any other (tampon/sanitary napkin/condom/object)		

4. Genital and anal evidence (each sample to be packed, sealed and labelled separately to be placed in bag).
***** swab sticks for collecting samples should be moistened with distilled water provided.

	Collected / Not collected	Reason for not collecting
Matted pubic hair		
Pubic hair combing (mention if shaved)		
Cutting of pubic hair (mention if shaved)		
Two vulval swabs (for semen examination and DNA testing)		
Two vaginal swabs (for semen examination and DNA testing)		
Two anal swabs (for semen examination and DNA testing)		
Vaginal smear (air-dried) for semen examination		
Vaginal washing		
Urethral swab		
Swab from glans penis/ clitoropenis		

*samples to be preserved as directed till handed over to police along with duly attested sample seal.

22. Provisional medical opinion:

I have examined (survivor) _____ M/F/other _____aged _____ reporting (type pf sexual violence and circumstances) _____ days/hours after incident, after having (bathed/douched) _____ my findings are as follows:

*samples collected (for FSL) awaiting reports _____

*samples collected (for hospital laboratory) _____

*clinical findings _____

*Additional observations (if any) _____

23. Treatment prescribed:

Treatment	Yes	No	Type and comments
STI prevention treatment			
Emergency contraception			
Wound treatment			
Tetanus prophylaxis			
Hepatitis B vaccination			
Post exposure prophylaxis for HIV			
Counselling			
Other			

24. Date and time of completion of examination _____

This report contains _____number of sheets and _____number of envelopes.

Place: _____ Signature of examining doctor/s_____

Date: _____ Name of examining doctor/s_____

Seal

25. **Final opinion**: (*After receiving lab reports)*

Findings in support of the above opinion, taking into account the history, clinical examination findings and laboratory reports of _____ bearing above identification marks described above _____ hours/days after the incident of sexual violence, I am opinion that: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Place: _____ Signature of examining doctor/s_____

Date: _____ Name of examining doctor/s_____

Seal

***copy of the entire report must be given to the survivor/ victim free of cost immediately.**

11. Examination of Accused of Sexual Violence

Name of Hospital:_ _____

OPD/ IPD No: _____ MLC No : _____ Date : _____

1. **Case Particulars:**
   Requisition from _____vide letter No. _____ Dated _____
   brought and identified by _____
2. **Particulars of the alleged accused:**
   i. Name: _____ S/o _____
   ii. Address: _____
   iii. Age as stated _____ iv. Occupation _____
   v. Married/Single/Divorcee _____ vi. Religion: _____
   vii. Marks of Identification:
   (a) _____(b) _____
   viii. Examined in presence of (name with signature) _____
3. **Consent given in writing**

I _____ _____ hereby voluntarily consent and agree to following
(Mark each that applies)

a) Medical examination and examination of genitals, examination of other secondary sexual characters and examination of other body parts.
b) Collection of samples for medical and Forensic examination and treatment.

All this has been explained to me in the manner and language, which I can understand



Left Thumb impression Signature of accused/ Guardian

Note: Age estimation is mandatory if the alleged accused is minor

4. **Brief History:**
   i. As given by police: _____
   _____
   _____
   ii. As given by alleged accused:

a. If he admits or denies the incidence(Account of incidence as per his statement)
b. Did he know the victim before? _____
c. Date and time of incidence: _____
d. Any history of S.T.D : YES / NO _____
e. Did he take bath, wash etc. after the alleged incidence? : YES / NO _____
f. Has he changed clothes after the incidence? : YES / NO _____
g. Condom used while sexual intercourse: YES / NO _____
h. Frequency and number of sexual intercourse: _____
i. Brief description of acts of penetration/ejaculation: _____
j. History of alcohol/other drug abuse: _____
k. Allergies: _____ Current medication: _____
l. Any Relevant Surgical history: _____
m. Any other: _____

5. Physical examination:

Clothing: If same was worn during the incidence look for presence of blood stains, semen, vaginal stain, female pubis hair, mud, grass, lipstick, any tear etc. and describe

_____

_____

_____

6. General examination:

Height: _____ Weight: _____ Body Built: _____

Blood Pressure: _____ Pulse: _____ RR: _____

Axillary hair: _____

Beard & Moustaches: _____

Pubic hair (including tanner staging) _____

Dentition: (8/8) _____

7. Systemic Examination

CNS : (Mental status) _____

CVS: _____ RS: _____

8 Marks of violence if any (Tick mark if present and describe):

Bite marks: _____

Abrasions: _____

Contusions: _____

Any other: _____

9. Genital Examination:

a. (Indicate as Y = Yes, N = No)

Observation	Pubic region	Thigh and adjoining part
Matted hair		
Seminal stain		
Blood		
Loose foreign hair		

b. Penis:

Observations	**Remark**
Development (Tanner Stage)	
Any defect/ Deformity	
Whether foreskin can be freely rolled up or is circumcised	
Evidence of any disease e.g. STD	
Presence of smegma under the foreskin	
Hair under prepuce	
Any stains nearby	

Injuries over Genital:

Prepuce: _____

Glans penis: _____

Frenulum: _____

Scrotum: _____

Any other: _____

10. Sample collection for Hospital/Clinical Laboratory

Sr No	Sample Name	Test For	Preservative/ Packing collected?	Yes/No
1.	Urethral Swab	Microscopy& Culture	Plain Sterile Bulb	
2.	Swab from discharge	Microscopy& Culture	Plain Sterile Bulb	
3.	Blood	Serology (For STD and Hep. B)	Plain Sterile Bulb	
4.	Urine (midstream)	Microscopy& Culture	Plain Sterile Bulb	

Note: *Every forensic examination room should have adjacent laboratory for detection of sperms and vaginal epithelium (Lugol's iodine test).*

11. Collection of Samples for Forensic Analysis:

a) Clothing, where available (Each garment to be wrapped separately and packed in paper bags after air drying) _____

_____

_____

b) **Sample collection for Forensic science laboratory:**

Sr No	Name of sample	Test (for evidence of)	Preservative / Packing	Collected YES/NO
1	Clothes (outer & inner)	For identification of any biological stains/ material from victim and scene of crime	Paper envelope	
2	Matted pubic hair	For detection of semen and identification of any hairs from victim	Paper envelope	
3	Combed pubic hairs	To identify foreign hairs by comparing with victim	Paper envelope	
4	Scalp hairs (10 to 15)	For comparison those found on victim and scene of crime	Paper envelope	
5	One swab & smear from prepuce, coronal sulcus	For detection of vaginal/buccal epithelial cells and DNA	Sterile tube & Paper envelope	
6	One swab & smear from glans and urethral meatus	For detection of vaginal/buccal epithelial cells and DNA	Sterile tube & Paper envelope	
7	Scrotal swab and smear	For detection of any biological stains	Sterile tube	
8	Swab and smear from stains on body	For detection of any biological stains	Sterile tube & Paper envelope	
9	Penile washing	For detection of vaginal/buccal epithelial cells and DNA	Sterile tube	
10	Buccal swab and smear	For detection of any biological stains and DNA	Paper envelope	
11	Nail clipping / scrapping	For detection of skin, blood, hair fiber of victim if human tissue blood group and DNA	Paper envelope	
12	Blood	Blood grouping	Plain bulb	
13	Blood	DNA analysis	EDTA bulb	
14	Blood	Drugs /alcohol	Fluoride and oxalate bulb	
15	Urine	Drugs /alcohol	Fluoride bulb	
16	Other object if any swab and smear	For detection of vaginal/buccal epithelial cells and DNA	Sterile tube & Paper envelope	

Note: Samples must be collected as per time elapsed between assault and examination, history received from alleged accused and clinical examination.

12. Provisional opinion:

I have examined _____ Sex _____

Aged _____ reporting on dated _____, _____ days/hours after the incidence.

My findings are as follows:

- Samples collected (for FSL): _____
- Samples collected (for hospital laboratory): _____
- Significant clinical findings: _____
- Additional observations (*if any*): _____

"The Opinion is kept pending awaiting the above laboratory reports**".**

(This report contains _____ number of sheets and _____number of envelopes.)

Place: _____ Signature of examining doctor_____

Name of examining doctor_____

Seal

13. Final Opinion *(After receiving Lab reports)*

Taking into consideration the history of the case, the data on clinical examination and the report of FSL (all being considered together) and other investigations

A. 1. Penetrative sexual assault i.e., of vaginal/ anal/ urethral/ oral penetration by the male sex organ. (*when presence of genital & physical injuries & the subject's penile washings show vaginal / buccal epithelium or faecal matter*)

2. Sexual assault by objects other than genitals (*when presence of physical injuries & the object shows presence of vaginal /buccal epithelium or faecal matter*)

3. No sexual and penetrative assault.

B. Intoxications (*Lab report positive for drugs/alcohol)*

C. Injuries suggestive of sexual assault (*when presence of genital & physical injuries over body & the subject's penile washings are negative for vaginal/buccal epithelium or faecal matter)*

D. Any other comments: _____

_____

Place: _____ Signature of examining doctor/s_____

Date & Time: _____ Name of examining doctor/s _____

Seal

12. Potency Certificate

Name of the Hospital: _____ MRD No: _____

Name of Person: _____

Age: _____ yrs, Sex: _____, Marital Status: _____

Address: _____

Brought By: _____

MLC No: _____ (*If Applicable*)

Consent: _____

_____

_____

(*This consent is explained to patient in* _____*language*)

Signature/Thumb impression

Identification Mark:

1. _____

2. _____

3. Left Thumb Impression 

History:

1. Present History: _____

   _____

2. Past History: _____

   _____

3. Sexual History: _____

   _____

   _____

Examination:

1. **General Examination**:
   - i) Height: _____
   - ii) Weight: _____
   - iii) Physical Development: _____
   - iv) Secondary Sexual Characters: _____
   - v) Any Disease / Deformity: _____
   - vi) Examination of spine: _____

Systemic Examination

i) C.V.S.: _____

ii) R.S.: _____

iii) G.I.T.: _____

iv) C.N.S. _____

2. Local Examination:

i) Penis: _____

Development: _____

Sensation over glans: _____

Disease / Deformity: _____

Injury: _____

Any other: _____

ii) Scrotum: _____

Testis: _____

Descended / Undescended: _____

Disease / Deformity: _____

iii) Epididymis / Spermatic Cord: _____

3. Psychological Examination

_____

_____

_____

4. Laboratory Test:

1.

2.

3.

4.

5.

Opinion: _____

_____

_____

_____

Date: -
Place: -

Seal

Signature
Name of Doctor _____
Designation _____

13. Examination of Alcoholic Person (Drunkenness)

AIM:

a) To decide whether the subject is under the influence of alcohol, and if so to what extent.
b) To decide whether his condition is due to illness or injury;
c) To decide whether it is safe for him to be detained in a police station or to decide whether he is to be admitted to a hospital.
   A doctor should attend the case as soon as possible without any delay.

DEFINATION:

Drunkenness: 'It is a condition produced in a person who has taken alcohol in a quantity sufficient to cause him to lose control of his faculties to such an extent, that he is unable to execute safely, the occupation in which he is engaged at the particular time.'

Use of alcohol in human population –

Laboratory investigations –

Clinical Interpretation

a). The individual examined has not consumed alcohol.
No smell of alcohol in breath and / or lab analysis is negative, clinical examination normal.

b) The individual examined has consumed alcohol but not under influence of it.
Smell of alcohol in breath present and / or lab. Analysis reveals the presence of alcohol, but clinical examination reveals normal findings.

c) The individual examined has consumed alcohol and is under influence of it.
Smell of alcohol in breath present and / or lab. Analysis reveals the presence of alcohol, and clinical examination reveals *abnormal* findings (definite signs of muscular in co-ordination, dilated pupils with sluggish reaction to light, fine lateral nystagmus, slurred in-coherent speech, staggering gait, delayed reaction time, etc).

Under the influence (100 -200mg%) – flushed face, dilated sluggish pupil, euphoria, loss of restrain, increased reaction time, test errors, stagger on sudden turning.

Drunk (200-300mg%) - flushed face, dilated sluggish inactive pupils, clouding of intellect, incoordination of thoughts, speech and action, staggering gate with reeling and lurching while making sudden turn.

Very drunk – flushed or pale face, pupils inactive contracted or dilated, mental confusion, marked incoordination of thoughts, speech and action, staggering and reeling gate with tendency to lurch and fall, vomiting, amnesia.

Differential Diagnosis of Alcohol Intoxication

Head injury. Cerebral tumour, Incipient C.V.A., Epilepsy, Disseminated sclerosis. Acute aural vertigo. Hypoglycaemia, Hyperglycaemia, Thyrotoxicosis, Delirium. Uraemia, Hepatic failure. Fatigue, Carbon monoxide poisoning, Hypomania, Psychosis, Hysteria and, Drugs esp. *Insulin, Barbiturates, Antihistamines, Narcotics, Sedatives, Antidepressants.*

Medico-Legal Aspects of Drunkenness

Drunkenness and criminal responsibility –

- **Sec 85 IPC** – act of a person incapable of judgment of reason of intoxication caused against his will.
- **Sec 86 IPC** – offence requiring a particular intent or knowledge, committed by one who is intoxicated.

Drunkenness and consent –

- **Sec 90 IPC** – the consent given by an insane or intoxicated person who is unable to understand the nature and consequences of that to which he gives his consent is invalid.

Drunkenness and driving –

- **Sec 185 of Motor Vehicle Act** (1988, Amend. 1994) – 30 mg%
- **Sec 279 IPC** – Rash driving on a public way
- **Sec 287 IPC** – Negligent conduct with respect to machines.

Drunkenness and disturbance of the peace –

- **Sec 510** – Misconduct in by drunken person

Medico-legal examination

- **Sec 53 & 54 Cr.P.C**
  Bombay High court ruling – collection of samples does not violate constitutional right to privacy

Examination of Alcoholic Person (Drunkenness)

Date:

To,

The Investigating officer,

_____Police station_____

Subject: Regarding examination of person with alleged history of intoxication.

Reference: Your letter No _____Dated _____Police Station_____

Date and Exact time of examination:

Name of Person examined_____, Age_____ (in years)

Address: _____Occupation: _____

Consent: (Informed consent) _____

_____

_____

(*This consent is explained to patient in* _____*language*)

Signature / Thumb impression
(Subject/Guardian)

Examined in presence of-
Signature/Thumb impression-

Identification marks: (At least two unique identification marks)

i) _____

ii) _____

iii) Left Thumb Impression 

History:

As stated by person examined_____

a. Has he consumed alcohol? If so, note the time, nature & quantity of the drink? _____

b. What food and drink he took last and when? _____

c. H/o fits, illness or other disability? _____

d. Is he Chronic alcoholic? Frequency of alcohol intake? _____

e. History of any medication? Nature & dose? _____

f . H/o Diabetes? Time of insulin taken & dose taken? _____

General appearance and demeanor:

a. State of clothing- Decent, disarrayed, soiled

b. Disposition- Calm, talkative, abusive, obscene

c. Speech- Incoherent/ slurred/clear

d. Gait- Steady/ staggering, self-control

General examination-

1) B.P.: _____ _____

2) Pulse (rapid & bounding, slow, etc.): _____

3) Temperature (surface temp. raised, lowered, normal): _____

4) Skin (dry, moist, flushed or pale): _____

5) Mouth (smell of alcohol, dribbling of saliva, _____
furred tongue, dry lips, etc.): _____

6) Eyes (lids swollen or red, conjunctivae congested or _____
not, visual acuity, pupils dilated or contracted, _____
nystagmus (+/-) & reaction of pupil to light & accommodation): _____

7) Gait:

(a) Manner of walking (unsteady/ steady). _____

(b) Reaction time to a direction to turn. _____

(c) Manner of turning (normal/ staggering). _____

8. Muscular coordination: _____

(Perform any of the test enumerated below

a. Walking along a straight line, b. Finger nose test _____

c. Picking up a coin from the floor, d. Romberg's sign/test _____

e. Handwriting, f. Copying simple geometric figures) _____

Examination of System (to exclude any other condition)

a. Central Nervous system _____

b. Cardiovascular system _____

c. Respiratory System_____

d. Abdomen _____

Examination of bodily Injuries (If any): _____

_____

_____

Laboratory investigation:

Blood / Urine for chemical examination: _____

_____

_____

Any other: _____

_____

Diagnosis: _____

_____

Opinion: I am of opinion that the above person has:

(1) Consumed alcohol and is under its influence.

(2) Consumed alcohol, but is not under its influence.

(3) Not consumed alcohol.

Place: Signature of Doctor:

Date: Name:

Designation:

Chapter—XIII—Blood Test

{136} THE BOMBAY PROHIBITION (MEDICAL EXAMINATION AND BLOOD TEST) RULES, 1959

"Registered Medical Practitioner" means any registered medical practitioner authorised by general or special order by the State Government under sub-section (4) of section 129-A of the Act;

"Testing Officer" means the Chemical Examiner or assistant Chemical examiner to government or any other officer appointed by the State Government for testing blood under sub-section (1) of section 129-A of the Act.

Medical examination.—A registered medical practitioner before whom a person is produced under sub-section (1) of section 129-A of the Act by a Police Officer or a Prohibition Officer for the purpose of medical examination of such person or collection of his blood, shall examine such person and if he deems necessary, collect and forward in the manner prescribed in these Rules, the blood of such person and furnish to the officer by whom such person was produced a certificate in Form 'A' containing the result of his examination and shall keep a copy of such certificate on his record.

Manner of collection and forwarding of blood—

(1) The registered medical practitioner shall use a syringe for the collection of the blood of the person produced before him under rule 3 the syringe shall be sterilised by purring in boiling water before it is used for the aforesaid purpose. He shall clean with sterilized water and swab the skin surface of the part of such person's body from which he intends to withdraw the blood. No alcohol shall be touched at any stage while withdrawing blood from the body of the person. He shall withdraw not less than 5 c. c. of venous blood in the syringe from the body of the person. The blood collected in the syringe shall then be transferred into a phial containing anti-coagulant and preservative and the phial shall then be shaken vigorously to dissolve the anti-coagulant and preservative in the blood. The phial shall be labelled and its cap sealed by means of sealing wax with the official seal or the monogram of the registered medical practitioner.

(2) The sample blood collected in the phial in the manner stated in sub-rule (1) shall be forward for test to the Testing Officer either by post or with a special messenger so as to reach him within seven days from the date of its collection. It shall be accompanied by a forwarding letter in form 'B' which shall bear a facsimile of the seal or monogram used for sealing the phial of the sample blood.

Certificate of test of sample blood. —The Testing Officer shall on receipt of the sample blood, test it and shall certify the result of his test in Form 'C.' The Testing Officer shall send the certificate in duplicate to the registered medical practitioner by whom the blood was forwarded to him for test and retain a copy thereof on his record. On receipt of the certificate from the Testing Officer, the registered medical practitioner shall forward the original copy of the certificate to the Police Officer or the Prohibition Officer concerned. The duplicate copy of the certificate shall be kept by him on his record.

FORM 'A'

(*See* rule 3)

Certificate by a registered medical practitioner showing whether a person examined by him has or has not consumed an intoxicant.

Serial No._____ (Name and location of the Dispensary or Hospital)

Certified that Shri/Smt./Kumari. _____

of _____ was brought to this hospital/dispensary by _____

_____ (*here state name and designation of the Officer*) on _____20___, at_____ A.M./P.M.

and was examined by me on _____20___, at_____ A.M./P.M

A clinical examination of the above-named person disclosed the following:

Age _____

Weight _____

Breath : Smelling / Not smelling
(Alcohol / ganja /bhang/ charas / opium)

Speech : Incoherent / Normal

Gait : Unsteady / Steady

Pupils : Dilated / Normal

Additional remarks, *if any*. : _____

I find that the above-named person has consumed alcohol/opium/ charas/ ganja/ bhang. / has not consumed any intoxicant.

I also find that he is / is not under the influence of alcohol.

N. B.—

(Blood from the body of the above named was / was not collected by me for chemical examination).

Dated: _____20___ (Signature) _____

Place: _____ Designation _____

Signature/Thumb-impression
of the person examined.

Marks of identification of the person examined in case he refuses to give his signature or thumb-impression.

FORM 'B'

[*See* rule 4 (2)]

No. _____

From

_____

(Name, designation and address of the registered medical practitioner.)

To,

_____

(Name, designation and address of the Testing Officer.)

Dated _____ 20

Sir,

I, forward herewith by post/with Shri* _____

of _____ a phial bearing serial No. _____

containing_____ c. c. of venous blood collected by me on_____

at. _____ A.M./P.M. of _____

who was produced before me for medical examination †and / or collection of blood from his / her body

‡ by _____

and request you to test the blood and issue a certificate (in duplicate) regarding the result of the test.

Yours faithfully,
Signature and designation of the
registered medical practitioner.

Facsimile of the seal or monogram used for
sealing the phial containing the blood.

---

* Here specify the name, designation and address of the messenger with whom the phial containing the blood is forwarded for delivery to the Testing Officer.

† Strike off, if these words are not required.

‡ Here state the name and designation of the officer by whom the said person was produced for collection of blood.

FORM 'C'

(*See* rule 5)

Alcohol Examination Certificate

No. R _____of _____

I. Case No. _____

Dated _____

From,

_____

(Here mention name, designation and address of testing officer.)

To,

(_____ ,

(Here mention the name, designation and address of Registered Medical Practitioner.)

Your letter No. _____Dated _____, forwarding a phial containing blood of Shri/Smt./Kumari. _____ of _____ bearing Serial No._____ labelled. _____ received here on _____ by post/with messenger Shri _____of _____ sealed/unsealed, seal perfect and as per copy sent/seals intact device no copy sent.

Result of the test of the blood

The blood contained _____ per cent. W/V of ethyl-alcohol.

Method, Factual Data and Reasons leading to the Result of Blood analysis

(1) *Method of Analysis*—Modified Cavette's Method Journal Analytical Chemistry, 1959, 31, 1908. It is based on oxidation of alcohol by chromic acid as that in Cavette's Method but the oxidation is carried out in vacuum and at room temperature. It takes only a fraction of a minute instead of a few hours to complete the reaction. Ketonic bodies are volatile acids do not interfere in this method. All usual precautions essential in microanalytical work mentioned in the paper referred to above have been strictly followed, *e.g.*, all chemical used in the test were of reagent quality the apparatus was first cleaned with hot chromic acid, then repeatedly with tap water and finally with distilled water. 2[It was then dried in hot air oven.] No grease was used anywhere in the apparatus. The atmosphere of the room where the test was caried out was free from all gases or suspended impurities. Fresh glass-distilled water used throughout the test.

(2) *Factual Data and Reasons for arriving at the findings pertaining to the blood sample in question*.-

Analysed on _____

Smell: Nothing to note/Has characteristic smell of _____

Quantity of blood taken for analysis : 0.5 ml.

Quantity of N/20 dichromate taken : 5.00 ml.

Quantity of N/20 dichromate used up in oxidising alcohol in the sample _____ ml.

1 ml. of N/20 dichromate oxidises 0.000575 gramme of ethyl-alcohol.

2[Therefore, 100 ml. of blood contained. 0.000575 x _____ ml. of dichromate used x 100 _____gramme of 0.50 ethyl-alcohol.]

Signature and Designation of testing officer

_____

Note.—(1) WV = _____ grammes of ethyl-alcohol in 100 c. c. of blood.

(2) The blood sample was stored in refrigerator from the time it was received in the laboratory till it was taken for analysis.

1. Subs. by G. N. of 26-9-1963.
2. Subs. by G. N. of 6-12-1963.

Format of Medico-Legal report of a person in Police, Judicial Custody or Referred by court of Law and Violation of Human rights as requirement of NMRC, who has been brought for Medical Examination.

14. Medico-Legal Examination of person at the time of entry into in Police / Judicial Custody and periodically thereafter

To, Date:

The Investigating Officer,

_____Police station, _____

Sub: - Submission of Medico-legal report of person in Police / Judicial Custody

Ref: - 1. Your Order / letter No._____ Dated_____

2. Case No._____

Sir,

I /We hereby certify that, I/We have examined Mr./Mrs. _____

S/O or D/O _____ Age (as Stated)_____ Sex_____

Residing at _____ as a person in police / Judicial custody

brought by PC/PN/HC_____ of _____ Police station.

Consent for Medical Examination:

_____

_____

(*This consent is explained to patient in _____language*)

Signature/Thumb impression
(Subject/Guardian)

Examined in presence of-
Signature/Thumb impression-

Date and time of admission in prison: _____

Identification Marks:

1. _____

2. _____

3 Left Thumb Impression

Previous history of illness: _____ **History of drug abuse,** if any? _____

Any information the prisoner may volunteer: _____

Physical Examination:

Hight_____ Weight_____ Pulse _____/sec BP_____/_____of Hg

RR_____/ min Temperature _____ LMP:_____

Pallor: _____ Clubbing: _____ Cyanosis: _____ Icterus: _____

CNS_____CVS_____

RS_____GIT_____

Eye/ENT_____ Urinary system_____

Investigations, if any clinically required:

Pathological tests: _____

X-ray Chest: _____

ECG: _____

Blood tests: _____

Bodily Injuries if any:

_____

_____

(Please see for all body areas & Prepare Separate Injury report of if any injury/injuries are present)

(If any history of previous mental illness/ finding of suicidal tendencies etc., psychiatrist's opinion to be sought)

(The medical examination and investigations were conducted with the consent of the prisoner after explaining to him/ her that it was necessary for diagnosis and treatment.)

The Medical examination done on Mr._____, By Me/Us bearing above mentioned identification marks does not show any disease, constitutional weakness or bodily infirmity except_____(NIL)

He / She is - Fit. / -Temporary Unfit. / - Unfit.

Time of commencement of medical examination:

Date of completion of medical examination:

Signature

Place: -

Name of Doctor _____

Seal: -

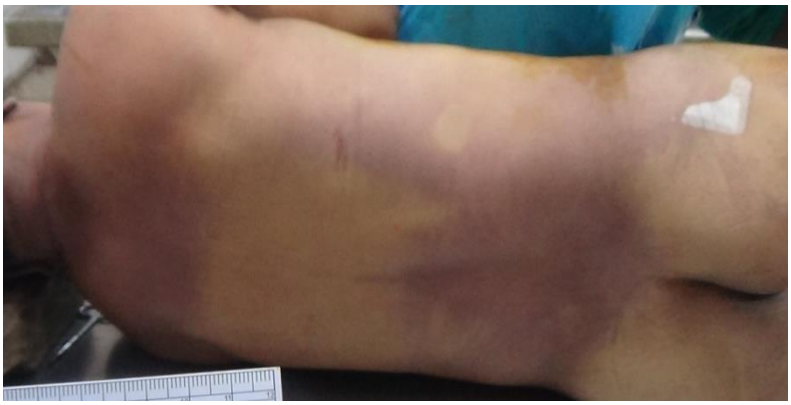
Designation _____

Part- II

Medico-legal Articles

Photographs

I. Post-mortem lividity



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

II. Decomposition changes-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

III. Decomposition changes-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

IV. Injury-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

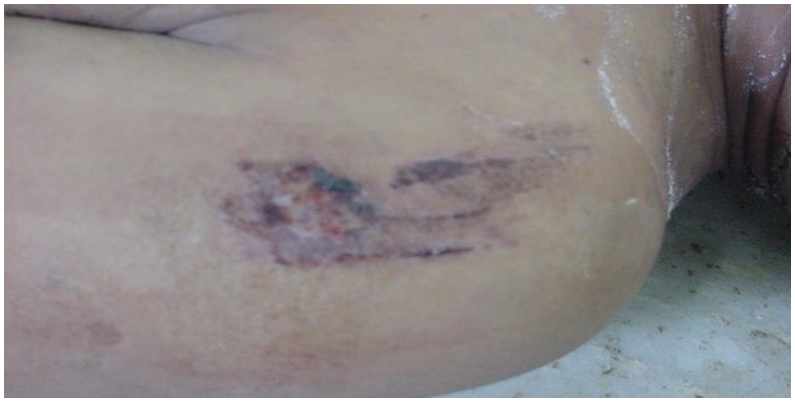
_____

3. Medicolegal Importance (MLI)- _____

_____

_____

V. Injury-



1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

VI. Injury



1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

VII. Injury-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

VIII. Injury



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

IX. Injury-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

X. Injury-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

XI. Injury-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

XII. Injury and identification-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

XIII. Injury-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

XIV. Injury-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

XV. Asphyxia-



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

XVI.



1. Identify the photograph- _____

_____

2. Observations- _____

_____

_____

3. Medicolegal Importance (MLI)- _____

_____

_____

Asphyxia-



1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

XVII.

1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

XVIII.

1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

XIX.

1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

XX.

1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

XXI.

1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

XXII.

1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

XXIII.

1. Identify the photograph- _____

   _____

2. Observations- _____

   _____

   _____

3. Medicolegal Importance (MLI)- _____

   _____

   _____

Museum Specimens

Sr. No.	Observation	Identification / Opinion	Medicolegal Importance
1			
2			
3			
4			
5			

Sr. No.	Observation	Identification / Opinion	Medicolegal Importance
6			
7			
8			
9			
10			

Sr. No.	Observation	Identification / Opinion	Medicolegal Importance
11			
12			
13			
14			
15			

Sr. No.	Observation	Identification / Opinion	Medicolegal Importance
16			
17			
18			
19			
20			

Instruments

Sr. No.	Identification	Medico-legal Significance / Uses
1		
2		
3		
4		
5		

Sr. No.	Identification	Medico-legal Significance / Uses
6		
7		
8		
9		
10		

Sr. No.	Identification	Medico-legal Significance / Uses
11		
12		
13		
14		
15		

Sr. No.	Identification	Medico-legal Significance / Uses
16		
17		
18		
19		
20		

X-Rays

1.



Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____

2.

Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____



3.



Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____

4.

Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____



5.



Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____

6.

Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____



7.



Describe X-Ray: _____

Observation: _____

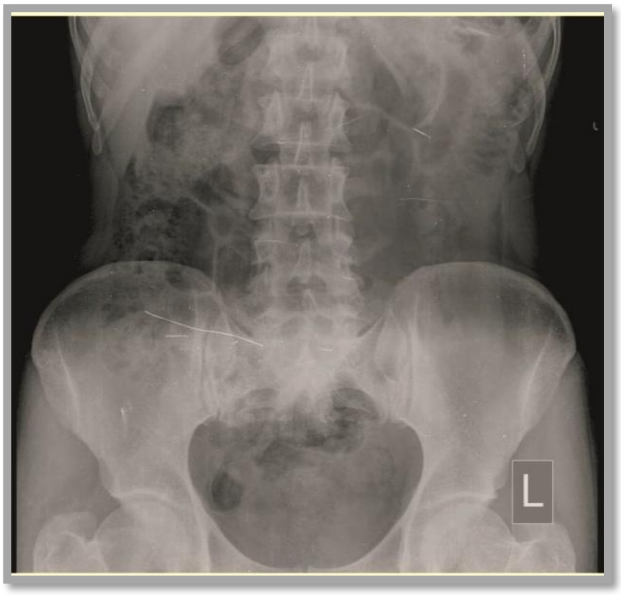
Opinion: _____

8.

Describe X-Ray: _____

Observation: _____

Opinion: _____



9.



Describe X-Ray: _____

Observation: _____

Opinion: _____

10 Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____



11



Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____

12 Describe X-Ray: _____

_____

_____

Observation: _____

_____

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_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____



13



Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

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_____

Opinion: _____

_____

_____

14 Describe X-Ray: _____

_____

_____

Observation: _____

_____

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_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____



15



Describe X-Ray: _____

_____

_____

Observation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Opinion: _____

_____

_____

Paste

Paste

Paste

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Paste

Poisons



Madar (Calotropis Gigantea)



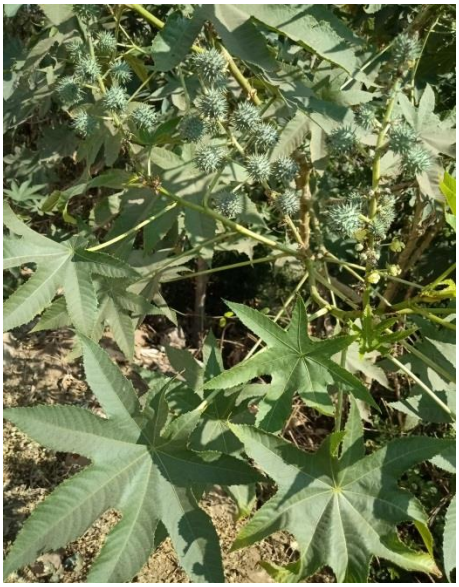
Yellow Oleander Plant
(Cerbera Thevetia)



Pink Kaner (Nerium Odorum)



Millipede



Castor Plant (Ricinus Communis) with fruits



Castor Seeds (Ricinus Communis)



Ratti /Gunja seeds
(Abrus Precatorius)



Chilli seeds (Capsicum annum)



Marking Nuts/ Bhilawa
(Semecarpus anacardium)



Nux Vomica (Strychnine)



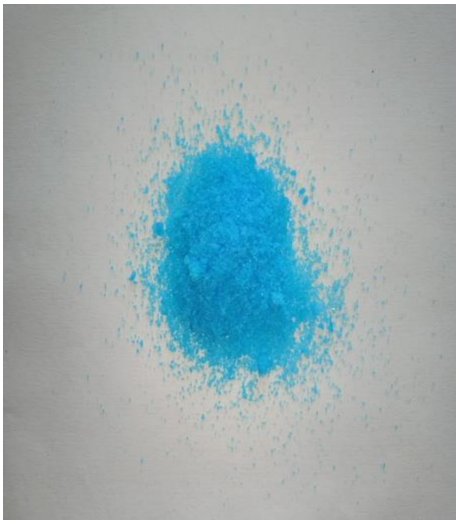
Tobacco (Nicotiana Tabacum)



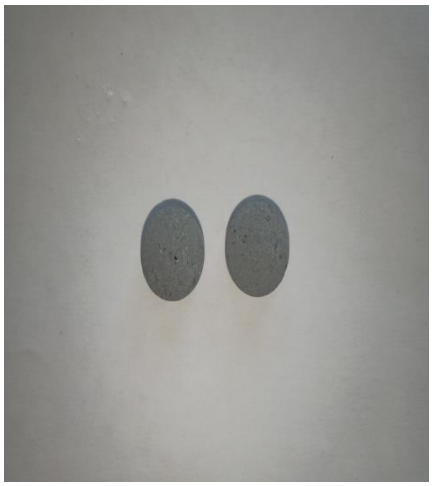
Datura Seeds



Bitter Almonds



Copper Sulphate Crystals



Aluminium Phosphide
(Celphos)



Poppy Seeds (Khaskhas)



Lead tetroxide (Sindur)



Alcohol (Ethanol)

Study of Common Poisons of Medico-legal Importance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
1	**Sulphuric Acid**				
2	**Nitric Acid**				
3	**Hydrochloric acid**				
4	**Carbolic Acid** (Phenol)				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
5	**Oxalic Acid**				
6	**Sodium Hydroxide**				
7	**Potassium Hydroxide**				
8	**Phosphorus**				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
9	**Lead Oxide**				
10	**Arsenic Oxide**				
11	**Mercuric Sulphide**				
12	**Copper Sulphate**				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
13	**Glass Powder**				
14	**Castor Seeds** (Ricinus Communis				
15	**Croton Seeds** (Croton Tiglium)				
16	**Red chillies** (Capsicum annum)				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
17	**Marking Nut/ Bhilwa** (Semicarpus Anacardium)				
18	**Madar** (Calotropis Gigantea)				
19	**Ratti /Gunja** (Abrus Precotorius)				
20	**Dhatura** (Thorn apple)				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
21	**Bhang/ Ganja** (Canabis Indica)				
22	**Opium/ Afeem** (Papaver Somniferum)				
23	**Bitter Almond** (Hydrocynic acid)				
24	**Aconite** (Mitha Jahar)				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
25	**Yellow Oleander** (Cerebra Thevecia)				
26	**Nux Vomica** (Strychnine)				
27	**Snakes:** Cobra				
28	**Snakes**: Krait				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
29	**Snakes**: Viper				
30	**Scorpion**				
31	**Honey bees** (sting Bite)				
32	**Methyl Alcohol**				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
33	**Kerosene**				
34	**Barbaturates**				
35	Organopho-sphorus compound (**Follidon & Tik-20**)				
36	Organo-chloro compound (**D.D.T**.)				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
37	Organo-chloro compound (**Endrine**)				
38	**Carbamates** (Carbaryl)				
39	**Tobacco** (Nicotiana Tobacum)				
40	**Tincture Iodine**				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
41	**Celphos/ Alphos** (Aluminium Phosphide)				
42	**Amphetamines** /Ecstacy / Designer drug				
43	**Cocaine** (Erythroxylum coca)				
44	**Mushrooms** (Amanita Phalloides & Amanita Muscaria)				

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
45	**Paracetamol** (Acetamino-phen)				
46	**Fish Poisoning**				
47	**Mother-in - law's tongue** (D**umbcane**) Dieffenbachia Snake plant (common)				
48					

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Sr. No.	Name of Poison	Type of Poison	Physical Characters	Salient Clinical Features	Fatal Dose
49					
50					
51					
52					

Fatal Period	Treatment	Post-mortem Features	Medicolegal Significance

Part- III
Medico-legal Autopsy

Medico-legal Autopsies observed by students

Sr. No.	P.M. No./ Year Date	Cause of Death	Signature
1	/		
2	/		
3	/		
4	/		
5	/		
6	/		
7	/		
8	/		
9	/		
10	/		
11	/		
12	/		
13	/		
14	/		
15	/		

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion** of village/City: Taluka: District**:** by **Dr** /_____ Hospital _____.

I. General Particulars: -

1. (a) By whom was the corpse sent?

   (b) Name of place from which sent.

   (c) Distance of place from which sent.

2. By whom was the corpse brought?

3. By whom identified? i.

   ii

4. (a) The date, hour and minute of its receipt.

   (b)The date, hour and minute of beginning of post mortem Examination

   (c)The date, hour and minute of ending of postmortem examination.

5. Substance of accompanying report from police office or magistrate, together with the date of death, if known. Supposed cause of death or reason, for examination.

6. If not examined at dispensary or hospital-
   (a) Name of place where examined -
   (b) Distance from Dispensary or hospital.
   (c) Reason why the body was not sent to the dispensary or hospital.

II. External Examination: -

7. Sex, apparent age, race or caste, Description of clothes and of ornaments on the body.

8. Condition of the clothes – Whether wet with water, stained with blood or soiled with vomit or faecal matter.

9. Special marks on the skin such as scars, tattooing etc, any malformations peculiarities or other marks of identification. State of the teeth.

   In newly-born infants: -
   The length and (if possible), the weight of the body is to be recorded together with the state of the hair, nails and umbilical cord, its length, whether placenta is attached or not, and if present, its size and condition.

10. Condition of Body- Whether well nourished, thin or emaciated warm or cold.

11. Rigor Mortis- Well-marked, slight or absent whether present

12. Extent and signs of decomposition, presence or post-mortem lividity of buttocks, loins, back and things or any other part. Whether bullae present and the nature of the it contains fluid, condition of the cuticle.
13. Feature- Whether natural or swollen, state of eyes, position of tongue; nature of fluid (if any) oozing from mouth, nostrils or ears.
14. Conditions of skin etc.
In suspected drowning the presence or absence of cutes anserine is to be noted.
15. Injuries to external genitals.
Indication of purging.

16. Position of limbs- Especially of arms and of Fingers or on the skin of hands and feet.

17. Surface wounds, and injuries- Their nature, position, dimensions(measured) and directions to be accurately stated- their probable age and causes to be noted.
If bruises be present, what is the condition of the subcutaneous tissues?
(N.B- When injuries are numerous and cannot be mentioned within the space available they should be mentioned on a separate paper which should be signed.)

18. Other injuries discovered by external examination or palpation of fractures etc.
18a. Can you say definitely that the injuries shown against serial nos. 17 and 18 are ***ante-mortem injuries?***

III. Internal Examination: -

19. Head: -

(i) Injuries under the scalp and their nature.

(ii) Skull: vault and base-describe fractures their sites, dimensions, direction etc.

(iii) Brain: The appearance of its Coverings, size, weight and general condition of the organ itself and any abnormality found in its examination to be carefully noted.

20. Thorax: -

(a) Walls, ribs, cartilages

(b) Pleura

(c) Larynx, Trachea and bronchi

(d) Right Lung with weight

(e) Left Lung with weight

(f) Pericardium

(g) Heart with weight

(h) Large vessels

(i) Additional remarks

21. Abdomen: -

(a) Walls -

(b) Peritoneum -

(c) Cavity-

(d) Buccal cavity, teeth, tongue and pharynx-

(e) Oesophagus-

(f) Stomach and its contents-

(g) Small intestine and its contents-

(h) Large intestine and its contents-

(i) Liver and gall bladder with weight-

(j) Pancreas and suprarenals-

(k) Spleen with weight.

(l) Kidneys with weights

(m) Bladder-

(o) Organ of generation-

(p) Additional remarks with, wherever possible, Medical Officer's deduction from the state of contents of the stomach as to the time of death and last meal.

(q) State which viscera, (if any) have been retained for chemical examination and also quote the numbers on the bottles containing the same-

22. Spine and spinal cord-

23. a) Whether the ante-mortem injuries found on the dead body were sufficient in the ordinary course of nature to cause death?

(b) If yes, which of the injuries were individually sufficient in the ordinary course of nature to cause death?

(c) Which of the injuries collectively are sufficient in the ordinary course of nature to cause death?

Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

*The spinal cord need not be examined unless there are any indications of disease, strychnine poisoning or injury.
Note: - The report must be written and signed immediately after the examination. Medical officers will at once dispatch a duplicate copy to the Civil Surgeon of their district for in his office.
Great care should be taken not to cut viscera before they have been inspected in *Situ.*

Post Mortem No. :- , Dated:

1. Place:

Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion**

of village/City: Taluka: District**:**

by **Dr** /_____ Hospital _____.

I. General Particulars: -

1. (a) By whom was the corpse sent?

   (b) Name of place from which sent.

   (c) Distance of place from which sent.

2. By whom was the corpse brought?

3. By whom identified? i.

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4. (a) The date, hour and minute of its receipt.

   (b)The date, hour and minute of beginning of post mortem Examination

   (c)The date, hour and minute of ending of postmortem examination.

5. Substance of accompanying report from police office or magistrate, together with the date of death, if known. Supposed cause of death or reason, for examination.

6. If not examined at dispensary or hospital-

   (a) Name of place where examined -

   (b) Distance from Dispensary or hospital.

   (c) Reason why the body was not sent to the dispensary or hospital.

II. External Examination: -

7. Sex, apparent age, race or caste, Description of clothes and of ornaments on the body.

8. Condition of the clothes – Whether wet with water, stained with blood or soiled with vomit or faecal matter.

9. Special marks on the skin such as scars, tattooing etc, any malformations peculiarities or other marks of identification. State of the teeth.

   In newly-born infants: -

   The length and (if possible), the weight of the body is to be recorded together with the state of the hair, nails and umbilical cord, its length, whether placenta is attached or not, and if present, its size and condition.

10. Condition of Body- Whether well nourished, thin or emaciated warm or cold.

11. Rigor Mortis- Well-marked, slight or absent whether present

12. Extent and signs of decomposition, presence or post-mortem lividity of buttocks, loins, back and things or any other part. Whether bullae present and the nature of the it contains fluid, condition of the cuticle.
13. Feature- Whether natural or swollen, state of eyes, position of tongue; nature of fluid (if any) oozing from mouth, nostrils or ears.
14. Conditions of skin etc.
In suspected drowning the presence or absence of cutes anserine is to be noted.
15. Injuries to external genitals.
Indication of purging.

16. Position of limbs- Especially of arms and of Fingers or on the skin of hands and feet.

17. Surface wounds, and injuries- Their nature, position, dimensions(measured) and directions to be accurately stated- their probable age and causes to be noted.
If bruises be present, what is the condition of the subcutaneous tissues?
(N.B- When injuries are numerous and cannot be mentioned within the space available they should be mentioned on a separate paper which should be signed.)

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18a. Can you say definitely that the injuries shown against serial nos. 17 and 18 are ***ante-mortem injuries?***

III. Internal Examination: -

19. Head: -

(i) Injuries under the scalp and their nature.

(ii) Skull: vault and base-describe fractures their sites, dimensions, direction etc.

(iii) Brain: The appearance of its Coverings, size, weight and general condition of the organ itself and any abnormality found in its examination to be carefully noted.

20. Thorax: -

(a) Walls, ribs, cartilages

(b) Pleura

(c) Larynx, Trachea and bronchi

(d) Right Lung with weight

(e) Left Lung with weight

(f) Pericardium

(g) Heart with weight

(h) Large vessels

(i) Additional remarks

21. Abdomen: -

(a) Walls -

(b) Peritoneum -

(c) Cavity-

(d) Buccal cavity, teeth, tongue and pharynx-

(e) Oesophagus-

(f) Stomach and its contents-

(g) Small intestine and its contents-

(h) Large intestine and its contents-

(i) Liver and gall bladder with weight-

(j) Pancreas and suprarenals-

(k) Spleen with weight.

(l) Kidneys with weights

(m) Bladder-

(o) Organ of generation-

(p) Additional remarks with, wherever possible, Medical Officer's deduction from the state of contents of the stomach as to the time of death and last meal.

(q) State which viscera, (if any) have been retained for chemical examination and also quote the numbers on the bottles containing the same-

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Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

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Post Mortem No. :- , Dated:

1. Place:

Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion**

of village/City: Taluka: District**:**

by **Dr** /_____ Hospital _____.

I. General Particulars: -

1. (a) By whom was the corpse sent?

   (b) Name of place from which sent.

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2. By whom was the corpse brought?

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   (a) Name of place where examined -

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7. Sex, apparent age, race or caste, Description of clothes and of ornaments on the body.

8. Condition of the clothes – Whether wet with water, stained with blood or soiled with vomit or faecal matter.

9. Special marks on the skin such as scars, tattooing etc, any malformations peculiarities or other marks of identification. State of the teeth.

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15. Injuries to external genitals.
Indication of purging.

16. Position of limbs- Especially of arms and of Fingers or on the skin of hands and feet.

17. Surface wounds, and injuries- Their nature, position, dimensions(measured) and directions to be accurately stated- their probable age and causes to be noted.
If bruises be present, what is the condition of the subcutaneous tissues?
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18a. Can you say definitely that the injuries shown against serial nos. 17 and 18 are ***ante-mortem injuries?***

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19. Head: -

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(ii) Skull: vault and base-describe fractures their sites, dimensions, direction etc.

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20. Thorax: -

(a) Walls, ribs, cartilages

(b) Pleura

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(d) Right Lung with weight

(e) Left Lung with weight

(f) Pericardium

(g) Heart with weight

(h) Large vessels

(i) Additional remarks

21. Abdomen: -

(a) Walls -

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(c) Cavity-

(d) Buccal cavity, teeth, tongue and pharynx-

(e) Oesophagus-

(f) Stomach and its contents-

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(h) Large intestine and its contents-

(i) Liver and gall bladder with weight-

(j) Pancreas and suprarenals-

(k) Spleen with weight.

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(m) Bladder-

(o) Organ of generation-

(p) Additional remarks with, wherever possible, Medical Officer's deduction from the state of contents of the stomach as to the time of death and last meal.

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22. Spine and spinal cord-

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Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

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Post Mortem No. :- , Dated:

1. Place:

Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion** of village/City: Taluka: District**:** by **Dr** /_____ Hospital _____.

I. General Particulars: -

1. (a) By whom was the corpse sent?

   (b) Name of place from which sent.

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2. By whom was the corpse brought?

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(i) Additional remarks

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(a) Walls -

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(q) State which viscera, (if any) have been retained for chemical examination and also quote the numbers on the bottles containing the same-

22. Spine and spinal cord-

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(b) If yes, which of the injuries were individually sufficient in the ordinary course of nature to cause death?

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Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

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Post Mortem No. :- , Dated:

1. Place:

Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion**

of village/City: Taluka: District**:**

by **Dr** /_____ Hospital _____.

I. General Particulars: -

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Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

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Post Mortem No. :- , Dated:

1. Place:

Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion**

of village/City: Taluka: District**:**

by **Dr** /_____ Hospital _____.

I. General Particulars: -

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   (c) Distance of place from which sent.

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In suspected drowning the presence or absence of cutes anserine is to be noted.
15. Injuries to external genitals.
Indication of purging.

16. Position of limbs- Especially of arms and of Fingers or on the skin of hands and feet.

17. Surface wounds, and injuries- Their nature, position, dimensions(measured) and directions to be accurately stated- their probable age and causes to be noted.
If bruises be present, what is the condition of the subcutaneous tissues?
(N.B- When injuries are numerous and cannot be mentioned within the space available they should be mentioned on a separate paper which should be signed.)

18. Other injuries discovered by external examination or palpation of fractures etc.
18a. Can you say definitely that the injuries shown against serial nos. 17 and 18 are ***ante-mortem injuries?***

III. Internal Examination: -

19. Head: -

(i) Injuries under the scalp and their nature.

(ii) Skull: vault and base-describe fractures their sites, dimensions, direction etc.

(iii) Brain: The appearance of its Coverings, size, weight and general condition of the organ itself and any abnormality found in its examination to be carefully noted.

20. Thorax: -

(a) Walls, ribs, cartilages

(b) Pleura

(c) Larynx, Trachea and bronchi

(d) Right Lung with weight

(e) Left Lung with weight

(f) Pericardium

(g) Heart with weight

(h) Large vessels

(i) Additional remarks

21. Abdomen: -

(a) Walls -

(b) Peritoneum -

(c) Cavity-

(d) Buccal cavity, teeth, tongue and pharynx-

(e) Oesophagus-

(f) Stomach and its contents-

(g) Small intestine and its contents-

(h) Large intestine and its contents-

(i) Liver and gall bladder with weight-

(j) Pancreas and suprarenals-

(k) Spleen with weight.

(l) Kidneys with weights

(m) Bladder-

(o) Organ of generation-

(p) Additional remarks with, wherever possible, Medical Officer's deduction from the state of contents of the stomach as to the time of death and last meal.

(q) State which viscera, (if any) have been retained for chemical examination and also quote the numbers on the bottles containing the same-

22. Spine and spinal cord-

23. a) Whether the ante-mortem injuries found on the dead body were sufficient in the ordinary course of nature to cause death?

(b) If yes, which of the injuries were individually sufficient in the ordinary course of nature to cause death?

(c) Which of the injuries collectively are sufficient in the ordinary course of nature to cause death?

Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

*The spinal cord need not be examined unless there are any indications of disease, strychnine poisoning or injury.
Note: - The report must be written and signed immediately after the examination. Medical officers will at once dispatch a duplicate copy to the Civil Surgeon of their district for in his office.
Great care should be taken not to cut viscera before they have been inspected in *Situ.*

Post Mortem No. :- , Dated:

1. Place:
Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion**

of village/City: Taluka: District**:**

by **Dr** /_____ Hospital _____.

I. General Particulars: -

1. (a) By whom was the corpse sent?

   (b) Name of place from which sent.

   (c) Distance of place from which sent.

2. By whom was the corpse brought?

3. By whom identified? i.

   ii

4. (a) The date, hour and minute of its receipt.

   (b)The date, hour and minute of beginning of post mortem Examination

   (c)The date, hour and minute of ending of postmortem examination.

5. Substance of accompanying report from police office or magistrate, together with the date of death, if known. Supposed cause of death or reason, for examination.

6. If not examined at dispensary or hospital-

   (a) Name of place where examined -

   (b) Distance from Dispensary or hospital.

   (c) Reason why the body was not sent to the dispensary or hospital.

II. External Examination: -

7. Sex, apparent age, race or caste, Description of clothes and of ornaments on the body.

8. Condition of the clothes – Whether wet with water, stained with blood or soiled with vomit or faecal matter.

9. Special marks on the skin such as scars, tattooing etc, any malformations peculiarities or other marks of identification. State of the teeth.

   In newly-born infants: -

   The length and (if possible), the weight of the body is to be recorded together with the state of the hair, nails and umbilical cord, its length, whether placenta is attached or not, and if present, its size and condition.

10. Condition of Body- Whether well nourished, thin or emaciated warm or cold.

11. Rigor Mortis- Well-marked, slight or absent whether present

12. Extent and signs of decomposition, presence or post-mortem lividity of buttocks, loins, back and things or any other part. Whether bullae present and the nature of the it contains fluid, condition of the cuticle.
13. Feature- Whether natural or swollen, state of eyes, position of tongue; nature of fluid (if any) oozing from mouth, nostrils or ears.
14. Conditions of skin etc.
In suspected drowning the presence or absence of cutes anserine is to be noted.
15. Injuries to external genitals.
Indication of purging.

16. Position of limbs- Especially of arms and of Fingers or on the skin of hands and feet.

17. Surface wounds, and injuries- Their nature, position, dimensions(measured) and directions to be accurately stated- their probable age and causes to be noted.
If bruises be present, what is the condition of the subcutaneous tissues?
(N.B- When injuries are numerous and cannot be mentioned within the space available they should be mentioned on a separate paper which should be signed.)

18. Other injuries discovered by external examination or palpation of fractures etc.
18a. Can you say definitely that the injuries shown against serial nos. 17 and 18 are ***ante-mortem injuries?***

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19. Head: -

(i) Injuries under the scalp and their nature.

(ii) Skull: vault and base-describe fractures their sites, dimensions, direction etc.

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20. Thorax: -

(a) Walls, ribs, cartilages

(b) Pleura

(c) Larynx, Trachea and bronchi

(d) Right Lung with weight

(e) Left Lung with weight

(f) Pericardium

(g) Heart with weight

(h) Large vessels

(i) Additional remarks

21. Abdomen: -

(a) Walls -

(b) Peritoneum -

(c) Cavity-

(d) Buccal cavity, teeth, tongue and pharynx-

(e) Oesophagus-

(f) Stomach and its contents-

(g) Small intestine and its contents-

(h) Large intestine and its contents-

(i) Liver and gall bladder with weight-

(j) Pancreas and suprarenals-

(k) Spleen with weight.

(l) Kidneys with weights

(m) Bladder-

(o) Organ of generation-

(p) Additional remarks with, wherever possible, Medical Officer's deduction from the state of contents of the stomach as to the time of death and last meal.

(q) State which viscera, (if any) have been retained for chemical examination and also quote the numbers on the bottles containing the same-

22. Spine and spinal cord-

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Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

*The spinal cord need not be examined unless there are any indications of disease, strychnine poisoning or injury.
Note: - The report must be written and signed immediately after the examination. Medical officers will at once dispatch a duplicate copy to the Civil Surgeon of their district for in his office.
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Post Mortem No. :- , Dated:

1. Place:

Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion**

of village/City: Taluka: District**:**

by **Dr** /_____ Hospital _____.

I. General Particulars: -

1. (a) By whom was the corpse sent?

   (b) Name of place from which sent.

   (c) Distance of place from which sent.

2. By whom was the corpse brought?

3. By whom identified? i.

   ii

4. (a) The date, hour and minute of its receipt.

   (b)The date, hour and minute of beginning of post mortem Examination

   (c)The date, hour and minute of ending of postmortem examination.

5. Substance of accompanying report from police office or magistrate, together with the date of death, if known. Supposed cause of death or reason, for examination.

6. If not examined at dispensary or hospital-

   (a) Name of place where examined -

   (b) Distance from Dispensary or hospital.

   (c) Reason why the body was not sent to the dispensary or hospital.

II. External Examination: -

7. Sex, apparent age, race or caste, Description of clothes and of ornaments on the body.

8. Condition of the clothes – Whether wet with water, stained with blood or soiled with vomit or faecal matter.

9. Special marks on the skin such as scars, tattooing etc, any malformations peculiarities or other marks of identification. State of the teeth.

In newly-born infants: -

The length and (if possible), the weight of the body is to be recorded together with the state of the hair, nails and umbilical cord, its length, whether placenta is attached or not, and if present, its size and condition.

10. Condition of Body- Whether well nourished, thin or emaciated warm or cold.

11. Rigor Mortis- Well-marked, slight or absent whether present

12. Extent and signs of decomposition, presence or post-mortem lividity of buttocks, loins, back and things or any other part. Whether bullae present and the nature of the it contains fluid, condition of the cuticle.
13. Feature- Whether natural or swollen, state of eyes, position of tongue; nature of fluid (if any) oozing from mouth, nostrils or ears.
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In suspected drowning the presence or absence of cutes anserine is to be noted.
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Indication of purging.

16. Position of limbs- Especially of arms and of Fingers or on the skin of hands and feet.

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If bruises be present, what is the condition of the subcutaneous tissues?
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18a. Can you say definitely that the injuries shown against serial nos. 17 and 18 are ***ante-mortem injuries?***

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(i) Injuries under the scalp and their nature.

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(a) Walls, ribs, cartilages

(b) Pleura

(c) Larynx, Trachea and bronchi

(d) Right Lung with weight

(e) Left Lung with weight

(f) Pericardium

(g) Heart with weight

(h) Large vessels

(i) Additional remarks

21. Abdomen: -

(a) Walls -

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(c) Cavity-

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(e) Oesophagus-

(f) Stomach and its contents-

(g) Small intestine and its contents-

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(i) Liver and gall bladder with weight-

(j) Pancreas and suprarenals-

(k) Spleen with weight.

(l) Kidneys with weights

(m) Bladder-

(o) Organ of generation-

(p) Additional remarks with, wherever possible, Medical Officer's deduction from the state of contents of the stomach as to the time of death and last meal.

(q) State which viscera, (if any) have been retained for chemical examination and also quote the numbers on the bottles containing the same-

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Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

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Post Mortem No. :- , Dated:

1. Place:

Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

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Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion**

of village/City: Taluka: District**:**

by **Dr** /_____ Hospital _____.

I. General Particulars: -

1. (a) By whom was the corpse sent?

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7. Sex, apparent age, race or caste, Description of clothes and of ornaments on the body.

8. Condition of the clothes – Whether wet with water, stained with blood or soiled with vomit or faecal matter.

9. Special marks on the skin such as scars, tattooing etc, any malformations peculiarities or other marks of identification. State of the teeth.

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(g) Heart with weight

(h) Large vessels

(i) Additional remarks

21. Abdomen: -

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(b) Peritoneum -

(c) Cavity-

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(e) Oesophagus-

(f) Stomach and its contents-

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(i) Liver and gall bladder with weight-

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Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

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Post Mortem No. :- , Dated:

1. Place:

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2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Indoor/Casualty no: **PM No:**

Hospital: ADR No.:

Police station:

Memorandum of a Post-mortem Examination held at _____ Hospital on the body of **Name** **, Age- Yrs, Sex , Religion**

of village/City: Taluka: District**:**

by **Dr** /_____ Hospital _____.

I. General Particulars: -

1. (a) By whom was the corpse sent?

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8. Condition of the clothes – Whether wet with water, stained with blood or soiled with vomit or faecal matter.

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19. Head: -

(i) Injuries under the scalp and their nature.

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(f) Pericardium

(g) Heart with weight

(h) Large vessels

(i) Additional remarks

21. Abdomen: -

(a) Walls -

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(c) Cavity-

(d) Buccal cavity, teeth, tongue and pharynx-

(e) Oesophagus-

(f) Stomach and its contents-

(g) Small intestine and its contents-

(h) Large intestine and its contents-

(i) Liver and gall bladder with weight-

(j) Pancreas and suprarenals-

(k) Spleen with weight.

(l) Kidneys with weights

(m) Bladder-

(o) Organ of generation-

(p) Additional remarks with, wherever possible, Medical Officer's deduction from the state of contents of the stomach as to the time of death and last meal.

(q) State which viscera, (if any) have been retained for chemical examination and also quote the numbers on the bottles containing the same-

22. Spine and spinal cord-

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(b) If yes, which of the injuries were individually sufficient in the ordinary course of nature to cause death?

(c) Which of the injuries collectively are sufficient in the ordinary course of nature to cause death?

Opinion as to the probable/Final cause of death: -

Sign
Name of Doctor and seal

PM no:
Dated:

*The spinal cord need not be examined unless there are any indications of disease, strychnine poisoning or injury.
Note: - The report must be written and signed immediately after the examination. Medical officers will at once dispatch a duplicate copy to the Civil Surgeon of their district for in his office.
Great care should be taken not to cut viscera before they have been inspected in *Situ.*

Post Mortem No. :- , Dated:

1. Place:

Forwarded to the **,** P.S. for information with reference to his No. / of Dated: .

2. Viscera has been/ **not** been preserved.

Sign
Name of Doctor and seal

PM no:
Dated:

Part- IV

Common Medico-legal proforma routinely used in medico-legal Practice

Form in which to report post mortem examination to be used when forwarding Viscera to the Chemical Analyser

From:
TO
THE CHEMICAL ANALYSER TO GOVERNMENT OF MAHARASHTRA, _____

Date: _____

Description of Viscera forwarded for examination:

Mode of packing: Box No. Bottle No. Weight of parcel		Copy of the label attached to bottle Impression of Seal
Mode of dispatch	Date of Dispatch	

Information furnished by police officer or precis of case :

Name: Sex: Age: Caste:

Thana or village:

Story of the case -

Date and hour of dispatch of body Date of receipt	Date and hour of autopsy	Names of officer by whom Examination was actually made

Appearance of Body –

Muscularity: Stout: Emaciated:

Special Marks:-

Scars: Tattooing: Amount of Hairs etc.

Signs of decomposition:-

Wounds and bruises:

(a) Position: (b) Character: (c) Size:

State of natural orifices:

Nostrils: Mouth: Vagina:

Anus: Urethra:

State of limbs etc.

Rigor mortis: Position:

Contents of hands if clenched:

Feature	Relaxed
	Contracted

Eyelids: Pupils: Contents of mouth:

Position of tongue: State of teeth:

Thorax -

Ribs: Cartilages: Pleura: Pericardium:

Heart: Shape and appearance

Cavities

Clots ante or post-mortem

Muscular structure

Vessels: Clots
Aneurysm
Atheroma

Lungs : Appearance
Colour
Consistence
Adhesions

Larynx, trachea and bronchi for foreign bodies or disease:

Abdomen: -

Peritoneum

Peritoneal cavity, contents

Liver and gall bladder -form and size, disease or injury

Pancreas disease or injury

Spleen disease or injury

Kidney disease or injury

Stomach Size and general appearance
Appearance of coats
Contents, appearance, odour and quantity.

Intestine Size and general appearance
Appearance of coats

General Organs: -

Bladder and contents

Uterus appearance, size and contents

Vagina, contents

Head:

Scalp

Bones, Disease or Injury

Membranes

Brain substance and ventricles

Base of skull fracture, caries, extravasations, etc.

The Spinal cord need not be examined unless any indication of disease or injury exists.

Fracture and dislocation

More detailed description of injury or disease

Opinion as to the cause of death: -

Station

Date Civil Surgeon / Medical Officer in Charge / Autopsy Surgeon

Form No II

Form or report to be used when forwarding substance Other than viscera to the chemical analyser

From:

To
THE CHEMICAL ANALYSER
GOVERNMENT OF MAHARASHTRA,

_____

Dated: / /

Forwarding the article mentioned below for examination for _____

_____ In connection with the case of_____

Description of Articles

Mode of packing and weight of parcel If standard boxes and bottles are used a) Box No. b) Bottle No.	Copy of the label attached to bottle
Mode of Dispatch Date Date:	Date of receipt in Chemical Analyzer's office

Facts of Medico legal importance in connection with case:

Station

Date Civil Surgeon / Medical Officer in Charge / Autopsy Surgeon

Form for Dispatch of Viscera for Histopathological Examination

TO,
HOD / In-charge,
Histopathology Section,
Department of Pathology,

_____, _____ .

(Through: _____)

Subject : **Regarding Histopathological examination and report.**

Reference : MLPM No._____ Date: _____

Name of deceased: _____

Age: _____ Sex: _____

Hospital Reg./MLC No_____ Ward: _____

DOA & Time _____ DOD & Time _____

Nature Of specimen:

Preservative Used:

Clinical Details:

Clinical Diagnosis:

Autopsy findings in brief:

Probable cause of death on Autopsy:

Special instruction, if any: -

Place: Signature
Date & Time: Name of Doctor
Designation & seal

✂- - - -

Labels for Viscera Bottles

Bottle No. 1

Name of the Hospital: _____

P.M. No: _____ **Date:** _____

Name of Deceased: _____

Police Station: _____

Nature of Specimen: _____

Preservative Used: _____

Date: _____ **Autopsy Surgeon**

Place: _____ *Sign & seal*

✂- - - -

Instructions for Forwarding Blood/Tissue For DNA Fingerprinting/ Paternity Testing.

1. Medical officer should collect fresh blood in 2 ml plastic tubes (2 blood samples from each person) provided by Regional Forensic Science Laboratory.

2. Please shake the tube for 7-8 times after collecting blood.

3. Duly labelled tube should be kept in sterile plastic bottle which should be immediately sealed.

4. Duly filled IDENTIFICATION FORM should be sent along with the sample.

5. COPY OF SEAL should be provided at the end of IDENTIFICATION FORM.

6. For each person, a separate IDENTIFICATION FORM should be filled by Medical Officer while forwarding samples for DNA profiling.

7. Photograph of person on IDENTIFICATION FORM should be duly signed and attested by the Medical Officer.

8. IDENTIFICATION FORM should be signed by Witnesses in front of Medical Officer.

9. The samples should be sent to the Regional Forensic Science Laboratory in ice box with ice, if more than 4 Hours are required to submit the samples.

10. Products of abortion/ other tissue should be sealed in a sterile plastic bottle and sent to the Regional Forensic Science Laboratory in ice box with ice. If available, 4% EDTA could be used as preservative.

11. Don’t use formalin or other preservatives. Formalin preserved samples are considered unacceptable/ inappropriate for DNA analysis by Forensic Science Laboratories.

12. In case of blood transfusion to donor within last three months, blood sample should not be collected. In such case, donor’s blood sample should be collected after four months of blood transfusion.

Identification form for forwarding samples for DNA Fingerprinting/ Profiling

To
Deputy Director,
Regional Forensic Science Laboratory,
State of Maharashtra, _____.

Prefix photograph.

Photograph to be attested by Medical Officer

IDENTIFICATION FORM

Name : _____
Age: _____Sex: _____
Father's / Husband's / Guardian's Name :_____
Address (with Tel. No. Fax. If any):_____
Description of sample : _____
Genetic abnormalities, if any (specify): _____
Date and Time of Sample collection :- Date:_____ Time:_____
Forwarded by:
(a) Hon'ble Court of / Police Station :_____
(b) C. R. No. /FIR/Case /MC/OP No., etc. : _____

DECLARATION BY DONOR
(OR BY GUARDIAN IN CASE OF MINOR DONOR)

I, _____hereby declare that the blood given by me / my ward to Regional Forensic Science Laboratory, State of Maharashtra, _____ is with my consent and I / my ward did not receive a blood transfusion within last three months.
(This consent is explained to patient in _____language)

Signature/Thumb impression
(Subject/Guardian)

The blood is collected in presence of following witnesses:

(1) Name: _____Signature: _____

(2) Name: _____Signature: _____

Copy of Seal

Sign. and designation of M.O. with Stamp

- STRIKE OUT WHICHEVER NOT APPLICABLE,
- IN CASE OF BLOOD TRANSFUSION TO DONOR WITHIN LAST THREE MONTHS, BLOOD SAMPLE SHOULD NOT BE COLLECTED.
- PASSPORT SIZE PHOTOGRAPH TO BE ATTESTED BY MEDICAL OFFICER.

Summons to Witness

In the District & Sessions Court

At

Session Case No. _____of 20

Summon to witness

To,

Whereas complaint has been made before me that_____

Of _____

has committed the offence of _____

on or above the _____day of _____20____at _____

and it appears to me that you are likely to give material evidence for the _____

You are hereby summoned to appear before this court on the _____day _____

at_____ hours to_____

testify what you know concerning the matter of the said complaint, and not to depart thence, without leave of the court, and you are hereby warned that if you shall, without just excuse neglect or refuse to appear at the said time and place a warrant will be issued to compel your attendance.

Given under my hand and the seal of the court this _____day of _____20_____

Superintendent

(By order of Session Judge)

Second MBBS (from October 2020)

Subject: Microbiology Theory / Practical

Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. (Vol. 1; page nos. 205-227)

1. Total Teaching hours : **190**
2. A. Lectures(hours): **70**
   B. Self-directed learning (hours):- **10**
   C. Clinical Postings (Hours): NA
   D. Small group teachings/tutorials/Integrated teaching / Practical's (hours)**: 110**

Competency Nos.	**Topics and Subtopics**
MI1.1	Introduction to Microbiology and historical aspects. Introduction to bacteria, viruses & Bacteriophages, fungi, parasites, host parasite relationship, normal flora.
MI1.2	Morphology of bacteria, microscopy, Gram staining, Z-N staining, stool examination- routine microscopy
MI1.3	Types of infection, source/ reservoir of infection, modes of transmission, pathogenicity, definition of prevalence, incidence, types of infectious diseases (endemic, epidemic, pandemic, sporadic)
MI1.4	Methods of sterilization and disinfection, their application in the laboratory, clinical and surgical practice, demonstration of working of autoclave
MI1.5	Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice
MI1.6	Mechanism of drug resistance, methods of antibiotic susceptibility testing, definition of MIC, MBC, break points, interpretation of antibiotic susceptibility test report, antimicrobial audit/use, antibiotic policy, antimicrobial stewardship.
MI1.7	Immunity
MI1.8	Antigen, antibodies, immune response and complement, antigen antibody reactions
MI1.9	Vaccines, universal vaccination program, immunoprophylaxis, immunotherapy

Competency Nos.	Topics and Subtopics
MI1.10	Hypersensitivity, autoimmune disorders and immunodeficiency states, laboratory methods used in their detection
MI1.11	Immunological mechanisms of transplantation and tumor immunity
MI2.1	Rheumatic Heart Disease-definition, etiological agent, pathogenesis, clinical features and laboratory diagnosis. Streptococci
MI2.2	Infective endocarditis- classification, etiological agents, pathogenesis, clinical features and laboratory diagnosis. Streptococcus viridans, Streptococcus mutans, HACEK
MI2.3	Blood collection for culture, throat swab collection, blood culture, ASO test, interpretation of the test
MI2.4	Anemia-definition, etiological agents, pathogenesis, clinical features and laboratory diagnosis. Hookworm, Trichuris trichiura,
MI2.5	Kala azar, malaria, filariasis and other common parasites prevalent in India - *Schistosomes*, ***Fasciolopsis buski,*** *Paragonimus westermani*,
MI2.6	Peripheral smear staining for malaria, Identify the slide for filarial
MI2.7	HIV- epidemiology, the etio- pathogenesis, evolution, complications, opportunistic infections, diagnosis, prevention and the principles of management of HIV
MI3.1	Microbial agents causing diarrhea and dysentery- epidemiology, morphology, pathogenesis, clinical features and laboratory diagnosis of Shigella, Campylobacter, . Vibrio, salmonella, E. hystolytica, Giardia, B. coli, H. nana, Taenia , Intestinal nematodes, Norwalk virus and Rota virus, Coronavirus
MI3.2	Stool examination-routine microscopy, hanging drop preparation,
MI3.3	Septicemia, Enteric fever and Food poisoning Salmonella -Morphology, pathogenesis, clinical features, laboratory diagnosis.
MI3.4	Blood culture, Widal test, Stool culture, Clot culture, Interpretation of the reports
MI3.5	Food poisoning- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Staphylococci, Cl. botulinum, Bacillus cereus
MI3.6	Acid peptic disease (APD)- etio-pathogenesis, clinical course laboratory diagnosis and management H. pylori
MI3.7	Viral hepatitis- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Hepatitis A, B, C, D, E, Cytomegalovirus, Epstein-Barr virus, HSV, VZV, Measles, Rubella
MI3.8	Serological tests for the laboratory diagnosis of viral hepatitis, viral markers, interpretation of reports

Competency Nos.	Topics and Subtopics
MI4.1	Anaerobic infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Spore bearing and non-spore bearing anaerobes, Clostridia
MI4.2	Bone and joint infections- etio-pathogenesis, clinical features and laboratory diagnosis. Prosthetic joint infections, Staphylococci, Acinetobacter
MI4.3	Skin and soft tissue infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Superficial, cutaneous and sub-cutaneous fungal infections, Mycetoma, Leprosy, Herpes.
MI5.1	Meningitis- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Meningococci, Leisteria, H. influenzae, Cryptococcus neoformans
MI5.2	Encephalitis- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Primary amoebic meningo-encephalitis, viral encephalitis, Japanese encephalitis, Rabies, Aseptic meningitis -ECHO viruses
MI5.3	laboratory diagnosis of meningitis, interpretation of laboratory reports
MI6.1	Upper respiratory tract infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis Orthomyxo virus, Paramyxo virus, Adenovirus, Rhinovirus, Diphtheria, Bordetella and Lower respiratory tract infections-etiological agents, pathogenesis, clinical features and laboratory diagnosis Streptococcus pneumonia, Mycobaterium tuberculosis,
MI6.2	Gram staining- Interpretation of results
MI6.3	Z-N staining and Fluorescent staining- Interpretation of results
MI7.1	Genitourinary infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Non-gonococcal urethritis, Trichomoniasis, . Bacterial vaginosis
MI7.2	Sexually transmitted infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Syphilis, Gonorrhea, Herpes, Calymmatobacterium, HPV, Molluscum contagiosum
MI7.3	Urinary tract infections- etiological agents, pathogenesis, significant bacteruria , clinical features and laboratory diagnosis. E. coli, Klebsiella, Proteus
MI8.1	Zoonotic diseases- etiological agents, mode of transmission, pathogenesis, clinical features laboratory diagnosis and prevention-Brucella, Yesinia, Leptospira, Anthrax and Arbo viruses, Hydatid disease
MI8.2	Opportunistic infections- etio-pathogenesis, factors contributing to the occurrence of OI, laboratory diagnosis - Toxoplasma, Pneumocystis jiroveci, Cryptospora, Isospora,
MI8.3	Oncogenic viruses in the evolution of virus associated malignancy

Competency Nos.	Topics and Subtopics
MI8.5	Healthcare Associated Infections (HAI)- definition, types, factors that contribute to the development of HAI and the methods for prevention- Pseudomonas, MOTT, Antibiotic associated diarrhea
MI8.6	Hand hygiene, bio medical waste management, environmental hygiene, use of equipments, respiratory hygiene and cough etiquette, PEP, spill management, vaccination
MI8.7	Infection control practices and use of Personal Protective Equipments (PPE)
MI8.8	Microbiology of food, water and air
MI8.9	Methods of sample collection and transport
MI8.10	Collection and transport of specimens
MI8.11	Respect for patient samples sent to the laboratory for performance of laboratory tests
MI8.12	Confidentiality pertaining to patient identity in laboratory results
MI8.13	Appropriate laboratory test in the diagnosis of the infectious disease
MI8.14	Confidentiality pertaining to patient identity in laboratory results
MI8.15	Interpret the results of the laboratory tests used in diagnosis of the infectious disease
MI8.16	National Health Programs in the prevention of common infectious diseases- Vector borne diseases control program, Revised National Tuberculosis Control Program (RNTCP), National AIDS Control Program, National Leprosy Eradication Program, Pulse Polio Program- Poliovirus
Miscellaneous topics - may be covered in theory or SGT	Burkholderia, Mycoplasma, Borrelia, Actinomyses & Nocardia, Rickettsia, Bortonella, Ehrlichia, Chlamydiae, Ebola virus, Slow viruses

AETCOM Module no.	Topics and Subtopics
2.5	Bioethics-patient autonomy and decision making
2.6	Bioethics-patient autonomy and decision making
2.7	Bioethics-patient autonomy and decision making

Revision

Paper wise distribution of topics for Prelim & MUHS Annual Examination
Year: Second MBBS Subject: MICROBIOLOGY

Paper	Section	Topics
I	A	MCQs on all topics of the paper I
		General Microbiology and Immunity
		CVS and Blood
		Gastrointestinal and hepatobiliary system
		AETCOM Module No- 2.5,2.6 and 2.7
II	A	MCQs on all topics of the paper II
		Musculoskeletal system, skin and soft tissue infection
		Central nervous system infections
		Respiratory tract infections
		Genitourinary and sexually transmitted infections
		Zoonotic diseases and miscellaneous

Second MBBS Internal Assessment Subject: Microbiology

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Phase	IA – 1 -Exam (After 3 months , Jan)			IA – 2 -Exam (After 7 months, May)			Prelims (July)		
	Theory	Practical (Including 10 Marks for Journal & Log Book)	Total Marks	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks	Theory	Practical	Total Marks
Second MBBS	50	50	100	50	50	100	Paper 1 -100 Paper 2 -100	100	300

Assessment in CBME is ONGOING PRCESS,

No Preparatory leave is permitted.

1. There shall be 3 internal assessment examinations in Microbiology.
2. The suggested patterns of question paper for first two internal assessment theory examinations is given below. Pattern of the prelims examinations should be similar to the University examinations.
3. Internal assessment marks for theory and practical will be converted to out of 40 (theory) + 40 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University. **Conversion Formula for calculation of marks in internal assessment examinations.**

Phase II	Theory	Practical
IA 1	**50**	**50**
IA 2	**50**	**50**
Prelim	**200**	**100**
Total	**300**	**200**
Conversion out of	**40**	**40**
Conversion formula	**Total marks in 3 IA theory examinations /7.5**	**Total marks in 3 IA Practical examinations /5**
Eligibility criteria after conversion	**16**	**16**
	Combined theory + Practical = 40	

4. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
33.01 to 33.49	33
33.50 to 33.99	34

5. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.

6. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

7. Remedial measures

A. Remedial measures for non-eligible students

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically.

ii) Extra classes for such students may be arranged. If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students. Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.

iii) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. The pattern for this repeat internal assessment examination shall be similar to the final University examination. Only the marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	**Practical**
Remedial examination (pattern as per final examination)	**200**	**100**
Conversion out of	**40**	**40**
Conversion formula	**Marks in remedial theory examinations /5**	**Marks in remedial Practical examinations /2.5**
Eligibility criteria after conversion	**16**	**16**
	Combined theory + Practical = 40	

B. <u>Remedial measures for absent students:</u>

If any of the students is absent for any of the 3 IA examinations due to any reasons, following measures shall be taken.

i. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.

ii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.

iii. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator.

Format for Internal Assessment Theory Paper IA – 1 & IA - 2

Question No.	Type of Question	No. of Questions	Max. Marks
1.	MCQ	10	10 (1 marks each)
2.	SAQ	5 (Any four out of 5)	28 (7 marks each)
3.	LAQ	1 (Compulsory)	12
		Total	50

Second MBBS Practical Mark's Structure
Internal Assessment Examinations
(Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards)

Subject : MICROBIOLOGY Practical										
Seat No.	IA – 1					IA - 2				
	Gram Stain	P.S. for M.P.	Journal/Log book	Viva	Total	Z-N stain	Stool - Routine microscopy	Journal/Log book	Viva	Total
Max. Marks	10	10	10	20	50	10	10	10	20	50

Second MBBS Practical Mark's Structure (Prelim)

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Subject: MICROBIOLOGY										
Practical							Oral/Viva			Total
Seat No.	Gram/ Z-N staining	P.S. for M.P./ Stool –routine microscopy	Use of PPE/ Hand hygiene	Interpretation of reports	Journal/ Log book	Total	Viva-I	Viva-II	Total	Practical & Oral (F + I)
Max. Marks	15	15	10	20	10	70	15	15	30	100

Second MBBS Practical Mark's Structure (M.U.H.S Examination)

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Subject: MICROBIOLOGY										
Practical							Oral/Viva			Total
Seat No.	Gram/ Z-N staining	P.S. for M.P./ Stool –routine microscopy	Use of PPE/ Hand hygiene	Interpretation of reports	Journal/ Log book	Total	Viva-I	Viva-II	Total	Practical & Oral (F + I)
	A	B	C	D	E	F	G	H	I	J
Max. Marks	15	15	10	20	10	70	15	15	30	100

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

SECTION "A" MCQ

Instructions:

1) *Put in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

1.20 MCQ(1 marks each) *(20x1)* *20*

a) b) c) d) e) f) g) h) i) j)
k) l) m) n) o) p) r) s) t) u)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B" (40 Marks)

2. Short Answer Questions (AETCOM 2.5, 2.6, 2.7) (compulsory) (7x1=07)

a)

3. Short Answer Questions (Answer Any 3 out of 4) (7x3=21)

a) b) c) d)

4. Structured Long Answer Questions (Compulsory) (12x1=12)

a)

5. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)

a) b) c) d) e)

6. Structured Long Answer Questions (Compulsory) (12x1=12)

a)

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

SECTION "A" MCQ

Instructions:

1) *Put in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (20 x1 = 20)

a) b) c) d) e) f) g) h) i) j)
k) l) m) n) o) p) r) s) t) u)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B"

2. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)
   a) b) c) d) e)

3. Structured Long Answer Questions (Compulsory) (12x1=12)
   a)

4. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)
   a) b) c) d) e)

5. Structured Long Answer Questions (Compulsory) .(12x1=12)
   a)

Competency Based Medical Education

Year: Second MBBS

Subject: Microbiology

Learning Resource Material

Books recommended:

1. Textbook of Microbiology – R. Ananthanarayan C. K. Jayaram Panikar
2. A Textbook of Microbiology – P. Chakraborty
3. Textbook of Medical Microbiology – Rajesh Bhatia & Itchpujani
4. Textbook of Medical Microbiology – Arora and Arora
5. Textbook of Medical Parasitology – C. K. Jayaram Panikar
6. Textbook of Medical Parasitology – Arora and Arora
7. Textbook of Medical Parasitology – S.C.Parija
8. Microbiology in clinical practice – D. C. Shanson
9. A Textbook of Parasitology – Dr. R.P. Karyakarte and Dr. A.S. Damle
10. Essentials of Medical Microbiology – Apurba shashtry

Reference books:

1. Mackie McCartney practical Medical Microbiology- Colle JG, Fraser AG
2. Principles of Bacteriology, Virology & Immunology vol. 1, 2, 3, 4, 5- Topley Wilsons
3. Medical Mycology (Emmons)- Kwon – Chung
4. Review of Medical Microbiology (Lange)- Jawetz
5. Immunology- Weir DM
6. Medical Microbiology- David Greenwood, Richard Stack, John Pentherer
7. Parasitology- KD Chatterjee
8. Medical virology- Timbury MC
9. Mackie McCartney Medical, Microbiology vol.1- Duguid JP
10. Microbial infections- Marmion BP, Swain RHA
11. Bailey & Scott's Diagnostic Microbiology
12. Textbook of Mycology – Jagdish Chander

Maharashtra University of Health Sciences
Nashik



MICROBIOLOGY LOGBOOK

For

PHASE II MBBS STUDENTS

AS PER

COMPETENCY BASED CURRICULUM

First Edition: 2020

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Preface

The Medical Council of India has revised the undergraduate medical education curriculum so that the Indian Medical Graduate (IMG) is able to recognize **“Health for all”** as a national goal. He/she should also be able to fulfil his/her societal obligations. The revised curriculum has specified the competencies that a student must attain and clearly defined teaching learning strategies for the same. With this goal in mind, early clinical exposure, integrated teaching, skill development, AETCOM and self-directed learning have been introduced. There would be emphasis on communication skills, basic clinical skills and professionalism. There is a paradigm shift from the traditional didactic classroom-based teaching to learning environments where there is emphasis on learning by exploring, questioning, applying, discussing, analysing, reflecting, collaborating and doing. The recognition of this need is enshrined by a greatly enhanced allocation of time to these methods and also the assessment techniques. With this view in mind the log book has been designed as per the guidelines of competency Based curriculum.

Name of the College

_____

_____

Admission Year : _____

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No. _____ has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for Phase II MBBS Competency Based Curriculum in the subject of Microbiology.

Date: ___/___/_____

Place: _____

Teacher-in-Charge

Professor and Head

Department of Microbiology

Instructions

1) This logbook is prepared as per the guidelines of MCI for implementation of Competency based curriculum for Phase II MBBS students in the subject of Microbiology.
2) Students are instructed to keep their logbook entries up to date.
3) Students are expected to write minimum 1 reflections on Self-Directed Learning (SDL).
4) Students also have to write reflections on AETCOM Modules – 2.5, 2.6 and 2.7.
5) Reflections should be structured using the following guiding questions:

- What happened? (What did you learn from this experience)
- So what? (What are the applications of this learning)
- What next? (What knowledge or skills do you need to develop so that you can handle **this type of situation?)**

6) The logbook assessment will be based on multiple factors like

- Attendance
- Active participation in the sessions,
- Timely completions
- Quality of write up of reflections
- Overall presentation

INDEX

Sr. No	Description	Page No's	Status	Signature of Teacher
			Complete/ Incomplete	
1	Self-Directed Learning, skill assessment, participation in Group discussions			
2	*AETCOM Module No. 2.5, 2.6, 2.7			
3	Attendance Records			
4	Records of Internal Assessment			

*AETCOM – Competencies for IMG, 2018, Medical Council of India.

Section 1. Self-Directed Learning, skill assessment, participation in Group discussions

Sr. No	Self-Directed Learning, skill assessment, participation in Group discussions	Date	Signature of Teacher

Sr. No	Self-Directed Learning, skill assessment, participation in Group discussions	Date	Signature of Teacher

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Section 2

Reflection on AETCOM Module – 2.5

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM Module – 2.6

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM Module - 2.7

Topic: **Date:**

Signature of Teacher-in- charge

SECTION 3B: Details of attending extra classes [For poor attendance (if any)]

S. No	Date	Period	Total hours	Signature of Student	Signature of Teacher
Total hours					

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

Course Content
Second MBBS (from October 2020)
Subject: Pathology (Theory and Practical)

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 1; page nos.160-203)

1. Total Teaching hours : **230 hours**
2. A. Lectures (hours): **80**
   B. Self-directed learning (hours): **12**
   C. Clinical postings (hours): NIL
   D. Small group teachings/tutorials/Integrated teaching/Practicals (hours)**: 138**

Competency Nos.	Topics & Subtopics	Lectures	Small group teaching	SDL
		80 hours	**138 hours**	**12 hours**
PA1.1 – 1.3	**Introduction to Pathology** *Core*: common definitions and terms, role of pathologist, branches of pathology Practicals: histological techniques, working of a microscope *Non-core*: history and evolution of pathology	1	2	
PA2.1 – 2.8	**Cell injury and adaptations** *Core*: Cell injury, necrosis, apoptosis, intracellular accumulations, cell death, cellular adaptations, calcification, disorders of pigment metabolism, *Non-core*: cellular aging	6	6	
PA3.1-3.2	**Amyloidosis-** *Core*: Pathogenesis and pathology of amyloidosis	1	2	
PA4.1 – 4.4	**Inflammation** *Core*: Acute and chronic inflammation, mediators of inflammation, granulomatous inflammation, including TB	4	4	
PA5.1	**Healing and repair-** *Core*: Repair and wound healing	1	-	
PA6.1- 6.7	**Hemodynamic disorders** *Core*: Edema, hyperemia, congestion, hemorrhage, shock, thrombosis, embolism, ischemia, infarction	4	6	
PA7.1-7.5	**Neoplasia** *Core*: Definition and classification of neoplasia, molecular basis of cancer, carcinogenesis, effects of tumour on host, paraneoplastic syndrome, laboratory diagnosis of cancer *Non-core*: Immunology and immune response to cancer	5	6	
PA8.1-8.3	**Basic diagnostic cytology** *Core*: Diagnostic role of cytology, exfoliative cytology	-	2	
PA9.1-9.37	**Immunopathology** *Core*: Principles of immunity, hypersensitivity reactions, HLA system, transplant rejection, autoimmunity, systemic lupus erythematosus, pathology of HIV/AIDS	5	2	
PA10.1-10.4	**Infections and infestations-** *Core*: Malaria, cysticercus, leprosy, *Non-core:* Common bacterial, viral, protozoal, and helminthic diseases	-	2	1

Competency Nos.	Topics & Subtopics	Lectures	Small group teaching	SDL
		80 hours	138 hours	12 hours
PA11.1-11.3	**Genetic and pediatric diseases-** *Non-core*: Mutations, Tumors and tumour-like conditions of infancy and childhood, common storage disorders	1	-	1
PA12.1-12.3	**Environmental and nutritional disease** *Core*: Air pollution, tobacco, alcohol, protein calorie malnutrition, starvation, obesity	-	2	
PA13.1-13.5	**Introduction to hematology** *Core*: Hematopoiesis and extramedullary hematopoiesis, definition and classification of anemia, anticoagulants, investigations in anemia, peripheral smear examination	2	8	
PA14.1-14.3	**Microcytic anemia-** *Core*: Iron metabolism, microcytic hypochromic anemia, peripheral smear in microcytic anemia	1	4	
PA15.1-15.4	**Macrocytic anemia** *Core*: Vitamin B12 metabolism. Etiology and pathogenesis of B12 deficiency, laboratory investigations in macrocytic anemia, megaloblastic anemia *Non-core:* differences between megaloblastic and non-megaloblastic anemia	1	4	
PA16.1-16.7	**Hemolytic anemia** *Core:* Definition and classification of hemolytic anemia, pathogenesis, features, hematological indices, sickle cell anemia, thalassemia, peripheral smear picture in hemolytic anemia, classification, clinical features of hemolytic anemia	2	6	
PA17.1-17.2	**Aplastic anemia-** *Non-core*: Etiology, pathogenesis, findings, bone marrow aspiration and biopsy	1	2	
PA18.1-18.2	**Leukocyte disorders** *Core:* Leukocytosis, leukopenia, acute and chronic leukemia	2	2	
PA19.1-19.7	**Lymph node and spleen** *Core:* Lymphadenopathy, TB lymphadenitis, Hodgkin's disease, non-Hodgkin's lymphoma, splenomegaly	2	2	
PA20.1	**Plasma cell disorders-** *Core:* Multiple myeloma	-	2	
PA21.1-21.5	**Hemorrhagic disorders** *Core:* Normal hemostasis, vascular and platelet disorders, ITP, hemophilia, clotting disorders, DIC, Vitamin K deficiency	3	4	
PA22.1-22.7	**Blood banking and transfusion** *Core:* Blood group systems, compatibility testing, blood components, transfusion transmitted infections, transfusion reactions, autologous transfusion	2	4	1
PA23.1-23.3	**Clinical Pathology** *Core*: Urine analysis, Body fluids, semen analysis, thyroid function tests, renal function tests, liver function tests		12	
PA24.1-24.7	**Gastrointestinal tract:-** *Core*: Etiology, pathogenesis, pathology, morphology and clinical features of: oral cancer,	5	4	

Competency Nos.	Topics & Subtopics	Lectures	Small group teaching	SDL
		80 hours	138 hours	12 hours
	peptic ulcer disease, polyp, carcinoma stomach, tubercular intestine, inflammatory bowel disease, carcinoma colon			
PA25.1-25.6	**Hepatobiliary system:** *Core*: Bilirubin metabolism, etiopathogenesis and classification of jaundice, hepatic failure, pathology, complications, consequences and laboratory diagnosis of viral hepatitis; pathophysiology of alcoholic liver disease and cirrhosis; portal hypertension; hepatocellular carcinoma Interpretation of liver function tests; Serology panel in viral hepatitis (small group)	5	6	
PA26.1-26.7	**Respiratory system:** *Core*: Etiopathogenesis, morphology, and complications of: pneumonia, lung abscess, chronic obstructive airway disease, bronchiectasis, tuberculosis, occupational lung disease, lung tumours, *Non-core*: pleural tumours, mesothelioma	4	4	
PA27.1-27.10	**Cardiovascular system:** *Core*: Arteriosclerosis, aneurysm, heart failure, ischemic heart disease, laboratory diagnosis of acute coronary syndrome, rheumatic fever and heart disease, infective endocarditis, pericarditis, pericardial effusion, *Non-core*: cardiomyopathies,	5	6	1
PA28.1-28.16	**Urinary tract** *Core*: Histology of kidney, clinical syndromes, acute renal failure, chronic renal failure, acute glomerulonephritis, glomerular manifestations in systemic disease, diseases of tubular interstitium, acute tubular necrosis, acute and chronic pyelonephritis, reflux nephropathy, vascular diseases of kidney, cystic diseases of kidney, urinary calculi and obstructive uropathy, renal tumours *Non-core*: thrombotic angiopathies, urothelial tumours	6	4	2
PA29.1-29.5	**Male genital tract:** *Core*: Testicular tumours, carcinoma penis, benign prostatic hyperplasia, carcinoma prostate, *Non-core*: prostatitis	1	2	
PA30.1-30.9	**Female genital tract:** *Core*: Pathogenesis, etiology, pathology, diagnosis, and progression of: carcinoma cervix, carcinoma endometrium, leiomyoma, leiomyosarcoma, ovarian tumours, gestational trophoblastic neoplasms, *Non-core*: cervicitis, endometriosis, adenomyosis, endometrial hyperplasia	1	6	2
PA31.1-31.4	**Breast-** *Core*: Benign breast disease, carcinoma breast, *Non-core*: gynecomastia	1	2	
PA32.1-32.9	**Endocrine system** *Core*: etiology, pathogenesis, pathology and iodine dependency of: goiters, thyrotoxicosis, hyperthyroidism,	4	4	2

Competency Nos.	Topics & Subtopics	Lectures	Small group teaching	SDL
		80 hours	**138 hours**	**12 hours**
	hypothyroidism; epidemiology, etiopathogenesis, pathology, laboratory diagnosis, complications of diabetes mellitus *Non-core*: hyperparathyroidism, pancreatic cancer, adrenal insufficiency, Cushing syndrome, adrenal neoplasms			
PA33.1-33.5	**Bone and soft tissue** *Core:* Osteomyelitis, bone tumours, soft tissue tumors *Non-core*: Rheumatoid arthritis, Paget's disease of bone	1	4	1
PA34.1-34.4	**Skin** *Core*: Squamous cell carcinoma, basal cell carcinoma *Non-core*: Nevus, melanoma,	1	4	
PA35.1-35.3	**Central nervous system** *Core:* CSF findings in meningitis, CNS tumours	2	4	
PA36.1	**Eye-** *Non-core*: Retinoblastoma			1
AETCOM 2.4	**Working in a health care team**		2	
AETCOM 2.8	**What does it mean to be family member of a sick patient?**		2	

Subject: Pathology

LIST OF PRACTICALS

GENERAL PATHOLOGY

1. Histological techniques, tissue processing, microscopy
2. Intracellular accumulations, calcification
3. Cellular adaptations
4. Disorders of pigment metabolism
5. Amyloidosis
6. Acute inflammation
7. Chronic inflammation and repair
8. Tuberculosis and leprosy
9. Hemodynamic disturbances
10. Neoplasia
11. Infections and infestations

HEMATOLOGY

1. Collection of specimens, anticoagulants, normal hematopoiesis
2. Hemoglobin estimation: Interpretation of report
3. Hematocrit and Erythrocyte sedimentation rate: Interpretation of report
4. Complete blood count: Interpretation of report (without flags) from automated cell counter
5. Preparation of peripheral smear and performing differential leukocyte count, interpretation of peripheral smear
6. Investigations of anemia
7. Investigations of leukemia
8. Plasma cell dyscrasias
9. Investigation of bleeding and clotting disorders
10. Blood banking: Performing blood grouping and interpretation of results

SYSTEMIC PATHOLOGY

1. Lymphoma
2. Splenomegaly
3. Gastrointestinal tract: Ulcers
4. Intestinal polyp and carcinoma intestine
5. Cirrhosis and hepatocellular carcinoma
6. Pneumonia, bronchiectasis
7. Pulmonary tuberculosis and bronchogenic carcinoma
8. Atherosclerosis
9. Left ventricular hypertrophy, myocardial infarction, lab diagnosis of MI
10. Rheumatic heart disease and infective endocarditis
11. Chronic contracted kidney, glomerulonephritis, pyelonephritis
12. Urinary calculi, Renal cell carcinoma,
13. Male genital tract
14. Female genital tract: Carcinoma cervix, Carcinoma endometrium
15. Leiomyoma, Ovarian tumours
16. Gestational trophoblastic disease
17. Breast
18. Thyroid
19. Bone and soft tissue tumours
20. Skin
21. CNS tumours

CLINICAL PATHOLOGY

1. Urine analysis: Interpretation of physical, chemical and microscopic examination results
2. Semen analysis: Lecture demonstration, interpretation of report
3. Basic cytological techniques: FNAC and exfoliative cytology (Lecture demonstration)
4. CSF examination: Lecture demonstration and interpretation of reports
5. Body fluids: Interpretation of serous effusion reports
6. Interpretation of kidney function tests
7. Investigations in jaundice
8. Investigations in diabetes mellitus

AUTOPSY

Indications and technique, autopsy findings in common conditions like myocardial infarction, cirrhosis, portal hypertension, bronchogenic carcinoma, miliary tuberculosis, renal cell carcinoma etc.

Suggested LIST OF SPECIMENS

1. Fatty liver
2. Vesicular mole (hydropic change)
3. Cardiac hypertrophy
4. Kidney- atrophy
5. Large white kidney-amyloidosis
6. Anthracosis
7. Hemochromatosis- Prussian blue reaction
8. Acute appendicitis
9. Serofibrinous pericarditis
10. Abscess- lung/ liver
11. Tubercular lymph node- caseation, matted lymph nodes
12. CVC Liver
13. Splenic infarct
14. Renal infarct
15. Myocardial infarction
16. Leiomyoma
17. Squamous papilloma
18. Hemangioma- Liver
19. Intestinal polyp
20. Squamous cell carcinoma-skin/cervix/penis
21. Adenocarcinoma- intestine
22. Melanoma
23. Enlarged lymph node: Hodgkin's disease
24. Benign ulcer-Peptic ulcer
25. Tubercular intestine
26. Amebic ulcer
27. Malignant ulcer- Carcinoma stomach
28. Cirrhosis
29. Hepatocellular carcinoma
30. Pulmonary tuberculosis
31. Miliary tuberculosis
32. Rheumatic heart disease mitral stenosis
33. Small contracted kidney
34. Renal cell carcinoma
35. Hydronephrosis
36. Urinary calculi
37. Wilm's tumour

38. Carcinoma penis
39. Seminoma
40. Carcinoma cervix
41. Carcinoma endometrium
42. Dermoid cyst
43. Ovarian cystadenoma
44. Leiomyoma
45. Carcinoma breast
46. Goitre
47. Solitary thyroid nodule
48. Giant cell tumour
49. Fibroadenoma of breast
50. Lipoma
51. Metastatic (Liver/Lung)
52. Fat necrosis
53. Meningioma

LIST OF SLIDES

1. Cloudy swelling-kidney
2. Fatty liver
3. Hyaline change in leiomyoma
4. Benign prostatic hyperplasia
5. Squamous metaplasia
6. Calcification
7. Amyloidosis- kidney
8. Nevus
9. Anthracosis
10. Acute appendicitis
11. Acute pyogenic meningitis
12. Tubercular lymphadenitis (Caseous necrosis, granuloma)
13. Tuberculoid leprosy
14. Lepromatous leprosy
15. Pulmonary edema
16. CVC lung
17. CVC liver
18. Thrombus
19. Renal infarct
20. Myocardial infarction
21. Capillary hemangioma
22. Squamous papilloma
23. Squamous cell carcinoma
24. Adenocarcinoma
25. Actinomycosis
26. Rhinosporidiosis
27. Cysticercosis
28. PS-Malaria
29. Eosinophilia
30. Neutrophilia
31. Microcytic anemia
32. Macrocytic anemia
33. Sickle cell anemia
34. Acute leukemia

35. Chronic myeloid leukemia
36. Hodgkin's disease
37. Peptic ulcer
38. Tubercular intestine
39. Adenocarcinoma intestine
40. Cirrhosis
41. Lobar pneumonia
42. Bronchopneumonia
43. Pulmonary tuberculosis
44. Atherosclerosis
45. Myocardial infarction
46. Crescentic glomerulonephritis
47. Chronic pyelonephritis
48. Renal cell carcinoma
49. Benign prostatic hyperplasia
50. Seminoma
51. Fibroadenoma
52. Carcinoma breast
53. Colloid goiter
54. Papillary carcinoma thyroid
55. Basal cell carcinoma
56. Melanoma
57. Lipoma
58. Osteogenic sarcoma
59. Giant cell tumour

CASE-BASED LEARNING

1. Microcytic anemia
2. Macrocytic anemia
3. Hemolytic anemia
4. Multiple myeloma
5. Hepatitis
6. Obstructive jaundice
7. Hemolytic jaundice
8. Nephrotic syndrome
9. Meningitis

CHARTS

1. Interpretation of microcytic anemia
2. Interpretation of macrocytic anemia
3. Interpretation of hemolytic anemia
4. Interpretation of acute leukemia
5. Interpretation of chronic leukemia
6. Interpretation of multiple myeloma
7. Interpretation of bleeding disorder
8. Interpretation of clotting disorder
9. Interpretation of Liver disorders
10. Interpretation of Renal disorders
11. Interpretation of Thyroid disorders
12. Interpretation of acute myocardial infarction
13. Pyogenic meningitis
14. Tubercular meningitis
15. Viral meningitis
16. Diabetes mellitus

Paper wise distribution of topics for Prelim & MUHS Annual Examination
Year: Second MBBS
Subject: Pathology

Paper	Section	Topics
I	A	**Topics of the paper I**
		General Pathology: 1. Cell injury and adaptation 2. Amyloidosis 3. Inflammation and repair 4. Tuberculosis and leprosy 5. Hemodynamic disturbances 6. Immunopathology 7. Neoplasia 8. Infections and infestations 9. Basic diagnostic cytology 10. Histological techniques, tissue processing 11. Genetic and pediatric diseases 12. Environmental and nutritional diseases
		Hematology 1. Introduction to hematology 2. Microcytic anemia 3. Macrocytic anemia 4. Hemolytic anemia 5. Aplastic anemia 6. Leukocyte disorder 7. Lymph node and spleen 8. Plasma cell disorders 9. Hemorrhagic disorders 10. Blood banking and transfusion medicine
		AETCOM 2.4 and 2.8
II	A	**Topics of the paper II**
		Systemic Pathology 1. Gastrointestinal tract 2. Hepatobiliary system 3. Respiratory system 4. Cardiovascular system 5. Urinary tract 6. Male genital tract 7. Female genital tract 8. Breast 9. Endocrine system 10. Bone and soft tissue 11. Skin 12. Central nervous system
		Clinical Pathology 1. Urine analysis 2. Body fluid analysis 3. CSF analysis 4. Liver function test 5. Renal function test 6. Diabetes mellitus 7. Thyroid function test

Second MBBS
Internal Assessment
Subject: Pathology
Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Phase	IA – 1 -Exam (After 3 months , Jan)			IA – 2 -Exam (After 7 months, May)			Prelims (July)		
	Theory	Practical (Including 10 Marks for Journal & Log Book)	Total Marks	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks	Theory	Practical	Total Marks
Second MBBS	100	50	150	100	50	150	Paper 1 -100 Paper 2 -100	100	300

Assessment in CBME is ONGOING PRCESS,

No Preparatory leave is permitted.

1. There shall be 3 internal assessment examinations in Pathology.
2. The suggested patterns of question paper for first two internal assessment theory examinations can be similar to any of the two papers for final examination. Pattern of the prelims examinations should be similar to the University examinations.
3. Internal assessment marks for theory and practical will be converted to out of 40 (theory) + 40 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University. **Conversion Formula for calculation of marks in internal assessment examinations.**

Phase II	Theory	Practical
IA 1	**100**	**50**
IA 2	**100**	**50**
Prelim	**200**	**100**
Total	**400**	**200**
Conversion out of	**40**	**40**
Conversion formula	**Total marks in 3 IA theory examinations /10**	**Total marks in 3 IA Practical examinations /5**
Eligibility criteria after conversion	**16**	**16**
	Combined theory + Practical = 40	

4. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
33.01 to 33.49	33
33.50 to 33.99	34

5. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.
6. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

7. Remedial measures

A. Remedial measures for non-eligible students

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically.
ii) Extra classes for such students may be arranged. If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students. Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.
iii) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. The pattern for this repeat internal assessment examination shall be similar to the final University examination. Only the marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	Practical
Remedial examination (pattern as per final examination)	**200**	**100**
Conversion out of	**40**	**40**
Conversion formula	**Marks in remedial theory examinations /5**	**Marks in remedial Practical examinations /2.5**
Eligibility criteria after conversion	**16**	**16**
	Combined theory + Practical = 40	

B. <u>Remedial measures for absent students:</u>

If any of the students is absent for any of the 3 IA examinations due to any reasons, following measures shall be taken.

i. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.

ii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.

iii. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator.

Second MBBS Practical Mark's Structure

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Subject: Pathology (I.A. 1)											
Practical							Oral/Viva				Total
Seat No.											
	OSPE	PS/DLC	CBC report interpretation	Blood group	Histopathology slide	Total	Gross specimen General Pathology	Hematology		Log book	Practical & Oral
Max. Marks	10	5	5	5	5	30	7	8	15	5	50

Subject: Pathology (I.A. 2)									
Practical					Oral/Viva				Total
Seat No.									Practical & Oral
	OSPE	Urine report interpretation	Histopathology slide	Total	Gross specimen Systemic Pathology	Clinical pathology	Total	Log book	Total
Max. Marks	20	5	5	30	7	8	15	5	50

Subject: Pathology Prelim Examination

	Practical								Oral/Viva			
Seat No.											Total	Practical & Oral
	OSPE	PS/DLC	Urine interpretation	CBC report interpretation	Blood group	Histopathology slide	Logbook	Total	Gross specimens	Clinical and hematology	Total	Total (G +)
Max. Marks	32	10	10	5	5	8	10	80	10	10	20	100

Subject: Pathology M.U.H.S. Final Exam.

	Practical							Oral/Viva			
Seat No.							Total			Total	Practical & Oral
	OSPE	PS/DLC	Urine interpretation	CBC report interpretation	Blood group	Histopathology slide		Gross specimens	Clinical and hematology	Total	Total (G + J)
	A	B	C	D	E	F	G	H	I	J	K
Max. Marks	32	10	10	5	5	8	70	15	15	30	100

For Urine examination

Students are not expected to perform urine examination, but to interpret results. Clinical cases with urinary findings may be given to them for interpretation.

Suggested OSPE stations

1. Clinical chart interpretation (Clinical Pathology) - 5 marks
2. Clinical chart interpretation (Clinical Pathology) - 5 marks
3. Clinical chart interpretation (CSF) - 5 marks
4. Clinical chart interpretation (Hematology)- 5 marks
5. Slides (3)- Hematology, benign, inflammatory- 6 marks
6. Specimens (3)- 6 marks

Subject: Pathology

LIST OF PRACTICALS

GENERAL PATHOLOGY

1. Histological techniques, tissue processing, microscopy
2. Intracellular accumulations, calcification
3. Cellular adaptations
4. Disorders of pigment metabolism
5. Amyloidosis
6. Acute inflammation
7. Chronic inflammation and repair
8. Tuberculosis and leprosy
9. Hemodynamic disturbances
10. Neoplasia
11. Infections and infestations

HEMATOLOGY

1. Collection of specimens, anticoagulants, normal hematopoiesis
2. Hemoglobin estimation: Interpretation of report
3. Hematocrit and Erythrocyte sedimentation rate: Interpretation of report
4. Complete blood count: Interpretation of report (without flags) from automated cell counter
5. Preparation of peripheral smear and performing differential leukocyte count, interpretation of peripheral smear
6. Investigations of anemia
7. Investigations of leukemia
8. Plasma cell dyscrasia
9. Investigation of bleeding and clotting disorders
10. Blood banking: Performing blood grouping and interpretation of results

SYSTEMIC PATHOLOGY

1. Lymphoma
2. Splenomegaly
3. Gastrointestinal tract: Ulcers
4. Intestinal polyp and carcinoma intestine
5. Cirrhosis and hepatocellular carcinoma
6. Pneumonia, bronchiectasis
7. Pulmonary tuberculosis and bronchogenic carcinoma
8. Atherosclerosis
9. Left ventricular hypertrophy, myocardial infarction, lab diagnosis of MI
10. Rheumatic heart disease and infective endocarditis
11. Chronic contracted kidney, glomerulonephritis, pyelonephritis
12. Urinary calculi, Renal cell carcinoma,
13. Male genital tract
14. Female genital tract: Carcinoma cervix, Carcinoma endometrium
15. Leiomyoma, Ovarian tumours
16. Gestational trophoblastic disease
17. Breast
18. Thyroid
19. Bone and soft tissue tumours
20. Skin
21. CNS tumours

CLINICAL PATHOLOGY

1. Urine analysis: Interpretation of physical, chemical and microscopic examination results
2. Semen analysis: Lecture demonstration, interpretation of report
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4. CSF examination: Lecture demonstration and interpretation of reports
5. Body fluids: Interpretation of serous effusion reports
6. Interpretation of kidney function tests
7. Investigations in jaundice
8. Investigations in diabetes mellitus

AUTOPSY

Indications and techniques, autopsy findings in common conditions like myocardial infarction, cirrhosis, portal hypertension, bronchogenic carcinoma, miliary tuberculosis, renal cell carcinoma etc.

LIST OF SPECIMENS

1. Fatty liver
2. Vesicular mole (hydropic change)
3. Cardiac hypertrophy
4. Kidney- atrophy
5. Large white kidney-amyloidosis
6. Anthracosis
7. Hemochromatosis- Prussian blue reaction
8. Acute appendicitis
9. Serofibrinous pericarditis
10. Abscess- lung/ liver
11. Tubercular lymph node- caseation, matted lymph nodes
12. CVC Liver
13. Splenic infarct
14. Renal infarct
15. Myocardial infarction
16. Leiomyoma
17. Squamous papilloma
18. Hemangioma- Liver
19. Intestinal polyp
20. Squamous cell carcinoma-skin/cervix/penis
21. Adenocarcinoma- intestine
22. Melanoma
23. Enlarged lymph node: Hodgkin’s disease
24. Benign ulcer-Peptic ulcer
25. Tubercular intestine
26. Amebic ulcer
27. Malignant ulcer- Carcinoma stomach
28. Cirrhosis
29. Hepatocellular carcinoma
30. Pulmonary tuberculosis
31. Miliary tuberculosis
32. Bronchectasis
33. Bronchogenic carcinoma
34. Atherosclerosis
35. Myocardial infarction

36. Small contracted kidney
37. Renal cell carcinoma
38. Hydronephrosis
39. Urinary calculi
40. Wilm's tumour
41. Carcinoma penis
42. Seminoma
43. Carcinoma cervix
44. Carcinoma endometrium
45. Dermoid cyst
46. Ovarian cystadenoma
47. Leiomyoma
48. Carcinoma breast
49. Goitre
50. Solitary thyroid nodule
51. Giant cell tumour
52. Fibroadenoma of breast
53. Lipoma
54. Metastasis of Liver/Lung
55. Fat necrosis
56. Meningioma

LIST OF SLIDES

1. Cloudy swelling-kidney
2. Fatty liver
3. Hyaline change in leiomyoma
4. Benign prostatic hyperplasia
5. Squamous metaplasia
6. Calcification
7. Amyloidosis- kidney
8. Nevus
9. Anthracosis
10. Acute appendicitis
11. Acute pyogenic meningitis
12. Tubercular lymphadenitis (Caseous necrosis, granuloma)
13. Tuberculoid leprosy
14. Lepromatous leprosy
15. Pulmonary edema
16. CVC lung /Liver
17. Thrombus
18. Renal infarct
19. Myocardial infarction
20. Capillary hemangioma
21. Squamous papilloma
22. Squamous cell carcinoma
23. Adenocarcinoma
24. Actinomycosis
25. Rhinosporidiosis
26. Cysticercosis
27. PS-Malaria

28. Eosinophilia
29. Neutrophilia
30. Microcytic anemia
31. Macrocytic anemia
32. Sickle cell anemia
33. Acute leukemia
34. Chronic myeloid leukemia
35. Hodgkin's disease
36. Peptic ulcer
37. Tubercular intestine
38. Adenocarcinoma intestine
39. Cirrhosis
40. Lobar pneumonia
41. Bronchopneumonia
42. Pulmonary tuberculosis
43. Atherosclerosis
44. Myocardial infarction
45. Crescentic glomerulonephritis
46. Chronic pyelonephritis
47. Renal cell carcinoma
48. Benign prostatic hyperplasia
49. Seminoma
50. Fibroadenoma
51. Carcinoma breast
52. Colloid goiter
53. Papillary carcinoma thyroid
54. Basal cell carcinoma
55. Melanoma
56. Lipoma
57. Osteogenic sarcoma
58. Giant cell tumour

CASE-BASED LEARNING

1. Microcytic anemia
2. Macrocytic anemia
3. Hemolytic anemia
4. Multiple myeloma
5. Hepatitis
6. Obstructive jaundice
7. Hemolytic jaundice
8. Nephrotic syndrome
9. Meningitis

CHARTS

1. Interpretation of microcytic anemia
2. Interpretation of macrocytic anemia
3. Interpretation of hemolytic anemia
4. Interpretation of acute leukemia
5. Interpretation of chronic leukemia

6. Interpretation of multiple myeloma
7. Interpretation of bleeding disorder
8. Interpretation of clotting disorder
9. Interpretation of Liver disorders
10. Interpretation of Renal disorders
11. Interpretation of Thyroid disorders
12. Interpretation of acute myocardial infarction
13. Pyogenic meningitis
14. Tubercular meningitis
15. Viral meningitis
16. Diabetes mellitus

f. Books recommended:

a) Text book of Pathology by Robbins
b) Text book of General Pathology Part I & II by Bhende and Deodhare c) Clinical Pathology by Talib
d) Text book of Pathology by Harsh Mohan e) Text book of Pathology by Muir
f) Haematology De Gruchi
g) IAPM text book of Pathology

Reference books:

a) Anderson's text book of Pathology Vol I & II
b) Oxford text book of Pathology Vol. I, II & III
c) Pathology by Rubin and Farber
d) Pathologic basis of Disease Robbins

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**Second MBBS** *(applicable w.e.f. September 2021 & onwards examinations)*				2. Subject Code	:
3. Subject (PSP)	:	**PATHOLOGY**					
(TT)	:						
4. Paper :	:	**I**	5. Total Marks : **100**	6. Total Time : 3 Hrs.		7. Remu. (Rs)	: Rs. 300/-
						8. Remu. (Rs)	: Rs. 350/-
9. Web Pattern	: [ ]	10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]	12. Web Old QP	: [ ]

Instructions:

SECTION "A" MCQ

1) *Put in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each. At least 5 should be scenario-based MCQ) (20 x1=20)

a)	b)	c)	d)	e)	f)	g)	h)	i)	j)
k)	l)	m)	n)	o)	p)	q)	r)	s)	t)

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

2. SAQ - AETCOM Module (2.4 and 2.8) (7x1=7)

a)

3. Short Answer Questions (Any 3 out of 4) (7x3=21)

a) b) c) d)

4. Long Answer Questions (Structured) (12x1=12)

a)

5 Short answer questions (Any 4 out of 5) (7x4=28)

a) b) c) d) e)

6 Long Answer Questions (Structured) (12x1=12)

a)

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**Second MBBS** *(applicable w.e.f. September 2021 & onwards examinations)*				2. Subject Code	:
3. Subject (PSP)	:	**PATHOLOGY**					
(TT)	:						
4. Paper :	:	**II**	5. Total Marks : **100**	6. Total Time : 3 Hrs.		7. Remu. (Rs)	: Rs. 300/-
						8. Remu. (Rs)	: Rs. 350/-
9. Web Pattern	: [ ]	10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]	12. Web Old QP	: [ ]

Instructions:

SECTION "A" MCQ

1) *Put in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each. At least 5 should be scenario-based MCQ) (20 x1=20)

a)	b)	c)	d)	e)	f)	g)	h)	i)	j)
k)	l)	m)	n)	o)	p)	q)	r)	s)	t)

SECTION "B" & "C"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

2. Short Answer Questions (Any 4 out of 5) (7x4=28)

a) b) c) d) e)

3. Long Answer Question Structured (12x1=12)

a)

4 Short answer question (Any 4out of 5) (7x4=28)

b) b) c) d) e)

(12x1=12)

5 Long Answer Questions (Scenario Based)

a)

Competency Based Medical Education

Year: Second MBBS

Subject: *Pathology Learning Resource Material*

Books recommended:

a)Text book of Pathology by Robbins
b)Text book of General Pathology Part I & II by Bhende and Deodhare
c)Clinical Pathology by Talib
d)Text book of Pathology by Harsh Mohan
e)Text book of Pathology by Muir
f)Haematology De Gruchi
g)IAPM text book of Pathology

Reference books:

a)Anderson's text book of Pathology Vol I & II
b)Oxford text book of Pathology Vol. I, II & III
c)Pathology by Rubin and Farber
d)Pathologic basis of Disease Robbins

PATHOLOGY LOGBOOK FOR PHASE SECOND MBBS STUDENTS AS PER COMPETENCY BASED CURRICULUM

Preface

The Medical Council of India has revised the undergraduate medical education curriculum so that the Indian Medical Graduate (IMG) is able to recognize **"Health for all"** as a national goal. He/she should also be able to fulfil his/her societal obligations. The revised curriculum has specified the competencies that a student must attain and clearly defined teaching-learning strategies for the same. With this goal in mind, integrated teaching, skill development, AETCOM and self-directed learning have been introduced. There would be emphasis on communication skills, basic clinical skills and professionalism. There is a paradigm shift from the traditional didactic classroom-based teaching to learning environments where there is emphasis on learning by exploring, questioning, applying, discussing, analysing, reflecting, collaborating and doing. The recognition of this need is enshrined by a greatly enhanced allocation of time to these methods and also the assessment techniques. With this view in mind the log book has been designed as per the guidelines of competency based curriculum.

Name of the College

_____

Admission Year: _____

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No. _____ has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for Phase II MBBS Competency Based Curriculum in the subject of Pathology.

Date: ___/___/_____

Place: _____

Teacher Incharge

Professor and Head
Department of Pathology

Instructions

1. This logbook is prepared as per the guidelines of MCI for implementation of Competency based curriculum for Phase II MBBS students in the subject of Pathology.
2. Students are instructed to keep their logbook entries up to date.
3. Students also have to write reflections on AETCOM Module 2.4 and 2.8)
   Reflections should be structured using the following guiding questions:
   - What happened? (What did you learn from this experience)
   - So what? (What are the applications of this learning)
   - What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)
4. The logbook assessment will be based on multiple factors like
   - Attendance
   - Active participation in the sessions
   - Timely completions
   - Quality of write up of reflections
   - Overall presentation

CONTENTS

S.No	Topic	Signature of the teacher	Remarks

S.No	Topic	Signature of the teacher	Remarks

S.No	Topic	Signature of the teacher	Remarks

ASSESSMENT OF LOG BOOK

Sr.No	Description	Maximum Marks	Marks obtained	Signature of Teacher
1	**Completion of Journal- I term**	5		
2	**Completion of Journal- II term**	5		
3	**Performance in case based learning**	3		
4	**Participation in seminars, research projects, quiz etc**	3		
5	**Reflections on AETCOM Module** *** 2.4 , 2.8**	2		
6	**Attendance Records**	2		
7	**Total marks obtained for log book**	20		

* AETCOM – Competencies for IMG, 2018, Medical Council of India.

The following skills have been performed by the student and are certified by the teacher as follows:

		Date	Teacher's signature
1.	Preparation of peripheral smear		
2.	Interpretation of liver function tests and viral serology panel		
3	Interpretation of CSF in meningitis		

PRACTICAL TOPICS IN PATHOLOGY

Students are expected to write briefly about the topics and draw labelled diagrams of relevant slides in their journal, and get it assessed from their teacher.

GENERAL PATHOLOGY

1. Histological techniques, tissue processing, microscopy
2. Intracellular accumulations, calcification
3. Cellular adaptations
4. Disorders of pigment metabolism
5. Amyloidosis
6. Acute inflammation
7. Chronic inflammation and repair
8. Tuberculosis and leprosy
9. Hemodynamic disturbances
10. Neoplasia
11. Infections and infestations

HEMATOLOGY

1. Collection of specimens, anticoagulants, normal hematopoiesis
2. Hemoglobin estimation: Interpretation of report
3. Hematocrit and Erythrocyte sedimentation rate: Interpretation of report
4. Complete blood count: Interpretation of report (without flags) from automated cell counter
5. Preparation of peripheral smear and performing differential leukocyte count, interpretation of peripheral smear
6. Investigation of anemia
7. Investigation of leukemia
8. Plasma cell dyscrasia
9. Investigation of bleeding and clotting disorders
10. Blood banking: Performing blood grouping and interpretation of results

SYSTEMIC PATHOLOGY

1. Lymphoma
2. Splenomegaly
3. Gastrointestinal tract: Ulcers
4. Intestinal polyp and carcinoma intestine
5. Cirrhosis and hepatocellular carcinoma
6. Pneumonia, bronchiectasis
7. Pulmonary tuberculosis and bronchogenic carcinoma
8. Atherosclerosis
9. Left ventricular hypertrophy, myocardial infarction, lab diagnosis of MI
10. Rheumatic heart disease and infective endocarditis
11. Chronic contracted kidney, glomerulonephritis, pyelonephritis
12. Urinary calculi, Renal cell carcinoma,
13. Male genital tract
14. Female genital tract: Carcinoma cervix, Carcinoma endometrium
15. Leiomyoma, Ovarian tumours
16. Gestational trophoblastic disease
17. Breast
18. Thyroid

19. Bone and soft tissue tumours
20. Skin
21. CNS tumours

CLINICAL PATHOLOGY

1. Urine analysis: Interpretation of physical, chemical and microscopic examination results
2. Semen analysis: Lecture demonstration, interpretation of report
3. Basic cytological techniques: FNAC and exfoliative cytology (Lecture demonstration)
4. CSF examination: Lecture demonstration and interpretation of reports
5. Body fluids: Interpretation of serous effusion reports
6. Interpretation of kidney function tests
7. Investigations in jaundice
8. Investigations in diabetes mellitus

AUTOPSY

Indications and techniques, autopsy findings in common conditions like myocardial infarction, cirrhosis, portal hypertension, bronchogenic carcinoma, miliary tuberculosis, renal cell carcinoma etc.

Reflection on AETCOM 2.4

Topic: Working in a health care team **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM 2.8

Topic: What does it mean to be a family member of a sick patient? Date:

Signature of Teacher-in- charge

Participation in Seminars, Research Projects, Quiz

S.No	Activity	Date	Signature of Teacher

Signature of Teacher-in- charge

Details of attending extra classes [For poor attendance (if any)]

S.No	Date	Period	Total hrs	Signature of student	Signature of Teacher
Total hours					

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

Course Content

Second MBBS (from October 2020) Subject:

PHARMACOLOGY Theory / Practical

Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. (Vol. 1; page nos. 136-159)

1. Total Teaching hours : **230**
2. A. Lectures(hours):**80** B. Self directed learning (hours) :- **12**
   C. Clinical Postings (Hours): NA
   D. Small group teachings/tutorials/Integrated teaching/Practicals (hours)**: 138**

Competency Nos.	Topics & Subtopics
PH1.1	Introduction to Pharmacology
PH1.2	
PH1.3	
PH1.9	
PH1.11	Routes of drug administration
PH1.4	Pharmacokinetics – Absorption, Distribution, Metabolism, Excretion
PH1.5	Pharmacodynamics
PH1.6	Adverse drug reactions –Types, mechanisms and precautions
PH1.7	
PH1.52	Principles of management of Poisoning
PH1.8	Drug interactions- Mechanisms and clinical relevance
PH1.59	Essential medicines, Fixed dose combinations Over the counter drugs Herbal medicines
PH1.60	Pharmacogenomics, Pharmacoeconomics
PH1.63	Drug Regulations
PH1.64	Drug development, Good Clinical Practice

Competency Nos.	Topics & Subtopics
PH1.10	Prescription writing
PH1.12	Factors modifying drug dose- Dose calculation

PH1.13	Pharmacology of Adrenergic drugs, Pharmacology of Anti adrenergic drugs
PH1.14	Pharmacology of Cholinergic drugs, Pharmacology of Anticholinergic drugs
PH1.15	Pharmacology of Skeletal muscle relaxants
PH1.16	Pharmacology of Histamine and antihistaminics, Pharmacology of Serotonin and drugs acting on serotonergic pathways, Pharmacotherapy of MigrainePharmacology of NSAIDSPharmacotherapy of Gout and Rheumatoid arthritis
PH1.17	Pharmacology of Local anaesthetics
PH1.18	Pharmacology of General anaesthetics and Preanesthetic drugs
PH1.19	Pharmacology of Sedatives & hypnotics Pharmacology of Antiepileptics Pharmacology of Anti depressants and anti anxiety drugs Pharmacology of Antipsychotics and anti manic drugs Pharmacology of Drugs used for neurodegenerative disorders Pharmacology of Opioids
PH1.20	Pharmacology of Alcohol and alcohol poisoning
PH1.21	
PH1.22	Pharmacology of drug dependence, drug abuse and Deaddiction
PH1.23	
PH1.24	Pharmacology of Diuretics and antidiuretics
PH1.25	Pharmacology of coagulants and anticoagulants Pharmacology of antiplatelets Pharmacology of thrombolytics and antifibrinolytics Pharmacology of plasma expanders
PH1.26	Pharmacology of Renin Angiotensin-Aldosterone system
PH1.27	Pharmacology of calcium channel blockers Pharmacology of other vasodilators and sympatholytics Pharmacotherapy of Hypertension, Pharmacotherapy of Shock

Competency Nos.	Topics & Subtopics
PH1.28	Pharmacology of Antianginal drugs Pharmacotherapy of IHD Pharmacology of Drugs for PVD
PH1.29	Pharmacology of Drugs used in CCF
PH1.30	Pharmacology of Antiarrhythmics
PH1.31	Pharmacology of Drugs for dyslipidemia
PH1.32	Pharmacology of Drugs for bronchial asthma and COPD
PH1.33	Pharmacology of Drugs for cough
PH1.34	Pharmacology of Drugs for acid peptic diseases Pharmacology of Antiemetics and prokinetics Pharmacology of Drugs for diarrhea and constipation
PH1.35	Pharmacotherapy of anemias
PH1.36	Pharmacology of Antidiabetic drugs Pharmacology of Drugs for thyroid dysfunction Pharmacology of Drugs affecting calcium metabolism
PH1.37	Pharmacology of Estrogen and antiestrogens Pharmacology of Progestins and antiprogestins Pharmacology of Androgens and antiandrogens Pharmacology of Anterior Pituitary hormones and their antagonists
PH1.38	Pharmacology of Corticosteroids and antagonists
PH1.39	Pharmacology of Hormonal contraceptives
PH1.40	Pharmacotherapy of infertility and erectile dysfunction
PH1.41	Pharmacology of Oxytocics and tocolytics
PH1.42	Introduction to Chemotherapy-General principles, Pharmacology of Sulfonamides and Timethoprim Pharmacology of Fluoroquinolones, Pharmacology of Penicillin and its derivatives Pharmacology of Cephalosporins, Pharmacology of other Beta lactam antibiotics Pharmacology of Aminoglycosides, Pharmacology of Macrolides Pharmacology of Broad spectrum antibiotics, Pharmacology of newer antibacterials
PH1.43	

Competency Nos.	Topics & Subtopics
PH1.44	Pharmacology of Antitubercular drugs including MDR and XDR TB
PH1.45	
PH1.46	Pharmacology of Antileprotics

PH1.47	Pharmacology of Antimalarials Pharmacology of Antiamoebic and other Antiprotozoal drugs Pharmacology of Anthelminthics
PH1.48	Pharmacotherapy of UTI Pharmacotherapy of STD Pharmacology of Antiretroviral drugs
PH1.49	Pharmacology of Anticancer drugs
PH1.50	Pharmacology of Immunomodulators
PH1.51	Occupational and environmental toxicology
PH1.53	Pharmacology of Chelating agents
PH1.54	Vaccines and Antisera
PH1.55	National health programs
PH1.56	Geriatric and Pediatric pharmacology
PH1.57	Drugs used in skin disorders
PH1.58	Drugs used in Ocular disorders
PH1.61	Dietary supplements and Nutraceuticals
PH1.62	Antiseptics and Disinfectants
Competency Nos.	**Topics & Subtopics**
	CLINICAL PHARMACY
PH2.1	Drug dosage forms (Oral, local, parenteral)
PH2.2	ORS preparation
PH2.3	Intravenous drip setting
PH2.4	Dosage calculation
	CLINICAL PHARMACOLOGY

Competency Nos.	Topics & Subtopics
	CLINICAL PHARMACY
PH3.1	Prescription writing and communication
PH3.8	
PH5.1	
PH3.2	Critical appraisal of Prescription
PH3.3	Evaluation of Promotional Drug literature
PH3.4	Adverse drug reaction-Identification and reporting
PH3.5	Introduction to the concept of P – drugs and preparation of P-drug list
PH3.6	Interaction with a pharmaceutic representative and critical evaluation of Drug information
PH3.7	Introduction to the concept of Essential medicines
	EXPERIMENTAL PHARMACOLOGY
PH4.1	Drug administration on Maniquins
PH4.2	Study of effects of drugs on blood pressure using software
	COMMUNICATION TOPICS
PH5.2	Importance of optimal use of drug therapy, storage of medicines
PH5.3	Importance of Drug Compliance
PH5.4	
PH5.5	Problems associated with prescribing drugs with dependence liability
PH5.6	Problems associated with use of OTC drugs
PH5.7	Prescription: legal and ethical aspects
2.1	AETCOM-1
2.2	AETCOM-2
2.3	AETCOM-3

Paper wise distribution of topics for Prelim & MUHS Annual Examination

Year: Second MBBS Subject: **Pharmacology**

Paper	Section	Topics
I	**A**	**MCQs on all topics of the paper I**
	B	General Pharmacology
		Autonomic Nervous system including skeletal muscle relaxants
		Cardiovascular system
		Haematology
		Gastro intestinal drugs
		Respiratory system
		AETCOM- 2.1, 2.2, 2.3 (section B one SAQ)
II	**A**	**MCQs on all topics of the paper II**
	B	Central Nervous system including general/local anaesthesia
		Endocrine system
		Chemotherapy system
		Autacoids
		MISC. TOPICS : Chelating agents, Vaccines and Antisera, ocular pharmacology, dermatological pharmacology, nutraceuticals, occupational and environmental pharmacology, toxicology)

Second MBBS Internal Assessment
Subject: Pharmacology
Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Phase	IA-1 - Exam (Jan)			IA – 2 -Exam (May)			Prelim (July)		
	Theory	Practical (Including 10 Marks for Journal & Log Book)	Total Marks	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks	Theory	Practical	Total Marks
Second MBBS	100	100	200	100	100	200	Paper 1 -100 Paper 2 -100	100	300

Assessment in CBME is ONGOING PRCESS,

No Preparatory leave is permitted.

1. There shall be 3 internal assessment examinations in Pharmacology.
2. The suggested patterns of question paper for first two internal assessment theory examinations can be similar to any of the two papers for final examination. Pattern of the prelims examinations should be similar to the University examinations.
3. Internal assessment marks for theory and practical will be converted to out of 40 (theory) + 40 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University. **Conversion Formula for calculation of marks in internal assessment examinations.**

Phase	Theory	Practical
IA 1	**100**	**100**
IA 2	**100**	**100**
Prelim	**200**	**100**
Total	**400**	**300**
Conversion out of	**40**	**40**
Conversion formula	**Total marks in 3 IA theory examinations /10**	**Total marks in 3 IA Practical examinations /7.5**
Eligibility criteria after conversion	**16**	**16**
	Combined theory + Practical = 40	

4. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
33.01 to 33.49	33
33.50 to 33.99	34

5. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.

6. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

7. **Remedial measures**

A. Remedial measures for non-eligible students

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically.
ii) Extra classes for such students may be arranged. If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students. Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.
iii) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. The pattern for this repeat internal assessment examination shall be similar to the final University examination. Only the marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	Practical
Remedial examination (pattern as per final examination)	**200**	**100**
Conversion out of	**40**	**40**
Conversion formula	**Marks in remedial theory examinations /5**	**Marks in remedial Practical examinations /2.5**
Eligibility criteria after conversion	**16**	**16**
	Combined theory + Practical = 40	

B. <u>Remedial measures for absent students:</u>

If any of the students is absent for any of the 3 IA examinations due to any reasons, following measures shall be taken.

i. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.

ii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.

iii. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator.

Practical marks Distribution:

A. For I st and II nd IA examinations

1. **Journal / Logbook** - 10 Marks
2. **Viva** – **20** marks
3. **Clinical Pharmacy (20 marks)** –
    a. Dosage form- 10 marks,
    b. ORS preparation/ IV drip setting- 5 marks
    c. Dose calculation – 5 marks
4. **Clinical Pharmacology** (30 marks)-
    a. Prescription writing- 10 marks
    b. Prescription criticism and rewriting / justification of FDC – 10 marks
    c. ADR identification / ADR reporting- 5 marks
    d. P- drug list- 5 marks.
5. **Experimental Pharmacology** (**10 marks**) **OSPE** –
    a. Drug administration using maniquin / drug effect using CAL software (or any other)- 10 marks
6. **Communication (10 marks) OSPE-**
    a. prescription communication **/** ethics- legal drug storage/ use of device/drug adherence-compliance/ drug dependence/OTC/ interaction with Medical representative- 10 marks

B. For Preliminary examinations

1. **Viva** – **30** marks
    a. Viva I- 15 marks
    b. Viva II- 15 marks
2. **Clinical Pharmacy (20 marks)** –
    a. Dosage form- 10 marks,
    b. ORS preparation/ IV drip setting- 5 marks
    c. Dose calculation – 5 marks
3. **Clinical Pharmacology (30 marks)-**
    a. Prescription writing- 10 marks
    b. Prescription criticism and rewriting / justification of FDC – 10 marks
    c. ADR identification / ADR reporting- 5 marks
    d. P- drug list- 5 marks.
4. **Experimental Pharmacology** (**10 marks**) **OSPE** –
    a. Drug administration using maniquin / drug effect using CAL software (or any other)- 10 marks
5. **Communication (10 marks) OSPE-**
    a. prescription communication **/** ethics- legal drug storage/ use of device/drug adherence-compliance/ drug dependence/OTC/ interaction with Medical representative- 10 marks

Second MBBS Practical Mark's Structure (I, II & Prelim Exam.)

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Subject: PHARMACOLOGY								
Practical						VIVA	Log Book/ Journal	Practical & Oral
Seat No.	Clinical Pharmacy	Clinical Pharmacology	Experimental Pharmacology	Communication	Total			
Max. Marks	20	30	10	10	**70**	20	**10**	100

Second MBBS Practical Mark's Structure

(M.U.H.S. Final Exam.)

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Subject: PHARMACOLOGY									
Practical						**Oral/Viva**			**Total**
Seat No.	**Clinical Pharmacy**	**Clinical Pharmacology**	**Experimental Pharmacology**	**Communication**	**Total**	**VIVA 1**	**VIVA 2**	**Total**	**Practical & Oral (E + H)**
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
Max. Marks	20	30	10	10	**70**	15	15	**30**	100

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	: **Second MBBS** *(applicable w.e.f. September 2021& onwards examinations)*					2. Subject Code	:
3. Subject (PSP)	: **Pharmacology**						
(TT)	:						
4. Paper :	: **I**	5. Total Marks	: **100**	6. Total Time	: **3** Hrs.	7. Remu. (Rs)	: Rs. 300/-
						8. Remu. (Rs)	: Rs. 350/-
9. Web Pattern	: [ ]	10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]	12. Web Old QP	: [ ]

SECTION "A" MCQ

Instructions:

1) *Put in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (20 x1 = 20)

a)	b)	c)	d)	e)	f)	g)	h)	i)	j)
k)	l)	m)	n)	o)	p)	q)	r)	s)	t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B"

2. Short Answer Questions (AETCOM(2.1, 2.2, 2.3)(compulsory) (7x1=07)

   a)

3. Short Answer Questions (Answer Any 3 out of 4) (7x3=21)

   a) b) c) d)

4. Structured Long Answer Questions (Compulsory) (12x1=12)

   a)

5. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)

   a) b) c) d) e)

6. Structured Long Answer Questions (Compulsory) (12x1=12)

   a)

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1.	Course and Year	:	**Second MBBS** *(applicable w.e.f. September 2021& onwards examinations)*						2. Subject Code	:	
3.	Subject (PSP)	:	**Pharmacology**								
	(TT)	:									
4.	Paper :	:	**II**	5. Total Marks	: **100**	6. Total Time	: **3** Hrs.		7. Remu. (Rs)	:	Rs. 300/-
									8. Remu. (Rs)	:	Rs. 350/-
9.	Web Pattern	: [ ]		10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]		12. Web Old QP	:	[ ]

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a)	b)	c)	d)	e)	f)	g)	h)	i)	j)
k)	l)	m)	n)	o)	p)	q)	r)	s)	t)

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7) *Use a common answerbook for all sections.*

SECTION "B"

2. Short Answer Questions(Answer Any 4 out of5) (7x4=28)

   a) b) c) d) e)

3. Structured Long Answer Questions (**Compulsory**) (12x1=12)

   a)

4. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)

   a) b) c) d) e)

5. Structured Long Answer Questions (**Compulsory**) (12x1=12)

   a)

Competency Based Medical Education

Year: Second MBBS

Subject: *Pharmacology Learning Resource Material*

***Books recommended* :**

1. Basic & Clinical Pharmacology. Katzung BG (Ed), Publisher: Prentice Hall International Ltd., London.
2. Pharmacology & Pharmacotherapeutics. Satoskar RS, Bhandarkar SD (Ed), Publisher: Popular Prakashan, Bombay.
3. Essentials of Medical Pharmacology. Tripathi KD (Ed), Jaypee Brothers, publisher:Medical Publishers (P) Ltd.
4. Clinical Pharmacology. Laurence DR, Bennet PN, Brown MJ (Ed). Publisher: Churchill Livingstone

***Reference books* :**

1. Goodman & G̀ilman s The Pharmacological Basis of Therapeutics. Hardman JG & Limbird LE (Ed), Publisher: McGraw-Hill, New York.
2. A Textbook of Clinical Pharmacology. Roger HJ, Spector RG, Trounce JR (Ed), Publisher: Hodder and Stoughton Publishers.

Maharashtra University of Health Sciences
Nashik



PHARMACOLOGY LOGBOOK For PHASE SECOND MBBS STUDENTS AS PER COMPETENCY BASED CURRICULUM

Preface

The Medical Council of India has revised the undergraduate medical education curriculum so that the Indian Medical Graduate (IMG) is able to recognize **"Health for all"** as a national goal. He/she should also be able to fulfil his/her societal obligations. The revised curriculum has specified the competencies that a student must attain and clearly defined teaching learning strategies for the same. With this goal in mind, integrated teaching, skill development, AETCOM and self-directed learning have been introduced. There would be emphasis on communication skills, basic clinical skills and professionalism. There is a paradigm shift from the traditional didactic classroom-based teaching to learning environments where there is emphasis on learning by exploring, questioning, applying, discussing, analysing, reflecting, collaborating and doing. The recognition of this need is enshrined by a greatly enhanced allocation of time to these methods and also the assessment techniques. With this view in mind the log book has been designed as per the guidelines of competency Based curriculum.

Name of the College

_____

_____

_____

Admission Year : _____

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No. _____ has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for Phase I MBBS Competency Based Curriculum in the subject of Pharmacology.

Date: ___/___/_____

Place: _____

Teacher Incharge

Professor and Head
Department of Pharmacology

Instructions

1) This logbook is prepared as per the guidelines of MCI for implementation of Competency based curriculum for Phase II MBBS students in the subject of Pharmacology.

2) Students are instructed to keep their logbook entries up to date.

3) Students are expected to write minimum 2 reflections on any two activities each of Clinical Pharmacology skills & Self-Directed Learning (SDL).

4) Students also have to write reflections on AETCOM Module 2.1 , 2.2, 2.3) Reflections should be structured using the following guiding questions:

- What happened? (What did you learn from this experience)
- So what? (What are the applications of this learning)
- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

5) The logbook assessment will be based on multiple factors like

- Attendance
- Active participation in the sessions
- Timely completions
- Quality of write up of reflections
- Overall presentation

INDEX

Sr. No	Description	Page No's	Status Complete/ Incomplete	Signature of Teacher
1	Clinical Pharmacology Skills			
2	Self-Directed Learning, Seminars, Projects, Quizzes			
3	AETCOM Module * 2.1 , 2.2, 2.3			
4	Attendance Records			
5	Records of Internal Assessment			

* AETCOM – Competencies for IMG, 2018, Medical Council of India.

Record of Clinical Pharmacology Skills

S.No	Skill	Setting	Correlation	Date	Signature of Teacher
1	Critical appraisal of prescription / audit				
2	Critical evaluation of promotional literature				
3	Filling and interpretation of ADR report				
4	Prepare and explain P drug list				
5	Optimised Interaction with pharmaceutical representative				
6	Prepare essential drug list for health care facility				

Reflection on Clinical Pharmacology Skills

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Clinical Pharmacology Skills

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Clinical Pharmacology Skills

Topic: **Date:**

Signature of Teacher-in- charge

2. Self Directed Learning, Seminars, Tutorials, Projects, Quizzes

S.No	Self Directed Learning, Seminars, Tutorials, Projects, Quizzes	Date	Signature of Teacher

Reflection on self directed learning activities

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on self directed learning activities

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on self directed learning activities

Topic: **Date:**

Signature of Teacher-in- charge

3: AETCOM Module

2.1 Foundation of communication 2

2.2 Foundation of bioethics

2.3 Health care as a right

Reflection on AETCOM module

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM module

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM module

Topic: **Date:**

Signature of Teacher-in- charge

SECTION 4B: Details of attending extra classes [For poor attendance (if any)]

S.No	Date	Period	Total hrs	Signature of student	Signature of Teacher
Total hours					

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

ANNEXURE 6

COURSE CONTENT

(Total teaching hours for Otorhinolaryngology = 25+40+5 = 70)

Lectures:

MBBS phase III-

Total Teaching hours: 25 hours

S. NO	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	Anatomy and Physiology of ear, nose, throat, head & neck				
			Lecture: 1		1
		EN 1.1 AN40.1 AN40.2 AN40.3	Describe the Anatomy & physiology of ear Describe & identify the parts, blood supply and nerve supply of external ear Describe & demonstrate the boundaries, contents, relations and functional anatomy of middle ear and auditory tube Describe the features of internal ear	Anatomy	
			Lecture: 2		1
		EN 1.1 AN37.1 AN37.2 AN37.3	Describe the Anatomy & physiology of Nose, Throat Describe & demonstrate features of nasal septum, lateral wall of nose, their blood supply and nerve supply Describe location and functional anatomy of paranasal sinuses Describe the morphology, identify structure of the wall, nerve supply, blood supply and actions of intrinsic and extrinsic muscles of the larynx	Anatomy Physiology	
		PY10.13	Describe and discuss perception of smell and taste sensation		
			Lecture: 3		1
		EN 1.1 EN 1.2	Describe the Anatomy & physiology of Head and Neck Describe the pathophysiology of common diseases in Head and Neck	Anatomy	
2.	Clinical Skills				
			Lecture: 4		1
		EN 2.11 EN 2.15	Describe and identify by clinical examination malignant & pre- malignant ENT diseases Describe the national programs for prevention of deafness, cancer, noise & environmental pollution	Community Medicine	
3.	Management of diseases of ear, nose & throat				
			Lecture: 5		1
		EN4.1 EN4.6 EN4.2	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Otalgia Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Discharging ear Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of diseases of the external Ear		

			Lecture: 6		1
		EN4.3 PE28.4 EN4.5	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of ASOM Discuss the etio-pathogenesis, clinical features and management of Acute Otitis Media (AOM) Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of OME	Paediatrics	
			Lecture: 7		1
		EN4.6 EN4.7	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of CSOM Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of squamosal type of CSOM		
			Lecture: 8		1
		EN4.12 EN4.12 EN4.15	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Hearing loss Describe the clinical features, investigations and management principles of Sudden Sensori-neural Hearing Loss Describe the clinical features, investigations management principles of Noise Induced Hearing Loss		
			Lecture: 9		1
		EN4.18	Describe the clinical features, investigations and principles management of Facial Nerve palsy		

			Lecture: 10		1
		EN4.19 EN4.13 EN4.21 EN4.14	Describe the clinical features, investigations and principles of management of Vertigo Describe the clinical features, investigations and principles of management of Otosclerosis Describe the clinical features, investigations and principles of management of Tinnitus Describe the clinical features, investigations and management of Sudden Sensorineural Hearing Loss		
			Lecture: 11		1
		EN4.23 EN4.25	Describe the clinical features, investigations and principles of management of DNS Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of type of Nasal Polyps		
			Lecture: 12		1
		EN4.27 EN4.28 EN4.29 PE31.1	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Allergic Rhinitis Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Vasomotor Rhinitis Elicit, document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Rhinitis Describe the etio-pathogenesis, management and prevention of Allergic Rhinitis in Children	Paediatrics	

			Lecture: 13		1
		EN4.30 EN4.31 EN4.32	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Epistaxis Describe the clinical features, investigations and principles of management of trauma to the face & neck Describe the clinical features, investigations and principles of management of nasopharyngeal Angiofibroma		
			Lecture: 14		1
		EN4.33	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of type of Acute & Chronic Sinusitis		
			Lecture: 15		1
		EN4.34 EN4.35	Describe the clinical features, investigations and principles of management of Tumors of Maxilla Describe the clinical features, investigations and principles of management of Tumors of Nasopharynx		
			Lecture: 16		1
		EN4.36 EN4.37 EN4.41 EN4.38	Describe the clinical features, investigations and principles of management of diseases of the Salivary glands Describe the clinical features, investigations and principles of management of Ludwig's angina Describe the clinical features, investigations and principles of management of Acute & chronic abscesses in relation to Pharynx Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of type of dysphagia		

			Lecture: 17		1
		EN4.39 PE28.1 PE28.2 PE28.3	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Tonsillitis Discuss the etio-pathogenesis, clinical features and management of Naso pharyngitis Discuss the etio-pathogenesis of Pharyngo Tonsillitis Discuss the clinical features and management of Pharyngo Tonsillitis	Paediatrics	
			Lecture: 18		1
		EN4.43 EN4.44 EN4.45 AN38.3	Describe the clinical features, investigations and principles of management of Acute & Chronic Laryngitis Describe the clinical features, investigations and principles of management of Benign lesions of the vocal cord Describe the clinical features, investigations and principles of management of Vocal cord palsy Describe anatomical basis of recurrent laryngeal nerve injury	Anatomy	
			Lecture: 19		1
		EN4.46 EN4.47	Describe the clinical features, investigations and principles of management of Malignancy of the Larynx & Hypopharynx Describe the clinical features, investigations and principles of management of Stridor		
			Lecture: 20		
		DE4.1 DE4.2	Discuss the prevalence of oral cancer and enumerate the common types of cancer that can affect tissues of the oral cavity Discuss the role of etiological factors in the formation of precancerous /cancerous lesions	Pathology	

		EN4.52	Describe the Clinical features, Investigations and principles of management of diseases of Oesophagus		
			Lecture: 21		1
		EN4.53 EN3.6	Describe the clinical features, investigations and principles of management of HIV manifestations of the ENT Observe and describe the indications for and steps involved in the skills of emergency procedures in ear, nose & throat		
			Lecture: 22		1
			Revision lecture		
			Lecture: 23		1
			Revision lecture		
			Lecture: 24		1
			Revision lecture		
			Lecture: 25		1
			Revision lecture		

Small group discussions

MBBS phase III/I-

Total Teaching hours: 40 hours

SR. NO.	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
	Anatomy and Physiology of ear, nose, throat, head & neck				
1.		AN40.1	Describe & identify the parts, blood supply and nerve supply of external ear		0.5 hour
2.		AN40.2	Describe & demonstrate the boundaries, contents, relations and functional anatomy of middle ear and auditory tube		1 hour
3.		AN37.1	Describe & demonstrate features of nasal septum, lateral wall of nose, their blood supply and nerve supply		1 hour
4.		AN38.1	Describe the morphology, identify structure of the wall, nerve supply, blood supply and actions of intrinsic and extrinsic muscles of the larynx		0.5 hour
5.		PY10.15	Describe and discuss functional anatomy of ear and auditory pathways & physiology of hearing		1 hour
6.		PY10.16	Describe and discuss pathophysiology of deafness. Describe hearing tests		0.5 hour
	General Medicine				
7.		IM24.17	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of hearing loss in the elderly		1.5 Hours
	Paediatrics				
8.		PE28.5	Discuss the etio-pathogenesis, clinical features and management of Epiglottitis		0.5 hour
9.		PE28.6	Discuss the etio-pathogenesis, clinical features and management of Acute laryngo-tracheo-bronchitis		0.5 hour

10.		PE28.7	Discuss the etiology, clinical features and management of Stridor in children		1 hour
11.		PE28.8	Discuss the types, clinical presentation, and management of foreign body aspiration in infants and children		1 hour
	Clinical Skills				
12.		EN 2.9	Choose correctly and interpret radiological, microbiological & histological investigations relevant to the ENT disorders X Rays of mastoid, PNS, nasopharynx, neck, thorax -Routine blood investigations, Pus-bacterial culture, sensitivity, Fungal culture and KOH mount -FNAC and biopsy		1 hour 1 hour 1 hour
13.		EN2.15	Describe the national programs for prevention of deafness, cancer, noise & environmental pollution		1.5 hour
	Management of diseases of ear, nose & throat				
14.		EN4.1	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Otalgia		1 hour
15.		EN4.3	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of ASOM		1.5 hour
16.		EN4.7	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of CSOM		1.5 hours
17.		EN4.12	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Hearing loss		1.5 hour
18.		EN4.13	Describe the clinical features, investigations and principle of management of Otosclerosis		1 hour
19.		EN 4.14	Describe the clinical features, investigations and principle of management of Sudden Sensorineural Hearing Loss		1 hour

20.		EN4.15	Describe the clinical features, investigations and principle of management of Noise Induced Hearing Loss		0.5 hour
21.		EN 4.18	Describe the clinical features, investigations and principle of management of Facial Nerve palsy		1 hour
22.		EN 4.19	Describe the clinical features, investigations and principle of management of Vertigo		0.5 hour
23.		EN 4.18	Describe the clinical features, investigations and principle of management of Tinnitus		0.5 hour
24.		EN4.27	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Allergic Rhinitis		1 hour
25.		EN4.29	Elicit, document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Rhinitis		1.5 hours
26.		EN 4.30	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of epistaxis		1 hour
27.		EN4.33	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Sinusitis		2 hours
28.		EN4.39	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Tonsillitis		1.5 hours
29.		EN 3.5 EN 4.10 EN 4.11	Observe and describe the indications for and the steps involved in the surgical procedures in ear, nose and throat		3 hours
30.		EN4.42	Elicit, document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of hoarseness of voice		1.5 hours
31.		EN4.47	Describe the clinical features, investigations and principles of management of Stridor		1 hour
32.		EN4.49	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of		1.5 hours

			management of foreign bodies in the air & food passages		
33.		EN4.53	Describe the clinical features, investigations and principles of management of HIV manifestations of the ENT		1 hour
	Community Medicine				
34.		CM3.1	Describe the health hazards of air, water, noise, radiation and pollution		1.5 hours

Self Directed Learning

MBBS phase III/I -

Total Teaching hours: 5 hours

Sr. No.	Competencies	SUBTOPICS	AIT	TL Methods	HOURS
1.	EN1.1	Anatomy and blood supply of Tonsil		Quiz-Poster Presentation (on topic given in groups)	5 hours
2.	EN1.2	Clinical features, diagnosis and treatment of: ASOM			
3.	EN2.4	Tuning Fork Tests			
4.	EN 3.5	Complications of tonsillectomy			
5.	EN 4.24	Septoplasty –Technique, Procedure and Complications			
6.	EN 4.5	Clinical features and management Otitis media with effusion, Myringotomy			
7.	EN 4.50	Indications and Complications of Tracheostomy			

Subject:
Otorhinolaryngology
Lectures

MBBS phase III-

Total Teaching hours: 25 hours

S. NO	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Anatomy and Physiology of ear, nose, throat, head & neck**				
			Lecture: 1		1
		EN 1.1 AN40.1 AN40.2 AN40.3	Describe the Anatomy & physiology of ear Describe & identify the parts, blood supply and nerve supply of external ear Describe & demonstrate the boundaries, contents, relations and functional anatomy of middle ear and auditory tube Describe the features of internal ear	Anatomy	
			Lecture: 2		1
		EN 1.1 AN37.1 AN37.2 AN37.3	Describe the Anatomy & physiology of Nose, Throat Describe & demonstrate features of nasal septum, lateral wall of nose, their blood supply and nerve supply Describe location and functional anatomy of paranasal sinuses Describe the morphology, identify structure of the wall, nerve supply, blood supply and actions of intrinsic and extrinsic muscles of the larynx	Anatomy Physiology	

		PY10.13	Describe and discuss perception of smell and taste sensation		
			Lecture: 3		1
		EN 1.1 EN 1.2	Describe the Anatomy & physiology of Head and Neck Describe the pathophysiology of common diseases in Head and Neck	Anatomy	
2.	**Clinical Skills**				
			Lecture: 4		1
		EN 2.11 EN 2.15	Describe and identify by clinical examination malignant & pre- malignant ENT diseases Describe the national programs for prevention of deafness, cancer, noise & environmental pollution	Community Medicine	
3.	**Management of diseases of ear, nose & throat**				
			Lecture: 5		1
		EN4.1 EN4.6 EN4.2	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Otalgia Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Discharging ear Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of diseases of the external Ear		

			Lecture: 6		1
		EN4.3 PE28.4 EN4.5	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of ASOM Discuss the etio-pathogenesis, clinical features and management of Acute Otitis Media (AOM) Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of OME	Paediatrics	
			Lecture: 7		1
		EN4.6 EN4.7	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of CSOM Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of squamosal type of CSOM		
			Lecture: 8		1
		EN4.12 EN4.12 EN4.15	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Hearing loss Describe the clinical features, investigations and management principles of Sudden Sensori-neural Hearing Loss Describe the clinical features, investigations management principles of Noise Induced Hearing Loss		
			Lecture: 9		1
		EN4.18	Describe the clinical features, investigations and principles management of Facial Nerve palsy		

			Lecture: 10		1
		EN4.19 EN4.13 EN4.21 EN4.14	Describe the clinical features, investigations and principles of management of Vertigo Describe the clinical features, investigations and principles of management of Otosclerosis Describe the clinical features, investigations and principles of management of Tinnitus Describe the clinical features, investigations and management of Sudden Sensorineural Hearing Loss		
			Lecture: 11		1
		EN4.23 EN4.25	Describe the clinical features, investigations and principles of management of DNS Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of type of Nasal Polyps		
			Lecture: 12		1
		EN4.27 EN4.28 EN4.29 PE31.1	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Allergic Rhinitis Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Vasomotor Rhinitis Elicit, document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Rhinitis Describe the etio-pathogenesis, management and prevention of Allergic Rhinitis in Children	Paediatrics	

			Lecture: 13		1
		EN4.30 EN4.31 EN4.32	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Epistaxis Describe the clinical features, investigations and principles of management of trauma to the face & neck Describe the clinical features, investigations and principles of management of nasopharyngeal Angiofibroma		
			Lecture: 14		1
		EN4.33	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of type of Acute & Chronic Sinusitis		
			Lecture: 15		1
		EN4.34 EN4.35	Describe the clinical features, investigations and principles of management of Tumors of Maxilla Describe the clinical features, investigations and principles of management of Tumors of Nasopharynx		
			Lecture: 16		1
		EN4.36 EN4.37 EN4.41 EN4.38	Describe the clinical features, investigations and principles of management of diseases of the Salivary glands Describe the clinical features, investigations and principles of management of Ludwig's angina Describe the clinical features, investigations and principles of management of Acute & chronic abscesses in relation to Pharynx Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of type of dysphagia		

			Lecture: 17		1
		EN4.39 PE28.1 PE28.2 PE28.3	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Tonsillitis Discuss the etio-pathogenesis, clinical features and management of Naso pharyngitis Discuss the etio-pathogenesis of Pharyngo Tonsillitis Discuss the clinical features and management of Pharyngo Tonsillitis	Paediatrics	
			Lecture: 18		1
		EN4.43 EN4.44 EN4.45 AN38.3	Describe the clinical features, investigations and principles of management of Acute & Chronic Laryngitis Describe the clinical features, investigations and principles of management of Benign lesions of the vocal cord Describe the clinical features, investigations and principles of management of Vocal cord palsy Describe anatomical basis of recurrent laryngeal nerve injury	Anatomy	
			Lecture: 19		1
		EN4.46 EN4.47	Describe the clinical features, investigations and principles of management of Malignancy of the Larynx & Hypopharynx Describe the clinical features, investigations and principles of management of Stridor		
			Lecture: 20		
		DE4.1 DE4.2	Discuss the prevalence of oral cancer and enumerate the common types of cancer that can affect tissues of the oral cavity Discuss the role of etiological factors in the formation of precancerous /cancerous lesions	Pathology	

		EN4.52	Describe the Clinical features, Investigations and principles of management of diseases of Oesophagus		
			Lecture: 21		1
		EN4.53 EN3.6	Describe the clinical features, investigations and principles of management of HIV manifestations of the ENT Observe and describe the indications for and steps involved in the skills of emergency procedures in ear, nose & throat		
			Lecture: 22		1
			Revision lecture		
			Lecture: 23		1
			Revision lecture		
			Lecture: 24		1
			Revision lecture		
			Lecture: 25		1
			Revision lecture		

Internal Assessment

Subject – Otorhinolaryngology

Applicable w.e.f batches admitted from 2019 and onwards

Phase		
	Theory	Practical
Second MBBS	-	EOP Practical Examination may be conducted. However, these marks shall not be added to the Internal Assessment.

3rd Year (III MBBS, PART I)						
Phase	**I-Exam (March)**			**II-Exam Prelim (August)**		
	Theory	Practical	Total Marks	Theory	Practical	Total Marks
III/I MBBS	50	50	100	100	100	200

Assessment in CBME is ONGOING PRCESS,

No Preparatory leave is permitted.

1. There shall be 2 internal assessment examinations in Otorhinolaryngology including Prelim.

2. The suggested pattern of question paper for internal assessment internal examinations, except prelim examination is attached at the end. Pattern of the prelims examinations should be similar to the University examinations.

3. Internal assessment marks for theory and practical will be converted to out of 25 (theory) + 25 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University. **Conversion Formula for calculation of marks in internal assessment examinations.**

	Theory	Practical
Phase II	**-**	**-**
Phase III/I	**150**	**150**
Total	**150**	**150**
Conversion out of	**25**	**25**
Conversion formula	**Total marks in 2 IA theory examinations /6**	**Total marks in 2 IA Practical examinations /6**
Eligibility criteria after conversion	**10**	**10**
	Combined theory + Practical = 25	

1. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
13.01 to 13.49	13
13.50 to 13.99	14

2. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.
3. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

4. Remedial measures

A. Remedial measures for non-eligible students

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically. Extra classes for such students may be arranged.

ii) If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students. Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.

iii) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. The pattern for this repeat internal assessment examination shall be similar to the final University examination. The marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	**Practical**
Remedial examination	**100**	**100**
Conversion out of	**25**	**25**
Conversion formula	**Marks in remedial theory examinations /4**	**Marks in remedial Practical examinations /4**
Eligibility criteria after conversion	**10**	**10**
	Combined theory + Practical = 25	

B. <u>Remedial measures for absent students:</u>

If any of the students is absent for any of the 2 IA examinations due to any reasons, following measures shall be taken.

i. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.

ii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.

iii. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator.

Format for Practical Examinations

Otorhinolaryngology

Internal Assessment Practical

Seat No.				Table viva				Practical Total
	Case	OSCE 1	OSCE 2	Surgical Pathology Radiology	Instruments and Surgical Procedure	Journal	Log Book	
Max. Marks	20	5	5	5	5	5	5	50

OSCE stations checklists to be prepared so as to give more weightage to crucial steps, if skills are small two or more skills may be included in same station

OSCE stations to include any of these – Clinical skills (case/audiology), Certifiable skils, AETCOM skills

Prelims Practical

Subject: Otorhinolaryngology Practical									
Seat No.						Table Viva			Practical Total
	Case	OSCE 1 (Clinical skills)	OSCE 2 (Clinical skills)	OSCE 3 (Certifiable skills)	OSCE 4 (AETCOM skills)	Surgical Pathology Radiology	Instruments and Surgical Procedure	Journal &log book	
Max. Marks	30	10	10	10	10	10	10	10	100

MUHS Final Practical

Subject: Otorhinolaryngology Practical								
Seat No.						**Table Viva**		**Practical Total**
	Case	**OSCE 1 (Clinical skills)**	**OSCE 2 (Clinical skills)**	**OSCE 3 (Certifiable skills)**	**OSCE 4 (AETCOM skills)**	**Surgical Pathology Radiology**	**Instruments and Surgical Procedure**	
Max. Marks	**30**	**10**	**10**	**10**	**10**	**15**	**15**	**100**

Internal Assessment Theory Examination (I)

Otorhinolaryngology

Instructions:

SECTION "A" MCQ

1) *Put ☒ in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (10 Marks)

1. Multiple Choice Questions (Total 10 MCQ of One mark each) (1x10=10)

a) b) c) d) e) f) g) h) i) j)

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Use a common answer book for all sections.*

SECTION "B" (40 Marks)

2. Long Answer Questions structured clinical questions (15 x1=15)

a)

3.Short Answer Questions (Any 5 out of 6),(including 1 on AETCOM) (5 x 5=25)

a) b) c) d) e) f)

MUHS Final Theory Examination

Otorhinolaryngology

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

SECTION "A" MCQ

Instructions:

5) Put ☒ in the appropriate box below the question number once only.
6) Use blue ball point pen only.
*7) Each question carries **One mark.***
8) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (1x20=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B" & "C"

Instructions:

*1) Use **blue/black** ball point pen only.*
*2) **Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
*3) **All** questions are **compulsory**.*
*4) The number to the **right** indicates **full** marks.*
*5) Draw diagrams **wherever** necessary.*
6) Use a common answer book for all sections.

SECTION "B" (40 Marks)

2. Long Answer Questions (Any 2 out of 3) structured clinical questions (15 x 2=30)

a) b) c)

3.Short Answer Questions (All 3),(including 1 on AETCOM) (5 x 3=15)

a) b) c)

SECTION C (40 Marks)

4 Long answer questions (15x1=15)

a)

5 Short answer questions(any 4 out of 5) (Clinical Reasoning) (5x4=20)

a) b) c) d) e)

. Section wise distribution of topics for Prelim & MUHS Annual Examination

Year: **III-I MBBS** Subject: **_Otorhinolaryngology**

Paper	Section	Topics
1	A	MCQs on all topics of Otorhinolaryngology Basic Science (2), Otology (6), Rhinology (6), Head Neck Laryngology (6)
	B Basic Sciences, Recent Advances, Otology	Anatomy and Physiology of Ear, Nose, Throat & Head and Neck; Recent Advances; Audiology and Hearing loss; Vestibular System; Diseases of External Ear and Middle Ear; Eustachian Tube and its disorder; Cholesteatoma, Chronic Otitis media and Complications; Otosclerosis; Facial Nerve and its Disorder; Meniere's Disease; Tumours of External Ear, Middle Ear and Mastoid; Deaf Child & Rehabilitation of Hearing Impaired
	C Rhinology, Laryngology, Head and Neck	Diseases of External Nose; Nasal Septum and its diseases Acute and Chronic Rhinitis and Sinusitis and its complications; Allergic, Vasomotor Rhinitis and NARES; Nasal Polypi; Epistaxis; Facial Trauma; Granulomatous Diseases of Nose; Neoplasm of Nasal Cavity and PNS; Disorders and Tumours of Oral Cavity and Salivary Gland; Acute and Chronic Tonsilitis, Adenoiditis and Pharyngitis Head and Neck space infections; Tumours of Nasopharynx, Hypopharynx, Oropharynx and Pharyngeal Pouch; Snoring and Sleep Apnoea; Laryngotracheal Trauma; Acute and Chronic inflammation of Larynx; Congenital Lesions and Benign Tumours of Larynx; Laryngeal paralysis; Carcinoma Larynx; Stridor and Tracheostomy; Voice and Speech Disorder; Foreign Bodies in Air and Food passage; Disorders of Oesophagus and Dysphagia

Name of the Institute

OTORHINOLARYNGOLOGY LOGBOOK

Competency – based medical education (CBME) involves the attainment of observable abilities by the students in a time-dependent, learner-centered manner. The emphasis is on outcomes that are relevant to the daily practice of medicine rather than facts. The student gets opportunity to learn at his/her own pace, the ultimate aim being the successful attainment of competencies by all students irrespective of when they do that. Assessment are aligned to these competencies; therefore, the tools differ drastically from the traditional curriculum. While written assessment of cognitive components constitute the bulk of traditional curricular assessment

Competency-based curriculum strives to employ more of workplace-based assessment including direct observation and daily logs.

Sayings of the great:

"I will prepare and someday my chance will come."

Sir Abraham Lincoln

"Strength does not come from physical capacity, it comes from an indomitable will."

Mahatma Gandhi

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LOGBOOK CERTIFICATE

This is to certify that this logbook is the bonafide record of Mr. / Ms. ..... Roll No……..Admission Year ……, of the Department of Otorhinolaryngology (ENT) at ……..…….Medical College.

The logbook is as per the guidelines of Competency Based Undergraduate Medical Education Curriculum, Graduate Medical Regulation 2019.

He / She has satisfactorily attended/ completed all assignments mentioned in this logbook as per the guidelines prescribed by National Medical Commission.

_____

Head of Department of Otorhinolaryngology

Signature with Date

BIODATA OF THE CANDIDATE

PHOTO

Name of the student:

Name of the course: MBBS

Date of birth:

Father’s / Guardian’s name:

Mother’s name:

Blood group:

Permanent Address:

……

……..

Temporary Address:

……

…….

Student’s contact no:

Father’s/ Guardian’s contact no:

Student’s Email id:

Father’s/ Guardian’s Email id:

Candidates Signature: ……... Date: .....

GENERAL INSTRUCTIONS

1) The logbook is a record of the academic / non-academic activities of the student. Each Medical student is responsible for maintaining their logbook.

2) This logbook is prepared as per the guidelines of NMC for implementation of Competency Based Curriculum for 3rd Professional MBBS students in the subject of Otorhinolaryngology.

3) Students are instructed to keep their logbook entries up to date. It is the responsibility of the student to enter their activity in respective pages & get them duly signed by the supervising faculty.

4) Entries in the logbook will be in accordance with activities done in the department & have to be scrutinized by the Head of the department.

5) The logbook assessment will be based on multiple factors like

   - Overall presentation
   - Active participation in the sessions Quality of write up of reflections.
   - Timely completions
   - Attendance

6) The logbook shall be kept as record work of the candidate for the department & be submitted to department as a bonafide record of the candidate before appearing for the University examination.

NOTE:

1. A **clear record** of all components that add to the internal assessment marks needs to be maintained by the institution and retained by them for at least **2 years** after passing of the examination. Institutions may be asked to provide these details by the University as and when required.

The contents in the logbook are suggested guidelines. The institutions can make **necessary changes as per the needs.**

ATTENDANCE

Attendance requirements are **75% in theory and 80% in practical/clinical** for eligibility to appear for the examination in that subject. In subjects that are taught in more than one phase- the learner must have 75% attendance in theory and 80% in practical in each phase of instruction in that subject

Records of Examinations and Internal Assessment

Sr. No.	Exam No.	Date	Theory	Date	Practical (Exam 1 and 2 – 5 marks each for journal and logbook, Prelim exam-10 marks each for journal and logbook)	Feedback provided	Signature of student	Signature of teacher
1	Exam no.1- *Phase II (end of 1st clinical postings)		–		/40+10			
2	Exam no.2- Phase III/I (end of 2nd clinical postings)		/50		/40+10			
3	Preliminary Examination		/100		/80+20			
4	Total		/150		/150			
5	Conversion		/30		/30			
6	Final Internal Assessment Marks (to be submitted to University)		/30		/30			

***The practical examination conducted in phase II will be college level examination and marks of the same will not be included in the internal assessment.**

.....

Signature of Head of the Department

Self-Directed Learning, Seminars, Tutorials, Projects, Quizzes, extracurricular activities

Sr. No.	Self- directed learning (Seminars, Tutorials, Projects, Quizzes, Extracurricular activities)	Date	Phase II	Phase III/I	Signature of Teacher

Reflection (minimum 200 words) – 1

Date :

TOPIC:

Reflection (minimum 200 words) – 2 **Date :**

TOPIC:

LOGBOOK : LIST OF COMPETENCIES

Clinical skills can be assessed by case presentation, case-based discussion, objective structured clinical assessment the checklist, MiniCex, as per the institutional preference.

Competency # addressed	Name of Activity
Topic: Clinical Skills	
EN2.1	Elicit document and present an appropriate history in a patient presenting with an ENT complaint
EN2.2	Demonstrate the correct use of a headlamp and head mirror in the examination of the ear, nose and throat
EN2.4	Demonstrate the correct technique of performing and interpreting tuning fork tests
EN2.5	Demonstrate the correct technique of examination of the nose & paranasal sinuses including the use of nasal speculum
EN2.6	Demonstrate the correct technique of examining the throat including the use of a tongue depressor
EN2.7	Demonstrate the correct technique of examination of neck including elicitation of laryngeal crepitus
EN2.8	Demonstrate the correct technique to perform and interpret pure tone audiogram & impedance audiogram
EN2.12	Counsel and administer informed consent to patients and their families in a simulated environment
Topic: Management of diseases of ear, nose & throat	
EN4.1	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Otalgia
EN4.3	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of ASOM
EN4.4	Demonstrate the correct technique to hold visualize and assess the mobility of the tympanic membrane and its mobility and interpret and diagrammatically represent the findings

EN4.7	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of mucosal type of CSOM
EN4.8	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of squamosal type of CSOM
EN4.9	Demonstrate the correct technique for syringing wax from the ear in a simulated environment
EN4.22	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Nasal Obstruction
EN4.26	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Adenoid
EN4.27	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Allergic Rhinitis
EN4.30	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Epistaxis
EN4.37	Describe the clinical features, investigations and principles of management of Ludwig's angina
EN4.39	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Chronic Tonsillitis
EN4.42	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of hoarseness of voice
EN4.49	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of foreign bodies in the air & food passages

LOGBOOK PSYCHOMOTOR / PERFORMANCE SKILLS:

Skills can be assessed by objective structured clinical assessment with checklist, Global Rating Scale, Simulated patients as per the institutional preference.

Colleges are instructed prepare modules for skill training as per NMC guidelines.

Module 5 Skill Training.

I - Otoscopy

D – Anterior nasal packing

LIST OF COMPETENCIES

Competency # addressed	**Name of Activity**
EN2.3	Demonstrate the correct technique of examination of the ear including Otoscopy
EN2.13	Identify, resuscitate and manage ENT emergencies in a simulated environment (including tracheostomy, anterior nasal packing, removal of foreign bodies in ear, nose, throat and upper respiratory tract)

LOGBOOK FOR AETCOM SKILLS

Counselling for Investigation, Treatment, Prognosis, Blood donation, Organ Donation, Breaking Bad news. All types of consent. Medicolegal aspects and Ethics, Empathy and professionalism as per the Phase of the MBBS. Include cases of Allied branches also.

Competency to be assessed during Clinical postings and /or small group discussions.

LIST OF COMPETENCIES FOR AETCOM

Competencies addressed

The student should be able to	Level
1. Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues as it pertains to the physician – patient relationship (including fiduciary duty)	KH
2. Identify and discuss physician's role and responsibility to society and the community that she/he serves	KH

PHASE II-clinical (minimum two assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE II-Psychomotor

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										

PHASE III Part I -clinical (Minimum two assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part I-Psychomotor skill

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										

PHASE III Part I - AETCOM

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										

REFLECTION ON AETCOM MODULE For PHASE III/Is

Module 2.1 – History taking

Competency addressed	Level
Elicit document and present an appropriate history in a patient presenting with an ENT complaint	SH

Reflection (minimum 200 words) -1 Date:

Signature of Teacher-in-charge

REFLECTION ON AETCOM MODULE

Module 2.12 – Counseling and administering informed consent

Competency addressed	Level
Counsel and administer informed consent to patients and their families in a simulated environment	SH

Reflection (minimum 200 words)-2 Date:

Signature of Teacher-in-charge

ANNEXURE 1:

RECORDING FORM FOR MINI – CEX

EVALUATOR : DATE :

STUDENT :

YEAR :

PATIENT DIAGNOSIS :

SETTINGS : AMBULATORY NEW COMPLEXITY : LOW

IN PATIENT FOLLOW UP MODERATE

ED HIGH

OTHER :

PATIENT AGE PATIENT SEX

FOCUS : DATA GATHERING / DIAGNOSIS / THERAPY / COUNSELLING

1. **MEDICAL INTERVIEWING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

2. **PHYSICAL INTERVIEWING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

3. **HUMANISTIC QUALITIES** / PROFFESIONALISM (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

4. **CLINICAL JUDGEMENT** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

5. **COUNSELLING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

6. **ORGANIZATION / EFFICIENCY** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

7. **OVERALL CLINICAL COMPETENCE** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

MINI CEX TIME : OBSERVING : _____ MINS

PROVIDING FEEDBACK _____ MINS

UNSATISFACTORY 1,2,3

SATISFACTORY 4, 5, 6

SUPERIOR 7, 8, 9

EVALUATOR SATISFACTION WITH MINI CEX

LOW 1 2 3 4 4 5 6 7 8 9 HIGH

RESIDENT SATISFACTION WITH MINI CEX

LOW 1 2 3 4 4 5 6 7 8 9 HIGH

COMMENTS :

STUDENT SIGNATURE EVALUATOR SIGNATURE

ANNEXURE 2:

AetCom skills can be assessed by use of Kalamazoo consensus.

Criteria
Builds relationship
Opens the discussion
Gathers information
Understands the patient's perspective
Shares information
Manages flow
Overall rating
Signature of teacher

Communication skills rating scale adapted from Kalamazoo consensus statement.

Rating 1-3 - Poor, 4 -6 Satisfactory, 6 -10 Superior

Subject: General Surgery
Clinical Postings

Learner -Doctor Programme (clinical clerkship)

Phase II

- History taking
- General Examination
- Local Examination with demonstration of signs.
- Psychomotor Skills
- AETCOM of Phase II

Phase III/ I

- All of Phase II plus
- Psychomotor Skills
- Differential diagnosis
- Investigations
- AETCOM of Phase III Part I

Phase III/ II

- All of Phase III Part I plus
- Psychomotor Skills
- Management
- Counselling
- AETCOM Phase III/ Part II

-There shall be end post exam at the end of 1st, 2nd and 3rd clinical posting which will be added to internal assessment for practicals.
-At the end of 4th clinical posting of 4 weeks there will be only formative assessment.

Subject: General Surgery
Lectures

MBBS Phase II-
Total Teaching hours: 25 hours

S. NO	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
			Lecture: 1		
1.	**Introductory Lecture**		Welcome History of surgery Introduction to surgery and allied subjects Teaching, Learning & Assessment -CBME		1
2.	**Metabolic Response to Injury**		**Lecture**: 2		
		SU 1.1			1
			Describe basic concepts of homeostasis, enumerate the metabolic changes in injury and their mediators.	Physiology and Biochemistry	
		SU 1.2	**Lecture**: 3		1
			Describe the factors that affect the metabolic responses to injury.	Biochemistry	
3.	**Shock**				
		SU 2.1	**Lecture**: 4		1
		PA6.3	Describe Pathophysiology of shock, types of shock and principles of resuscitation including fluid replacement and monitoring. Define and describe shock, its pathogenesis and its stages	Pathology and Physiology	
		SU 2.2	**Lecture**: 5		1
			Describe the clinical features of shock and its appropriate treatment		

4.	**Blood and blood components**				
		SU 3.1	**Lecture**: 6		1
		PA22.4	Describe the indications and appropriate use of blood and blood products and complications of blood transfusion. Enumerate blood components and describe their clinical uses	Pathology	
5.	**Burns**				
		SU 4.1	**Lecture**: 7		1
			Describe pathophysiology of burns. Describe clinical features, diagnose type and extent of burns.	Physiology	
		SU 4.2, 4.3	**Lecture**: 8		1
			Plan appropriate treatment of burns. Discuss medicolegal aspect in burns injuries.		
6.	**Wound healing and wound care**				
		SU 5.1	**Lecture**: 9		1
		PA5.1 PA4.1 PA4.2	Describe normal wound healing and factors affecting healing. Define and describe the process of repair and regeneration including wound healing and its types Define and describe the general features of acute and chronic inflammation including stimuli, vascular and cellular events Enumerate and describe the mediators of acute inflammation	Pathology	
		SU 5.3	**Lecture**: 10		1
			Differentiate the various types of wounds, plan and observe management of wounds.		
7.	**Surgical Infections**				
		SU 6.1	**Lecture**: 11		1
			Define and describe the etiology and pathogenesis of surgical infections	Microbiology	

		SU 6.1	**Lecture**: 12		1
			Define and describe the etiology and pathogenesis of surgical infections- HIV-AIDS, Hepatitis, Gas Gangrene etc.	Microbiology	
		SU 6.2	**Lecture**: 13		1
			Enumerate prophylactic and therapeutic antibiotics. Plan appropriate management.		
8.	**Investigations of a surgical patient**				
		SU 9.1	**Lecture**: 14		1
		PA8.1 PA8.2 MI7.1	Choose appropriate biochemical, microbiological, pathological, imaging investigations and interpret the investigative data in a surgical patient. Describe the diagnostic role of cytology and its application in clinical care. Describe the basis of exfoliative cytology including the technique, stains used Describe the etio-pathogenesis and discuss the laboratory diagnosis of infections of genitourinary system	Biochemistry, Microbiology and Pathology	
9.	**Nutrition and fluid therapy**				
		SU 12.1	**Lecture**:15		1
			Enumerate the causes and consequences of malnutrition in the surgical patient.	Physiology	
		SU 12.2	**Lecture**:16		1
			Describe and discuss the methods of estimation and replacement of the fluid and electrolyte requirements in the surgical patients.	Physiology	
		SU 12.3	**Lecture**:17		1

			Discuss the nutritional requirements of surgical patients, the methods of providing nutritional support and their complications.	Biochemistry	
10.	**Transplantation**				
		SU 13.1	**Lecture**: 18		1
			Describe the immunological basis of organ transplantation.	Microbiology	
		SU 13.2	**Lecture**: 19		1
			Discuss the principles of immunosuppressive therapy. Enumerate Indications, describe surgical principles, management of organ transplantation	Microbiology, Pharmacology	
11.	**Basic surgical skills**				
		SU 14.1	**Lecture**: 20		1
		MI1.4 MI1.5	Describe Aseptic techniques, sterilisation and disinfection. Classify and describe the different methods of sterilization and disinfection. Discuss the application of the different methods in the laboratory, in clinical and surgical practice Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice	Microbiology	
12.	**Biohazard disposal**				
		SU 15.1	**Lecture**: 21		1
		MI8.7	Describe classification of hospital waste and appropriate methods of disposal. Demonstrate Infection control practices and use of Personal Protective Equipment (PPE)	Microbiology	
13.	**Trauma**				
		SU 17.1	**Lecture**: 22		1
			Describe the principles of first aid.		
		SU 17.2	**Lecture**: 23		1

			Basic Life Support	Anaesthesiology	
14.	**Skin and Subcutaneous tissue**				
		SU 18.1, SU 18.2, 18.3	**Lecture**: 24		1
			Describe the pathogenesis, clinical features and management of various cutaneous and subcutaneous infections. Describe clinical examination of surgical patient including swelling and discuss investigations for diagnosis and treatment plan. Classify skin tumours. Differentiate different skin tumours and discuss their management.		
15.	**Vascular diseases**				
		SU27.1	**Lecture**: 25		1
			Describe the etiopathogenesis, clinical features, investigations and principles of treatment of occlusive arterial disease.		

MBBS Phase III- Part I
Total Teaching hours: 25 hours

S. NO	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Metabolic response to injury**				
		SU1.3	**Lecture**: 1		1
			Describe basic concepts of postoperative care.		
2.	**Surgical Audit and Research**				
		SU7.1.7.2	**Lecture**: 2		1
			Describe the planning and conduct of surgical audit Describe the principles and steps of clinical research in General Surgery	Community Medicine	
3.	**Ethics**				
		SU8.1, 8.2	**Lecture**: 3		1
		AS10.3	Describe the principles of Ethics as it pertains to General Surgery and demonstrate professionalism and empathy to the patient undergoing general surgery Describe the role of communication in patient safety	Forensic Medicine, AETCOM	
		SU9.2	**Lecture**: 4		1
			Biological basis for early detection of cancer and multidisciplinary approach in management of cancer		
4.	**Pre, intra and post-operative management**.				
		SU10.1	**Lecture**: 5		1
			Describe the principles of perioperative management of common	AETCOM	
			surgical procedures and Describe the steps and obtain informed consent in a simulated environment		

		IM5.13, IM15.9	Enumerate the indications for ultrasound and other imaging studies including MRCP and ERCP and describe the findings in liver disease. Choose and interpret diagnostic tests based on the clinical diagnosis including complete blood count, PT and PTT, stool examination, occult blood, liver function tests, H.pylori test.		
5.	**Anaesthesia and pain management**				
		SU11.1, 11.5	**Lecture**: 6		1
		AS3.1, AS5.6	Describe principles of Preoperative assessment. Describe principles of providing post-operative pain relief and management of chronic pain. Describe the principles of preoperative evaluation. Observe and describe the principles and steps/ techniques involved S in common blocks used in Surgery(including brachial plexus blocks)	Anaesthesiology	
		SU11.6	**Lecture**: 7		1
		AS3.2	Describe Principles of safe General Surgery Elicit, present and document an appropriate history including medication history in a patient undergoing Surgery as it pertains to a preoperative anaesthetic evaluation	Anaesthesiology	
6.	**Transplantation**				
		SU13.4	**Lecture**: 9		1
			Counsel patients and relatives on organ donation in a simulated Environment Enumerate the indications for hepatic transplantation	AETCOM	
7.	**Basic Surgical Skills**				
		SU14.2	**Lecture**: 10		1
			Describe Surgical approaches, incisions and the use of appropriate instruments in Surgery in general.		
		SU14.3	**Lecture**: 11		1
			Describe the materials and methods used for surgical wound closure and anastomosis (sutures, knots and needles)		

8.	**Trauma**				
		SU17.2	**Lecture**: 12		1
			Demonstrate the steps in Basic Life Support. Transport of injured patient in a simulated environment	Anaesthesiology	
9.	**Developmental anomalies of face, mouth and jaws**				
		SU19.1, 19.2	**Lecture**: 13		1
			Describe the etiology and classification of cleft lip and palate. Describe the Principles of reconstruction of cleft lip and palate.	Human Anatomy	
10.	**Oropharyngeal cancer**				
		SU20.1, SU20.2	**Lecture**: 14		1
			Describe etiopathogenesis of oral cancer symptoms and signs of oropharyngeal cancer. Enumerate the appropriate investigations and discuss the Principles of treatment and reconstructive flap	ENT	
		DE 4.1, DE 4.2, DE 4.3, DE 4.4	**Lecture**: 15		1
			Discuss the prevalence of oral cancer and enumerate the common types of cancer that can affect tissues of the oral cavity. Discuss the role of etiological factors in the formation of precancerous /cancerous lesions. Identify potential pre-cancerous /cancerous lesions. Counsel patients to risks of oral cancer with respect to tobacco, smoking, alcohol and other causative factors.		
11.	**Disorders of salivary glands**				
		SU21.1	**Lecture**: 16		1
		AN28.9 , AN34.1 ,	Describe surgical anatomy of the salivary glands, pathology clinical presentation of disorders of salivary glands Describe & demonstrate the parts, borders, surfaces, contents, relations and nerve supply of parotid gland with course of its duct		

			and surgical importance. Describe & demonstrate the morphology, relations and nerve supply		
		SU21.2	**Lecture**: 17		1
			Enumerate the appropriate investigations and describe the Principles of treatment of disorders of salivary glands		
12.	**Thyroid and Parathyroid Glands**				
		SU22.1, 22.2	**Lecture**: 18		1
		AN35.2 PA32.1, IM12.13, IM12.15	Describe the applied anatomy and physiology of thyroid. Describe the etiopathogenesis of thyroidal swellings. Describe the etiopathogenesis of thyroidal swellings. Describe & demonstrate location, parts, borders, surfaces, relations & blood supply of thyroid gland Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings, Describe the pharmacology, indications, adverse reaction, interactions of thyroxine and antithyroid drugs. Describe and discuss the indications of thionamide therapy, radio iodine therapy and Surgery in the management of thyrotoxicosis	Human Anatomy, Pathology	
		SU22.4	**Lecture**: 19		1
			Describe the clinical features, classification and principles of management of thyroid cancer		
		SU22.5	**Lecture**: 20		1
		IM22.2	Describe the applied anatomy of parathyroid. Describe and discuss the clinical features of hypo - and hyperparathyroidism and the principles of their management Describe the aetiology, clinical manifestations, diagnosis and clinical approach to primary hyperparathyroidism	Human Anatomy	
13.	**Adrenal Glands**				
		SU23.1, 23.2, 23.3	**Lecture**: 21		1

			Describe the applied anatomy of adrenal glands. Describe the etiology, clinical features and principles of management of disorders of adrenal gland. Describe the clinical features, principles of investigation and management of Adrenal tumours	Human Anatomy	
14.	**Breast**				
		SU25.1	**Lecture**: 22		1
		PA31.1	Describe applied anatomy and appropriate investigations for breast disease Classify and describe the types, etiology, pathogenesis, pathology and hormonal dependency of benign breast disease	Human Anatomy	
		SU25.2	**Lecture**: 23		1
		PA31.2	Describe the etiopathogenesis, clinical features and principles of management of benign breast disease including infections of the breast. Classify and describe the epidemiology, pathogenesis, classification, morphology, prognostic factors, hormonal dependency, staging and spread of carcinoma of the breast		
		SU 25.3	**Lecture**: 24		1
			Describe the etiopathogenesis, clinical features, Investigations and principles of treatment of benign and malignant tumours of breast.	Radiodiagnosis	
15.	**Vascular diseases**				
		SU 27.1	**Lecture**: 25		
		AN19.3, AN20.5 AN20.9	Describe the etiopathogenesis, clinical features, investigations and principles of treatment of occlusive arterial disease. Explain the concept of "Peripheral heart. Explain anatomical basis of varicose veins and deep vein thrombosis. Identify & demonstrate palpation of vessels (femoral, popliteal, dorsalis pedis, post tibial), Mid inguinal point, Surface projection of: femoral nerve, Saphenous opening, Sciatic, tibial, common peroneal & deep peroneal nerve, great and small saphenous veins		

MBBS Phase III- Part II
Total Teaching hours: 70 hours

S. NO	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Anaesthesia and Pain Management**				
		SU 11.2	**Lecture**: 1		1
		AS5.6	Enumerate the principles of general, regional and local anaesthesia. Observe and describe the principles and steps/ techniques involved in common blocks used in Surgery (including brachial plexus blocks)	Anaesthesiology	
		SU 11.4	**Lecture**: 2		1
			Enumerate the indications and principles of day care General Surgery.	Anaesthesiology	
		SU 16.1	**Lecture**: 3		1
			Minimal Invasive General Surgery: Describe indications, advantages and disadvantages of Minimally Invasive General Surgery.		
2.	**Trauma**				
		SU 17.4, 17.5, 17.6	**Lecture**: 4		1
			Describe pathophysiology, mechanism of head injuries. Describe clinical features for neurological assessment and GCS in head injuries. Choose appropriate investigations and discuss the principles of management of head injuries.		

		SU 17.7	**Lecture**: 5		1
			Describe the clinical features of soft tissue injuries. Choose appropriate investigations and discuss the principles of management.		
		SU 17.8, 17.9	**Lecture**: 6		1
			Describe pathophysiology of chest injuries. Describe the clinical features and principles of management of chest injuries.		
		SU17.3	**Lecture**: 7		1
			Describe pathophysiology of Abdominal injuries. Describe the clinical features and principles of management of Abdominal injuries.		
3.	**Pancreas**				
		SU 24.1	**Lecture**: 8		1
		AN55.2	Describe the clinical features, principles of investigation, prognosis and management of pancreatitis. Demonstrate the surface projections of: stomach, liver, fundus of gall bladder, spleen, duodenum, pancreas, ileocecal junction, kidneys & root of mesentery	Human Anatomy	
		SU 24.2	**Lecture**: 9		1
			Describe the clinical features, principles of investigation, prognosis and management of pancreatic endocrine tumours.		
		SU 24.3	**Lecture**: 10		1
			Describe the principles of investigation and management of pancreatic disorders including pancreatitis and endocrine tumours.		
4.	**Cardio-thoracic General Surgery- Chest- Heart and Lungs**				
		SU 26.1, 26.2	**Lecture**: 11		1

			Outline the role of surgery in the management of coronary heart disease, valvular heart diseases and congenital heart diseases, diseases of Thorax and Diaphragm		
		SU 26.3	**Lecture**: 12		1
			Describe the clinical features of mediastinal diseases and the principles of management.		
		SU 26.4	**Lecture**: 13		1
			Describe the etiology, pathogenesis, clinical features of tumors of the lung and the principles of management.		
5.	**Vascular Diseases**				
		SU 27.1	**Lecture**: 14		1
			Describe the etiopathogenesis, clinical features, investigations and principles of treatment of occlusive arterial disease.		
		SU 27.2, 27.3, 27.4	**Lecture**: 15		1
			Demonstrate the correct examination of the vascular system and enumerate and describe the investigation of vascular disease. Describe clinical features, investigations and principles of management of vasospastic disorders. Describe the types of gangrene and principles of amputation.		
		SU 27.5, 27.6	**Lecture**: 16		1
		AN20.5	Describe the applied anatomy of the venous system of lower limb. Explain anatomical basis of varicose veins and deep vein thrombosis	Human Anatomy	
		SU 27.7	**Lecture**: 17		1
			Describe pathophysiology, clinical features, Investigations and principles of management of lymph edema, lymphangitis and lymphomas. Explain the concept of lymphoedema and spread of tumors via lymphatics and venous system		
6.	**Abdomen**				

		SU 28.1	**Lecture**: 18		1
		AN44.4 AN44.5	Describe pathophysiology, clinical features, Investigations and principles of management of Hernias Describe & demonstrate extent, boundaries, contents of Inguinal canal including Hesselbach's triangle. Explain the anatomical basis of inguinal hernia.	Human Anatomy	
		SU 28.1	**Lecture**: 19		1
			Describe pathophysiology, clinical features, Investigations and principles of management of Hernias	Human Anatomy	
		SU 28.1	**Lecture**: 20		1
		AN44.6	Describe pathophysiology, clinical features, Investigations and principles of management of Hernias Describe & demonstrate attachments of muscles of anterior abdominal wall	Human Anatomy	
		SU 28.1	**Lecture**:21		1
		AN44.7	Describe pathophysiology, clinical features, Investigations and principles of management of Hernias Enumerate common Abdominal incisions	Human Anatomy	
		SU 28.3	**Lecture**: 22		1
		AN47.2 AN47.3 AN47.4	Describe causes, clinical features, complications and principles of management of peritonitis and omental pathologies Name & identify various peritoneal folds & pouches with its explanation. Explain anatomical basis of Ascites & Peritonitis Explain anatomical basis of Subphrenic abscess	Human Anatomy	
		SU 28.4	**Lecture**: 23		1
		AN47.4	Describe pathophysiology, clinical features, investigations and K principles of management of Intra-abdominal abscess, mesenteric cyst, and retroperitoneal tumors Explain anatomical basis of Subphrenic abscess		
		SU 28.5	**Lecture**: 24		1
		AN23.1	Describe the applied Anatomy and physiology of esophagus Describe & demonstrate the external appearance, relations, blood supply, nerve supply, lymphatic drainage and applied anatomy of	Human Anatomy, Physiology	

			oesophagus		
		SU 28.6	**Lecture**: 25		1
			Describe the clinical features, investigations and principles of management of benign and malignant disorders of esophagus		
		SU 28.7	**Lecture**: 26		1
		AN47.6 AN47.1	Describe the applied anatomy and physiology of stomach Explain the anatomical basis of Splenic notch, accessory spleens, Kehr's sign, different types of vagotomy, liver biopsy (site of needle puncture), referred pain in cholecystitis, Obstructive jaundice, referred pain around umbilicus, radiating pain of kidney to groin &Lymphatic spread in carcinoma stomach Describe & identify boundaries and recesses of Lesser & Greater sac	Human Anatomy	
		SU 28.8	**Lecture**: 27		1
			Describe and discuss the aetiology, the clinical features, investigations and principles of management of congenital hypertrophic pyloric stenosis, Peptic ulcer disease, Carcinoma stomach		
		SU 28.10	**Lecture**: 28		1
		   AN47.4 AN47.6	Describe the applied anatomy of liver. Describe the clinical features, Investigations and principles of management of liver abscess, hydatid disease, injuries and tumors of the liver Explain anatomical basis of Subphrenic abscess Liver biopsy (site of needle puncture), referred pain in cholecystitis, Obstructive jaundice	Human Anatomy	
		SU 28.10	**Lecture**: 29		1
			Describe the applied anatomy of liver. Describe the clinical features, Investigations and principles of management of liver abscess, hydatid disease, injuries and tumours of the liver	Human Anatomy	

		SU 28.10	**Lecture**: 30		1
		AN47.3	Describe the applied anatomy of liver. Describe the clinical features, Investigations and principles of management of liver abscess, hydatid disease, injuries and tumors of the liver Explain anatomical basis of Ascites & Peritonitis	Human Anatomy	
		SU 28.11	**Lecture**: 31		1
		AN47.6	Describe the applied anatomy of spleen. Describe the clinical features, investigations and principles of management of splenic injuries. Describe the post-splenectomy sepsis – prophylaxis Explain the anatomical basis of Splenic notch, accessory spleens, Kehr's sign	Human Anatomy	
		SU 28.12	**Lecture**: 32		1
		AN47.7	Describe the applied anatomy of biliary system. Describe the clinical features, investigations and principles of management of diseases of biliary system Mention the clinical importance of Calot's triangle	Human Anatomy	
		SU 28.12	**Lecture**: 33		1
			Describe the applied anatomy of biliary system. Describe the clinical features, investigations and principles of management of diseases of biliary system	Human Anatomy	
		SU 28.12	**Lecture**: 34		1
		AN47.10 AN47.11	Describe the applied anatomy of biliary system. Describe the clinical features, investigations and principles of management of diseases of biliary system Enumerate the sites of portosystemic anastomosis Explain the anatomic basis of hematemesis & caput medusae in portal hypertension	Human Anatomy	

		SU 28.13, 28.14	**Lecture**: 35		1
		AN52.6	Describe the applied anatomy of small and large intestine Describe the development and congenital anomalies of foregut, midgut & hindgut	Human Anatomy	
		SU 28.13, 28.14	**Lecture**: 36		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome	Human Anatomy	
		SU 28.13, 28.14	**Lecture**: 37		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome	Human Anatomy	
		SU 28.13, 28.14	**Lecture**: 38		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome	Human Anatomy	
		SU 28.13, 28.14	**Lecture**: 39		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome	Human Anatomy	
		SU 28.13, 28.14	**Lecture**: 40		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome	Human Anatomy	
		SU 28.13, 28.14	**Lecture**: 41		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome	Human Anatomy	
		SU 28.15	**Lecture**: 42		1

			Describe the clinical features, investigations and principles of management of diseases of Appendix including appendicitis and its complications.		
		SU 28.16	**Lecture**: 43		1
		AN49.4	Describe applied anatomy including congenital anomalies of the rectum and anal canal Describe & demonstrate boundaries, content & applied anatomy of Ischiorectal fossa	Human Anatomy	
		SU 28.16	**Lecture**: 44		1
		AN48.8	Describe applied anatomy including congenital anomalies of the rectum and anal canal Mention the structures palpable during vaginal & rectal examination	Human Anatomy	
		SU 28.17	**Lecture**: 45		1
			Describe the clinical features, investigations and principles of management of common anorectal diseases		
		SU 28.17	**Lecture**: 46		1
			Describe the clinical features, investigations and principles of management of common anorectal diseases		
7.	**Urinary System**				
		SU 29.1	**Lecture**: 47		1
			Describe the causes, investigations and principles of management of Hematuria		
		SU 29.2	**Lecture**: 48		1
		AN52.7	Describe the clinical features, investigations and principles of management of congenital anomalies of genitourinary system Describe the development of urinary system	Human Anatomy	
		SU 29.3	**Lecture**: 49		1
		MI7.1	Describe the Clinical features, Investigations and principles of management of urinary tract infections Describe the etio-pathogenesis and discuss the laboratory diagnosis of infections of genitourinary system	Microbiology	
		SU 29.4	**Lecture**: 50		1

			Describe the clinical features, investigations and principles of management of hydronephrosis		
		SU 29.5	**Lecture**: 51		1
			Describe the clinical features, investigations and principles of management of renal calculi		
		SU 29.5	**Lecture**: 52		1
			Describe the clinical features, investigations and principles of management of renal calculi		
		SU 29.6	**Lecture**: 53		1
			Describe the clinical features, investigations and principles of management of renal tumours		
		SU 29.7	**Lecture**: 54		1
			Describe the principles of management of acute and chronic retention of urine		
		SU 29.8	**Lecture**: 55		1
			Describe the clinical features, investigations and principles of management of bladder cancer		
		SU 29.9	**Lecture**: 56		1
		AN48.7	Describe the clinical features, investigations and principles of management of disorders of prostate Mention the lobes involved in benign prostatic hypertrophy & prostatic cancer	Human Anatomy	
		SU 29.10	**Lecture**: 57		1
			Describe clinical features, investigations and management of urethral strictures and urethral injuries		
8.	**Penis, Testis and scrotum**				
		SU 30.1	**Lecture**: 58		1
		AN46.5	Describe the clinical features, investigations and principles of management of phimosis, paraphimosis. Explain the anatomical basis of Phimosis & Circumcision	Human Anatomy	
		SU 30.1	**Lecture**: 59		1

			Describe the clinical features, investigations and principles of management of carcinoma penis.		
		SU 30.2, 30.3	**Lecture**: 60		1
		AN46.1	Describe the applied anatomy clinical features, investigations and principles of management of undescended testis. Describe the applied anatomy clinical features, investigations and principles of management of epidydimo-orchitis Describe & demonstrate coverings, internal structure, side determination, blood supply, nerve supply, lymphatic drainage & descent of testis with its applied anatomy	Human Anatomy	
		SU 30.4, 30.5	**Lecture**: 61		1
		AN46.4	Describe the applied anatomy clinical features, investigations and principles of management of varicocele and hydrocoele Explain the anatomical basis of varicocele	Human Anatomy	
		SU 30.6	**Lecture**: 62		1
			Describe classification, clinical features, investigations and principles of management of benign tumours of testis.		
		SU 30.6	**Lecture**: 63		1
			Describe classification, clinical features, investigations and principles of management of malignant tumours of testis.		
9.			**Lecture**: 64		1
			Revision **Lecture** 1		
10.			**Lecture**: 65		1
			Revision **Lecture** 2		
11.			**Lecture**: 66		1
			Revision **Lecture** 3		
12.			**Lecture**: 67		1
			Revision **Lecture** 4		
13.			**Lecture**: 68		1
			Revision **Lecture**5		

14.			**Lecture**: 69		1
			Revision **Lecture** 6		
15.			**Lecture**: 70		1
			Revision **Lecture** 7		

Subject: General Surgery
Self-Directed Learning

MBBS phase III/I
Total Teaching hours : 5 hours
***These are suggested topics which can be modified at institutional level**

Sr. No.	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Ethics**				
		SU8.1	SDL:1		3
			Describe the principles of Ethics as it pertains to General Surgery. Demonstrate Professionalism and empathy to the patient.		
2.	**Transplantation**				
		SU13.3	SDL:2		2
			Discuss the legal and ethical issues concerning organ donation. Counsel patients and relatives on organ donation in a simulated.		

MBBS phase III/II

Total Teaching hours : 15 hours

***These are suggested topics which can be modified at institutional level**

Sr. No	TOPICS	COMPETENCIES	SUBTOPICS	HOURS
1.	**Thyroid**			
		SU 22.2, SU 22.3, SU22.4	SDL:1	4
			Describe the etiopathogenesis of thyroidal swellings. Demonstrate and document the correct clinical examination of thyroid swellings and discus the differential diagnosis and their management. Describe the clinical features, classification and principles of management of thyroid cancer	
2.	**Breast**			
		SU 25.2, SU 25.3	SDL:2	4
			Describe the etiopathogenesis, clinical features and principles of management of benign breast disease including infections of the breast. Describe the etiopathogenesis, clinical features, Investigations and principles of treatment of benign and malignant tumours of breast.	
3.	**Oral malignancy**			
		SU 20.1, SU 20.2	SDL:3	3
			Describe etiopathogenesis of oral cancer symptoms and signs of oropharyngeal cancer. Enumerate the appropriate investigations and discuss the Principles of treatment.	
4.	**Communication skills – Role play**			
		AETCOM	SDL:4	4

Subject: General Surgery
Small Group Discussion

MBBS phase III/I -

Small group teachings/ Tutorials/ Integrated teaching/ Practical's: 35 hours

- Competencies written in red (horizontal) and green (vertical) are of alignment and integration.
- 25 % of allotted time of the third professional shall be utilised for integrated learning with pre- and para-clinical subjects and shall be assessed during the clinical subject's examination.
- This allotted time will be utilised as integrated teaching by para- clinical subjects with clinical subjects (as Applied Anatomy, Clinical Pathology, Clinical Pharmacology, Clinical Microbiology, Radio diagnosis, Instruments, Operative Surgery, Communication skills etc.).

S. NO	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Metabolic response to injury**				
		SU1.3	SGD: 1		1
		AS3.1, AS9.3, AS9.4	Describe basic concepts of perioperative care- preoperative Describe the principles of preoperative evaluation Describe the principles of fluid therapy in the preoperative period	Anaesthesiology	

			Enumerate blood products and describe the use of blood products in the preoperative period		
		SU1.3	SGD: 2		1
			Describe basic concepts of perioperative care.- intraoperative	Anaesthesiology	
		SU1.3,	SGD: 3		1
		AS6.3	Describe basic concepts of perioperative care- postoperative Describe the common complications encountered by patients in the recovery room, their recognition and principles of management	Anaesthesiology	
2.	**Shock**				
		SU2.1,	SGD: 4		1
		PA6.3	Describe Pathophysiology of shock, types of shock & principles of resuscitation including fluid replacement and monitoring. Define and describe shock, its pathogenesis and its stages	Pathology, Physiology	
		SU2.2,	SGD: 5		1
		IM15.3	Describe the clinical features of shock and its appropriate treatment Describe and discuss the physiologic effects of acute blood and volume loss	General Medicine	
3.	**Blood and blood components**				
		SU3.2	SGD: 6		1
		PA22.4	Observe blood transfusions Enumerate blood components and describe their clinical uses	Pathology	
4.	**Burns**				

		SU4.1, SU4.2	SGD: 7		1
			Elicit document and present history in a case of Burns and perform physical examination. Describe Pathophysiology of Burns. Describe Clinical features, Diagnose type and extent of burns and plan appropriate treatment.	Physiology	
		SU4.3	SGD: 8		1
		FM2.25	Discuss the Medicolegal aspects in burn injuries. Describe types of injuries, clinical features, patho-physiology, postmortem findings and medico-legal aspects in cases of burns, scalds, lightening, electrocution and radiations		
					1
				Forensic Medicine	
5.	**Wound healing and wound care**				
		SU5.2, SU5.3	SGD: 9		1
			Elicit, document and present a history in a patient presenting with wounds. Differentiate the various types of wounds, plan and observe management of wounds.		
		SU5.4	SGD:10		1
			Discuss medico legal aspects of wounds		
					1
		FM3.3 , FM3.4	Mechanical injuries and wounds: Define, describe and classify different types of mechanical injuries, abrasion, bruise, laceration, stab wound, incised wound, chop wound, defense wound, self-inflicted/fabricated wounds and their	Forensic Medicine	

		, FM3.6	medico-legal aspects. Mechanical injuries and wounds: define injury, assault & hurt. Describe IPC pertaining to injuries Mechanical injuries and wounds:Describe healing of injury and fracture of bones with its medico-legal importance		
6.	**Surgical infections**				
		SU6.1	SGD:11		1
			Define and describe the aetiology and pathogenesis of surgical	Microbiology	
		MI7.1	Infections Describe the etio-pathogenesis and discuss the laboratory diagnosis of infections of genitourinary system		
		SU6.2	SGD:12		1
			Enumerate Prophylactic and therapeutic antibiotics		
			Plan appropriate management		
7.	**Surgical Audit and Research**				
		SU7.1, SU7.2	SGD:13		1
			Describe the Planning and conduct of Surgical audit Describe the principles and steps of clinical research in General Surgery	Community Medicine	
8.	**Ethics**				
		SU8.1 ,SU8.2	SGD:14		1
			Describe the principles of Ethics as it pertains to General Surgery Demonstrate Professionalism and empathy to the patient undergoing general surgery	Forensic Medicine, AETCOM	

9.	**Investigation of surgical patient**				
		SU9.1	SGD:15		1
			Choose appropriate biochemical, microbiological, pathological, imaging investigations and interpret the investigative data in a surgical patient	Biochemistry,microbiology,pathology	
		SU9.2	SGD 16		
			Biological basis for early detection of cancer and multidisciplinary approach in management of cancer		
10.	**Pre, intra and post-operative management**.				
		SU10.1	SGD:17		1
			Describe the principles of perioperative management of common		
			surgical procedures		
11.	**Nutrition and fluid therapy**				
		SU12.1	SGD:18	Physiology,Biochemistry	1
			Enumerate the causes and consequences of malnutrition in the surgical patient		
		SU12.2	Describe and discuss the methods of estimation and replacement Of the fluid and electrolyte requirements in the surgical patient		

		SU12.3	Discuss the nutritional requirements of surgical patients, the methods of providing nutritional support and their complications		
12.	**Transplantation**				
		SU13.3	SGD: 19	AETCOM	1
			Discuss the legal and ethical issues concerning organ donation		
13.	**Basic Surgical Skills**				
		SU14.2	SGD: 20		1
			Describe Surgical approaches, incisions and the use of appropriate instruments in Surgery in general.		
		SU14.3	SGD: 21		1
			Describe the materials and methods used for surgical wound		
			closure and anastomosis (sutures, knots and needles)		
14	**Biohazard Disposal**	SU15.1	SGD 22	Microbiology, Community medicine	1
		MI8.7	Describe **c**lassification of hospital waste and appropriate methods of disposal Demonstrate Infection control practices and use of Personal Protective Equipments (PPE)		
15.	**Trauma**				
		SU17.3	SGD:23		1
			Describe the Principles in management of mass casualties		
16.	**Skin and Subcutaneous Tissue**		SGD 24		1
		SU18.1 SU18.2	Describe the pathogenesis, clinical features and management of various cutaneous and subcutaneous infections. Classify skin tumors		

		SU18.3	Differentiate different skin tumors and discuss their management. Describe and demonstrate the clinical examination of surgical patient including swelling and order relevant investigation for diagnosis. Describe and discuss appropriate treatment plan.		
17.	**Developmental anomalies of face, mouth and jaws**				
		SU19.1, 19.2	SGD:25	Human Anatomy	1
			Describe the etiology and classification of cleft lip and palate. Describe the Principles of reconstruction of cleft lip and palate		
18	**Oropharyngeal carcinoma**		SGD 26	ENT	1
		SU20.1 SU20.2	Describe etiopathogenesis of oral cancer symptoms and signs of oropharyngeal cancer Enumerate the appropriate investigations and discuss the Principles of treatment		
19.	**Disorders of salivary glands**				
		SU21.1	SGD:27	Human Anatomy	1
		AN34.1 AN28.9	Describe surgical anatomy of the salivary glands, pathology, and clinical presentation of disorders of salivary glands Describe & demonstrate the morphology, relations and nerve supply of submandibular salivary gland & submandibular ganglion		

			Describe & demonstrate the parts, borders, surfaces, contents, relations and nerve supply of parotid gland with course of its duct and surgical importance		
		SU21.2	SGD:28		1
			Enumerate the appropriate investigations and describe the Principles of treatment of disorders of salivary glands		
20.	**Thyroid and Parathyroid Glands**				
		SU22.1, 22.2	SGD:29	Human anatomy, Pathology	1
		AN35.2	Describe the applied anatomy and physiology of thyroid. Describe the etiopathogenesis of thyroidal swellings. Describe & demonstrate location, parts, borders, surfaces, relations & blood supply of thyroid gland		
		SU22.3	SGD:30		1
		PA32.1	Demonstrate and document the correct clinical examination of thyroid swellings and discus the differential diagnosis and their management Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings		
		SU22.4, SU22.5	SGD:31		1
		AN35.8	Describe the clinical features, classification and principles of management of thyroid cancer		

			Describe the applied anatomy of parathyroid Describe and discuss the clinical features of hypo - and hyperparathyroidism and the principles of their management Describe the anatomically relevant clinical features of Thyroid swellings		
21.	**Breast**				
		SU 25.1	SGD:32	Human anatomy, Radiodiagnosis	1
		AN9.2	Describe applied anatomy and appropriate investigations for breast disease Breast-Describe the location, extent, deep relations, structure, age changes, blood supply, lymphatic drainage, microanatomy and applied anatomy of breast		
		SU 25.2	SGD:33		1
			Describe the etiopathogenesis, clinical features and principles of management of benign breast disease including infections of the breast.		
22.	**Vascular diseases**				
		SU 27.1, 27.2, 27.3, 27.4	SGD:34	Human Anatomy	1
		AN20.9	Describe the etiopathogenesis, clinical features, investigations and principles of treatment of occlusive arterial disease. Demonstrate the correct examination of the vascular system and enumerate and describe the investigation of vascular disease. Describe clinical features, investigations and principles of management of vasospastic disorders. Describe the types of gangrene and principles of amputation.		

			Identify & demonstrate palpation of vessels (femoral, popliteal, dorsalis pedis, post tibial), Mid inguinal point, Surface projection of: femoral nerve, Saphenous opening, Sciatic, tibial, common peroneal & deep peroneal nerve, great and small saphenous veins		
		SU 27.5, 27.6, 27.7	SGD:35		1
		AN6.3 AN23.7	Describe the applied anatomy of venous system of lower limb. Describe pathophysiology, clinical features, Investigations and principles of management of DVT and Varicose veins. Describe pathophysiology, clinical features, investigations and principles of management of Lymph edema, lymphangitis and Lymphomas. Explain the concept of lymphoedema and spread of tumors via lymphatics and venous system Mention the extent, relations and applied anatomy of lymphatic duct		

MBBS Phase III/II-

Small group teachings/ Tutorials/ Integrated teaching/ Practical's: 125 hours

- Competencies written in red (horizontal) and green (vertical) are of alignment and integration.
- 25 % of allotted time of the third professional shall be utilised for integrated learning with pre- and para-clinical subjects and shall be assessed during the clinical subject's examination.
- This allotted time will be utilised as integrated teaching by para- clinical subjects with clinical subjects (as Applied Anatomy, Clinical Pathology, Clinical Pharmacology, Clinical Microbiology, Radio diagnosis, Instruments, Operative Surgery, Communication skills etc.).

SR. NO.	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Shock**				
		SU 2.3	SGD: 1		1
		PA6.3	Communicate and counsel patients and families about the treatment and prognosis of shock demonstrating empathy and care. Define and describe shock, its pathogenesis and its stages	AETCOM	
2	**Blood and blood components**				
		SU 3.3	SGD: 2		1
		PA22.4	Councell patients and family/friend for blood transfusion and blood donation. Enumerate blood components and describe their clinical uses	Pathology	
3.	**Burns**				
		SU 4.4	SGD: 3		1
			Communicate and counsel patients and families on the outcome and rehabilitating demonstrating empathy and care.		

4.	**Surgical infections**				
		SU 6.1, 6.2,	SGD: 4		1
		OR3.1,OR3.3,OR4.1	Communicate and counsel patients and families on the outcome and rehabilitating demonstrating empathy and care. Describe and discuss the aetiopathogenesis, clinical features, Investigations and principles of management of Bone and Joint infections. Describe and discuss the clinical features, Investigation and principles of management of Tuberculosis affecting major joints (Hip, Knee) including cold abcess and caries spine a) Acute Osteomyelitis b) Subacute osteomyelitis c) Acute Suppurative arthritis d) Septic arthritis & HIV infection e) Spirochaetal infection f) Skeletal Tuberculosis. Participate as a member in team for procedures like drainage of abscess, sequestrectomy/ saucerisation and arthrotomy	Orthopaedics	
5.	**Ethics**				
		SU 8.3	SGD: 5		1
			Discuss Medico-legal issues in surgical practice	Forensic Medicine, AETCOM	
6.	**Investigation of surgical patient**				
		SU 9.2	SGD: 6		1

			Biological basis for early detection of cancer and multidisciplinary approach in management of cancer		
		SU 9.3	SGD: 7		1
			Communicate the results of surgical investigations and counsel the patient appropriately.		
7.	**Pre, intra and post operative management.**				
		SU 10.2	SGD: 8		1
		IM24.11	Describe the steps and obtain informed consent in a simulated environment. Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of the elderly undergoing surgery	AETCOM	
		SU 10.3	SGD: 9		1
			Observe common surgical procedures and assist in minor surgical procedures; observe emergency life saving surgical procedures.		
		SU 10.4	SGD: 10		1
			Perform basic surgical skills such as first aid including suturing and minor surgical procedures in simulated environment.		
8.	**Anaesthesia and Pain Management**				
		SU 11.3	SGD: 11		1
			Demonstrate maintenance of an airway in a mannequin or equivalent.	Anaesthesiology	
		SU 11.1, 11.2	SGD: 12		1

			Describe principles of preoperative assessment. Enumerate the principles of general, regional and local anaesthesia.	Anaesthesiology	
		SU 11.3, 11.4, 11.5	SGD: 13		1
			Enumerate the indications and principles of day care general surgery. Describe principles of providing post-operative pain relief and management of chronic pain. Describe principles of safe General surgery.	Anaesthesiology	
9.	**Nutrition and fluid therapy**				
		SU 12.1, 12.2	SGD: 14		1
			Enumerate the causes and consequnces of malnutrition in the surgical patient. Describe and discuss the methods of estimation and replacement of the fluid and electrolyte requirements in the surgical patient.	Physiology	
		SU 12.3	SGD: 15		1
			Discuss the nutritional requirements of surgical patients, the methods of providing nutritional support and their complications.	Biochemistry	
10.	**Transplantation**				
		SU 13.3	SGD: 16		1
			Discuss the legal and ethical issues concerning organ donation.	AETCOM	
11.	**Biohazard disposal**				
		SU 15.1	SGD: 17		1
			Describe classification of hospital waste and appropriate methods of disposal.	Microbiology	
12.	**Minimally invasive General surgery**				

		SU 16.1	SGD: 18		1
			Minimally invasive General surgery: Describe indications advantages and disadvantages of minimally invasive General surgery.		
13.	**Trauma**				
		SU 17.4	SGD: 19		1
			Describe pathophysiology, mechanism of head injuries.		
		SU 17.5	SGD: 20		1
			Describe clinical features for neurological assessment and GCS in head injuries.		
		SU 17.6,	SGD: 21		1
		PM8.1	Choose appropriate investigations and discuss the principles of management of head injuries. Describe the clinical features, evaluation, diagnosis and management of disability following traumatic brain injury	Physical Medicine & Rehabilitation	
		SU 17.7	SGD: 22		1
		OR11.1	Describe the clinical features of soft tissue injuries. Choose appropriate investigations and discuss the principles of management. Describe and discuss the aetiopathogenesis, clinical features, Investigations and principles of management of benign and malignant bone tumours and pathological fractures	Orthopaedics	
		SU 17.8	SGD: 23		1
			Describe pathophysiology of chest injuries.		
		SU 17.9	SGD: 24		1

			Describe the clinical features and principles of management of chest injuries.		
		SU 17.10	SGD: 25		1
			Demonstrate Airway maintenance. Recognise and manage tension pneumothorax, hemothorax and flail chest in simulated environment.	Anaesthesiology	
14.	**Skin and subcutaneous tissue**				
		SU 18.3.	SGD: 26		1
		PM7.9	Describe and demonstrate the clinical examination of surgical patient including swelling and order relevant investigation for diagnosis. Describe and discuss appropriate treatment plan. Enumerate the indications of debridement, and Split thickness skin grafting.	Physical Medicine & Rehabilitation	
15.	**Oropharyngeal cancer**				
		SU 20.1	SGD: 27		1
			Describe etiopathogenesis of oral cancer. Symptoms and signs of oropharyngeal cancer.	ENT	
		SU 20.2	SGD: 28		1
			Enumerate the appropriate investigations for oropharyngeal cancer.		
		SU 20.2	SGD: 29		1
			Enumerate the appropriate investigations for oropharyngeal cancer.		
		SU 20.3	SGD: 30		1
			Enumerate the principles of treatment for oropharyngeal cancer.		
		SU 20.3	SGD: 31		1

			Enumerate the principles of treatment for oropharyngeal cancer.		
16.	**Adrenal Glands**				
		SU 23.1, 23.2	SGD: 32		1
			Describe the applied anatomy of adrenal glands. Describe the etiology, clinical features and principles of management of disorders of adrenal glands.	Human Anatomy,General Medicine	
		SU 23.3	SGD: 33		1
			Describe the clinical features, principles of investigation and management of adrenal tumors.		
17.	**Pancreas**				
		SU 24.1,	SGD: 34		1
		PA32.6	Describe the clinical features, principles of investigation, prognosis and management of pancreatitis. Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications and metastases of pancreatic cancer	Human Anatomy	
		SU 24.2	SGD: 35		1
			Describe the clinical features, principles of investigation, prognosis and management of pancreatic endocrine tumors.		
		SU 24.3	SGD: 36		1
			Describe the principles of investigation and management of pancreatic disorders including pancreatitis and endocrine tumors.		

18.	**Breast**				
		SU 25.3	SGD: 37		1
			Describe the etiopathogenesis, clinical features, investigations and principles of treatment of benign and malignant tumors of breast.	Radiodiagnosis	
		SU 25.3	SGD: 38		1
			Describe the etiopathogenesis, clinical features, investigations and principles of treatment of benign and malignant tumors of breast.	Radiodiagnosis	
		SU 25.4	SGD: 39		1
			Counsel the patient and obtain informed consent for treatment of malignant conditions of the breast.		
		SU 25.5	SGD: 40		1
			Demonstrate the correct technique to palpate the breast for breast swelling in a mannequin or equivalent.		
19.	**Cardio-thoracic General Surgery-Chest- Heart and Lungs**				
		SU 26.1	SGD: 41		1
			Outline the role of surgery in the management of coronary heart disease, valvular heart diseases and congenital heart diseases.		
		SU 26.2	SGD: 42		1
			Outline the role of surgery in the management of diseases of Thorax and Diaphragm		
		SU 26.3	SGD: 43		1

			Describe the clinical features of mediasitnal diseases and the principles of management.		
		SU 26.4	SGD: 44		1
			Describe the etiology, pathogenesis, clinical features of tumors of the lung and the principles of management.		
20.	**Vascular Diseases**				
		SU 27.1	SGD: 45		1
			Describe the etiopathogenesis, clinical features, investigations and principles of treatment of occlusive arterial disease.		
		SU 27.2	SGD: 46		1
			Demonstrate the correct examination of the vascular system and enumerate and describe the investigation of vascular disease.		
		SU 27.3	SGD: 47		1
			Describe clinical features, investigations and principles of management of vasospastic disorders.		
		SU 27.4	SGD: 48		1
			Describe the types of gangrene and principles of amputation.		
		SU 27.5	SGD: 49		1
			Describe the applied anatomy of the venous system of lower limb.		
		SU 27.6	SGD: 50		1
			Describe pathophysiology , clinical features, investigations and principles of management of DVT and varicose veins.		
		SU 27.7	SGD: 51		1

			Describe pathophysiology, clinical features, Investigations and principles of management of lymph edema, lymphangitis and lymphomas.		
		SU 27.8	SGD: 52		1
			Demonstrate the correct examination of the lymphatic system.		
21.	**Abdomen**				
		SU 28.1 .	SGD: 53 .		1
		AN44.1.	Describe pathophysiology, clinical features, Investigations and principles of management of Hernias . Describe & demonstrate the Planes (transpyloric, transtubercular, subcostal, lateral vertical, linea alba, linea semilunaris), regions & Quadrants of abdomen .	Human Anatomy	
		SU 28.1 .	SGD: 54		1
		AN44.4 . AN44.5	Describe pathophysiology, clinical features, Investigations and principles of management of Hernias . Describe & demonstrate extent, boundaries, contents of Inguinal canal including Hesselbach's triangle.	Human Anatomy	
		SU 28.1	SGD: 55		1
			Describe pathophysiology, clinical features, Investigations and principles of management of Hernias		
		SU 28.1	SGD: 56		1
		AN44.4 . AN44.5	Describe pathophysiology, clinical features, Investigations and principles of management of Hernias .	Human Anatomy	

			Explain the anatomical basis of inguinal hernia.		
		SU 28.1	SGD: 57		1
		AN15.3	Describe pathophysiology, clinical features, Investigations and principles of management of Hernias . Describe and demonstrate boundaries, floor, roof and contents of femoral triangle	Human Anatomy	
		SU 28.1,AN44.6,	SGD: 58		1
			Describe pathophysiology, clinical features, Investigations and principles of management of Hernias. Describe & demonstrate attachments of muscles of anterior abdominal wall	Human Anatomy	
		SU 28.3	SGD: 59		1
			Describe causes, clinical features, complications and principles of mangament of peritonitis		
		SU 28.3	SGD: 60		1
			Describe causes, clinical features, complications and principles of managament of peritonitis		
		SU 28.3	SGD: 61		1
		AN47.5	Describe causes, clinical features, complications and principles of mangament of omental pathologies. Describe & demonstrate major viscera of abdomen under following headings (anatomical position, external and internal features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and applied aspects)	Human Anatomy	

		SU 28.4	SGD: 62		1
			Describe pathophysiology, clinical features, investigations and K principles of management of Intra-abdominal abscess, mesenteric cyst, and retroperitoneal tumors		
		SU 28.5	SGD: 63		1
		IM19.9	Describe the applied Anatomy and physiology of esophagus. Enumerate the indications for use of Surgery and botulinum toxin in the treatment of movement disorders	Human Anatomy, Physiology	
		SU 28.5,	SGD: 64		1
		IM15.4, IM15.6	Describe the applied Anatomy and physiology of esophagus. Elicit document and present an appropriate history that identifies the route of bleeding, quantity, grade, volume loss, duration, etiology, comorbid illnesses and risk factors. Distinguish between upper and lower gastrointestinal bleeding based on the clinical features	Human Anatomy, Physiology	
		SU 28.6,	SGD: 65		1
			Describe the clinical features, investigations and principles of management of benign and malignant disorders of esophagus.		
		SU 28.6	SGD: 66		1
			Describe the clinical features, investigations and principles of management of benign and malignant disorders of esophagus		
		SU 28.7	SGD: 67		1

			Describe the applied anatomy and physiology of stomach	Human Anatomy	
		SU 28.8,	SGD: 68		1
		IM15.15	Describe and discuss the aetiology, the clinical features, investigations and principles of management of congenital hypertrophic pyloric stenosis, Peptic ulcer disease, Carcinoma stomach. Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy of acid peptic disease including Helicobacter pylori		
		SU 28.9	SGD: 69		1
		IM15.2	Demonstrate the correct technique of examination of a patient with disorders of the stomach. Enumerate describe and discuss the evaluation and steps involved in stabilizing a patient who presents with acute volume loss and GI bleed		
		SU 28.10	SGD: 70		1
		IM5.16	Describe the applied anatomy of liver. Describe the clinical features, Investigations and principles of management of liver abscess, hydatid disease, injuries and tumors of the liver. Describe and discuss the management of hepatitis, cirrhosis, portal hypertension, ascites, spontaneous, bacterial peritonitis and hepatic encephalopathy	Human Anatomy	
		SU 28.10	SGD: 71		1

			Describe the applied anatomy of liver. Describe the clinical features, Investigations and principles of management of liver abscess, hydatid disease, injuries and tumors of the liver	Human Anatomy	
		SU 28.10	SGD: 72		1
			Describe the applied anatomy of liver. Describe the clinical features, Investigations and principles of management of liver abscess, hydatid disease, injuries and tumors of the liver	Human Anatomy	
		SU 28.11	SGD: 73		1
			Describe the applied anatomy of spleen. Describe the clinical features, investigations and principles of management of splenic injuries. Describe the post-splenectomy sepsis - prophylaxis	Human Anatomy	
		SU 28.11	SGD: 74		1
		PA24.5	Describe the applied anatomy of spleen. Describe the clinical features, investigations and principles of management of splenic injuries. Describe the post-splenectomy sepsis – prophylaxis Describe and etiology and pathogenesis and pathologic features of Tuberculosis of the intestine		
		SU 28.12	SGD: 75		1
			Describe the applied anatomy of biliary system. Describe the clinical features,		

			investigations and principles of management of diseases of biliary system		
		SU 28.12	SGD: 76		1
			Describe the applied anatomy of biliary system. Describe the clinical features, investigations and principles of management of diseases of biliary system		
		SU 28.12	SGD: 77		1
			Describe the applied anatomy of biliary system. Describe the clinical features, investigations and principles of management of diseases of biliary system		
		SU 28.12	SGD: 78		1
		AN47.2,PA24.6	Describe the applied anatomy of biliary system. Describe the clinical features, investigations and principles of management of diseases of biliary system. Discuss Paediatric surgery biliary disorders. Name & identify various peritoneal folds & pouches with its explanation. Describe and etiology and pathogenesis and pathologic and distinguishing features of inflammatory bowel disease	Human Anatomy	
		SU 28.12	SGD: 79		1
		AN47.1	Describe the applied anatomy of biliary system. Describe the clinical features, investigations and principles of management of diseases of biliary system. Discuss Choledochal cyst. Describe & identify boundaries and recesses of Lesser & Greater sac	Human Anatomy	

		SU 28.13, 28.14	SGD: 80		1
		PA24.7	Describe the applied anatomy of small and large intestine Describe the etiology and pathogenesis and pathologic and distinguishing features of carcinoma of the colon	Human Anatomy, Physiology	
		SU 28.13, 28.14	SGD: 81		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome		
		SU 28.13, 28.14	SGD: 82		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome		
		SU 28.13, 28.14	SGD: 83		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome		
		SU 28.13, 28.14	SGD: 84		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome		
		SU 28.13, 28.14	SGD: 85		1

			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome		
		SU 28.13, 28.14	SGD: 86		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome		
		SU 28.13, 28.14	SGD: 87		1
		AN55.2	Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome Demonstrate the surface projections of: stomach, liver, fundus of gall bladder, spleen, duodenum, pancreas, ileocaecal junction, kidneys & root of mesentery	Human Anatomy	
		SU 28.13, 28.14	SGD: 88		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including neonatal obstruction and Short gut syndrome		
		SU 28.13, 28.14	SGD: 89		1
			Describe the clinical features, investigations and principles of management of disorders of small and large intestine including		

			neonatal obstruction and Short gut syndrome		
		SU 28.15	SGD: 90		1
			Describe the clinical features, investigations of diseases of Appendix including appendicitis and its complications.		
		SU 28.15	SGD: 91		1
		AN55.1	Describe the principles of management diseases of Appendix including appendicitis and its complications. Demonstrate the surface marking of regions and planes of abdomen, superficial inguinal ring, deep inguinal ring , McBurney's point, Renal Angle & Murphy's point	Human Anatomy	
		SU 28.16	SGD: 92		1
			Describe applied anatomy including congenital anomalies of the rectum and anal canal	Human Anatomy	
		SU 28.16	SGD: 93		1
			Describe applied anatomy including congenital anomalies of the rectum and anal canal	Human Anatomy	
		SU 28.16	SGD: 94		1
			Describe applied anatomy including congenital anomalies of the rectum and anal canal		
		SU 28.17	SGD: 95		1
			Describe the clinical features, investigations and principles of management of common anorectal diseases		
		SU 28.17	SGD: 96		1

			Describe the clinical features, investigations and principles of management of common anorectal diseases		
		SU 28.17	SGD: 97		1
			Describe the clinical features, investigations and principles of management of common anorectal diseases		
22.	**Urinary System**				
		SU 29.1	SGD: 98		1
			Describe the causes, investigations and principles of management of Hematuria		
		SU 29.2	SGD: 99		1
			Describe the clinical features, investigations and principles of management of congenital anomalies of genitourinary system	Human Anatomy	
		SU 29.2	SGD: 100		1
			Describe the clinical features, investigations and principles of management of congenital anomalies of genitourinary system	Human Anatomy	
		SU 29.3	SGD: 101		1
			Describe the Clinical features, Investigations and principles of management of urinary tract infections	Microbiology	
		SU 29.3	SGD: 102		1
		PA28.10	Describe the Clinical features, Investigations and principles of management of urinary tract infections including renal TB and abscess. Describe the etiology, pathogenesis, pathology, laboratory findings, distinguishing features progression and complications of acute and chronic pyelonephritis and reflux nephropathy	Microbiology, Pathology	

		SU 29.4	SGD: 103		1
			Describe the clinical features, investigations and principles of management of hydronephrosis		
		SU 29.4	SGD: 104		1
			Describe the clinical features, investigations and principles of management of hydronephrosis		
		SU 29.5	SGD: 105		1
		PA28.13	Describe the clinical features,investigations and principles of management of renal calculi. Define, classify and describe the etiology, pathogenesis, pathology, laboratory urinary findings, distinguishing features, progression and complications of renal stone disease and obstructive uropathy	Pathology	
		SU 29.5	SGD: 106		1
			Describe the clinical features,investigations and principles of management of renal calculi		
		SU 29.6	SGD: 107		1
			Describe the clinical features, investigations and principles of management of renal tumours		
		SU 29.7	SGD: 108		1
			Describe the principles of management of acute and chronic retention of urine		
		SU 29.7	SGD: 109		1
		PA28.16	Describe the principles of management of acute and chronic retention of urine.	Pathology	

			Describe the etiology, genetics, pathogenesis, pathology, presenting features and progression of urothelial tumors		
		SU 29.8	SGD: 110		1
			Describe the clinical features, investigations and principles of management of bladder cancer		
		SU 29.8	SGD: 111		1
			Describe the clinical features, investigations and principles of management of bladder cancer		
		SU 29.9	SGD: 112		1
			Describe the clinical features, investigations and principles of management of disorders of prostate		
		SU 29.9	SGD: 113		1
			Describe the clinical features, investigations and principles of management of disorders of prostate		
		SU 29.10	SGD: 114		1
			Demonstrate a digital rectal examination of the prostate in a mannequin or equivalent		
		SU 29.10	SGD: 115		1
			Describe clinical features, investigations and management of urethral strictures		
		SU 29.10	SGD: 116		1
		OG26.2	Describe clinical features, investigations and management of urethral strictures and urethral injuries.	Obstetrics and gynaecology	

			Describe the causes, prevention, clinical features, principles of management of genital injuries and fistulae		
23.	**Penis, Testis and scrotum**				
		SU 30.1	SGD: 117		1
		AN46.1	Describe the clinical features, investigations and principles of management of phimosis, paraphimosis. Describe & demonstrate coverings, internal structure, side determination, blood supply, nerve supply, lymphatic drainage & descent of testis with its applied anatomy	Human Anatomy	
		SU 30.1	SGD: 118		1
		PA29.1 PE21.14	Describe the clinical features, investigations and principles of management of phimosis, paraphimosis. Classify testicular tumors and describe the pathogenesis, pathology, presenting and distinguishing features, diagnostic tests, progression and spread of testicular tumors. Recognize common surgical conditions of the abdomen and genitourinary system and enumerate the indications for referral including acute and subacute intestinal obstruction, appendicitis, pancreatitis, perforation, intussusception, Phimosis, undescended testis, Chordee, hypospadiasis,Torsion testis, hernia Hydrocele, Vulval Synechiae	Pathology	
		SU 30.1,	SGD: 119		1

		PA29.2	Describe the clinical features, investigations and principles of management of phimosis, paraphimosis. Describe the pathogenesis, pathology, presenting and distinguishing features, diagnostic tests, progression and spread of carcinoma of the penis	Pathology	
		SU 30.1	SGD: 120		1
		PA29.4	Describe the clinical features, investigations and principles of management of carcinoma penis. Describe the pathogenesis, pathology, hormonal dependency, presenting and distinguishing features, diagnostic tests, progression and spread of carcinoma of the prostate	Pathology	
		SU 30.2	SGD: 121		1
			Describe the applied anatomy clinical features, investigations and principles of management of undescended testis.	Human Anatomy	
		SU 30.3	SGD: 122		1
			Describe the applied anatomy clinical features, investigations and principles of management of epidydimo-orchitis	Human Anatomy	
		SU 30.4	SGD: 123		1
			Describe the applied anatomy clinical features, investigations and principles of management of varicocele	Human Anatomy	
		SU 30.5	SGD: 124		1
			Describe the applied anatomy clinical features, investigations and principles of management of hydrocoele	Human Anatomy	

		SU 30.4	SGD: 125		1
			Describe classification, clinical features, investigations and principles of management of tumours of testis		

Internal Assessment

Subject: General surgery and allied including Orthopedics

Applicable for batches admitted from 2019 and onwards

Phase	IA – 1 -Exam			IA – 2 -Exam		
	Theory General Surgery Only (January)	**Practical EOP**	Total Marks	**Theory General Surgery Only (May)**	**Practical of Allied EOP**	Total Marks
Second MBBS	50	50	100	50	Orthopedics = 25 Radiodiagnosis = 25	100

Phase	IA – 3 -Exam			IA – 4 -Exam		
	Theory General Surgery + allied) (January)	**Practical EOP**	Total Marks	**Theory General Surgery + allied) (April)**	**Practical of Allied EOP**	Total Marks
III MBBS Part I	50	50	100	50	Orthopaedics =25 Anaesthesia =25	100

Phase	IA – 5 - Exam			Prelim Exam (As per university pattern)		
	Theory Gen Surgery + Allied (May)	**Practical End of** 8 Weeks posting	Total Marks	**Theory (November)**	**Practical (November)**	Total Marks
III MBBS Part II	100	100	200	100 x 2 papers = 200	200	400

(There will be FORMATIVE ASSESSMENT at the End of four weeks Clinical Posting of General Surgery NOT to be added to INTERNAL ASSESSMENT)**.**

Assessment in CBME is **ONGOING PRCESS**,

No Preparatory leave is permitted.

1. There shall be 6 internal assessment examinations in General Surgery including allied.

2. The suggested pattern of question paper for internal assessment internal examinations, except prelim examination is attached at the end. Pattern of the prelims examinations should be similar to the University examinations.

3. Internal assessment marks for theory and practical will be converted to out of 50 (theory) +50 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University.

4. **Conversion Formula for calculation of marks in internal assessment examinations**

	Theory	**Practical**
Phase II	100	100
Phase III/I	100	100
Phase III/II	300	300
Total	**500**	**500**
Conversion out of	**50**	**50**
Conversion formula	**Total marks in 6 IA theory examinations /10**	**Total marks in 6 IA Practical examinations /10**
Eligibility criteria after conversion	**20**	**20**
	Combined theory + Practical = 50	

5. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
33.01 to 33.49	33
33.50 to 33.99	34

6. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.
7. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

8. Remedial measures

A. Remedial measures for non-eligible students

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically. Extra classes for such students may be conducted, if needed.
ii) If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students.
iii) Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.
iv) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. Extra classes for such students may be conducted for such students. The pattern for this repeat internal assessment examination shall be similar to the final University examination. Only the marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	Practical
Remedial examination (as per final examination)	**200**	**200**
Conversion out of	**50**	**50**
Conversion formula	**Marks in remedial theory examinations /4**	**Marks in remedial Practical examinations /4**
Eligibility criteria after conversion	**20**	**20**
	Combined theory + Practical = 50	

B. Remedial measures for absent students:

i. If any of the students is absent for any of the 6 IA examinations due to any reasons, following measures shall be taken.
ii. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.
iii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.
iv. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator of 500.

Internal Assessment Practical Examinations

II MBBS

Internal Assessment - 1

General Surgery

Clinical A (30)			OSCE & Viva B (20)		
Long Case	Demonstration of clinical signs	Communication skills	OSCE & Table viva (20)		Grand Total A +B= 50
			OSCE of Psychomotor Skills	Table viva [Surgical pathology, X rays, Instruments, Logbook, Journal]	
20	5	5	10	10	50

Internal Assessment - 2

Orthopaedics and Radiodiagnosis (to be conducted at the end of respective clinical postings)

Subject: General Surgery Allied Practical (IA – 2) Examination in Orthopaedics			
Case	OSCE 1	Viva (Surgical Pathology, Radiology, Instruments and Surgical Procedure, Journal / log book)	Practical Total
10	5	10	25

Subject: General Surgery Allied Practical (IA – 2) Examination in Radiodiagnosis			
X-Ray and other diagnostic modalities - Basics	Viva (Knowledge of legal aspects, radiation protection etc)	Journal / log book	Practical Total
15	5	5	25

* The marks for internal assessment – 2 shall be communicated by orthopedics / Radiology department to General Surgery department immediately after completion of examination and assessment.

III MBBS Part I

Internal Assessment - 3

General Surgery

Clinical A (30)			OSCE & Viva B (20)		
Long Case	Demonstration of clinical signs	Communication skills	OSCE & Table viva		Grand Total A +B= 50
			OSCE of Psychomotor Skills	Table viva [Surgical pathology, X rays, Instruments, Logbook, Journal]	
20	5	5	10	10	50

Internal Assessment - 4

Orthopaedics and Anaesthesia

Subject: General Surgery Allied Practical (IA – 2) Examination in Orthopaedics			
Case	OSCE 1	Viva (Surgical Pathology, Radiology, Instruments and Surgical Procedure, Journal / log book)	Practical Total
10	5	10	25

Subject: General Surgery Allied Practical (IA – 2) Examination in Anesthesia			
OSCE	Drugs, Instruments	Viva	Practical Total
10	8	7	25

* The marks for internal assessment – 4 shall be communicated by orthopedics / Anaesthesia department to General Surgery department immediately after completion of examination and assessment.

III MBBS Part II

Internal Assessment - 5

General Surgery

Clinical A (60)			OSCE & Viva B (40)		
Long Case	Demonstration of clinical signs	Communication skills	OSCE & Table viva (40)		Grand Total A +B= 100
			OSCE of Psychomotor Skills	Table viva [Surgical pathology, X rays, Instruments, Logbook, Journal]	
40	10	10	20	20	100

MUHS final practical examination

General Surgery

Seat No.	**Long Case General Surgery including communication skill (60)**		**Short Case 1 General Surgery (30)**		**Short Case 2 Ortho (30)**		**General Surgery (60) OSCE # & Table viva**			**Ortho (20)**	**Grand Total**
	Long case	Communication skills *	Short case	Clinical signs demo	Short case	Clinical signs demo	Instruments +Procedure+ Log book	X rays + Surgical Pathology +Journal	OSCE	OSCE (10) + Table (10)	
	50	10	20	10	20	10	20	20	20	20	200

OSCE Stations may include General examinations, Local examinations, psychomotor skills, Communication skills, AETCOM etc.

*Communication skills to be assessed by Kalamazoo Consensus, clinical signs to be assessed by either GLOBAL Rating Scale or OSCE, Psychomotor Skills to be assessed by OSCE with checklist. If the skills are small, 2 or 3 skills may be combined.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

Format / Skeleton of question paper for 1st & 2nd internal

Assessment Theory Examinations.

Instructions:

SECTION "A" MCQ

1) *Put ☒ in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **one mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (10Marks)

1. Multiple Choice Questions (Total -10 MCQ of One mark each from General surgery) (1x10=10)

a) b) c) d) e) f) g) h) i) j)

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*

2. Long Answer Question (Any 2 out of 3) (General surgery) (2 x 10 = 20)

a) b) c)

3. Short answer questions (Any 4 out of 5) (At least2 Clinical reasoning question) (General surgery) (4 x 5 = 20)

a) b) c) d) e)

Format / Skeleton of question paper for 3rd and 4th internal

Assessment Theory Examinations (III MBBS Part I)

SECTION "A" MCQ

Instructions:

5) *Put ☒ in the appropriate box below the question number once only.*
6) *Use blue ball point pen only.*
7) *Each question carries **One mark.***
8) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (10Marks)

1. Multiple Choice Questions (Total -10 MCQ of One mark each from General surgery) (1x10=10)

a) b) c) d) e) f) g) h) i) j)

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*

2. Long Answer Question (Any 2 out of 3) (General surgery) (2 x 10 = 20)

b) b) c)

3. Short answer questions (1 from AETCOM) (General surgery) (2 x 5 = 10)

a) b)

4. Short answer questions (Any 2 out of 3) (At least 2 Clinical reasoning question) (Orthopaedics) (2 x 5 = 10)

a) b) c)

Separate answer sheet for question 4 (SAQ from orthopaedics) may be used for the ease of evaluation.

Format / Skeleton of question paper 5th internal assessment

Theory Examinations (III MBBS Part II)

SECTION "A" MCQ

Instructions:

9) Put ☒ in the appropriate box below the question number once only.
10) Use blue ball point pen only.
*11) Each question carries **One mark.***
12) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.

SECTION "A" MCQ (20Marks)

1. Multiple Choice Questions (Total-20MCQ of One mark each - 15 General surgery , 2 orthopaedics, 1 anesthesia, 1 dentistry and 1 radiology) (1 x20=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B" & "C"

Instructions:

*1) Use **blue/black** ball point pen only.*
*2) **Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
*3) **All** questions are **compulsory**.*
*4) The number to the **right** indicates **full** marks.*
*5) Draw diagrams **wherever** necessary.*

SECTION "B"

2 . Long Answer Questions (Structured Case Based) (General Surgery) (2x15=30)

a) b)

3.Short Answer Questions (Any 3 out of 4) (Any one should be Clinical reasoning), 1 from AETCOM (General Surgery) (3x5=15)

a) b) c) d)

SECTION "C"

4. Short Answer Questions (1 Orthopedics, 1 Anesthesia, 1 Dentistry or Radiodiagnosis) (4 x5=20)

a) b) c) d)

5. Long Answer Question (Structured Case Based) (Orthopedics) (1 x15=15)

a)

Separate answer sheet for question 5 (LAQ from orthopaedics) may be used for the ease of evaluation.

Format / Skeleton of question paper for University Theory Examinations (III MBBS Part II) Paper – I

(Subject names to be removed)

SECTION "A" MCQ

Instructions:

13) Put ☒ in the appropriate box below the question number once only.
14) Use blue ball point pen only.
*15) Each question carries **One mark.***
16) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.

SECTION "A" MCQ (20Marks)

1. Multiple Choice Questions (Total-20MCQ of One mark each) – (General surgery) (1 x20=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B" & "C"

Instructions:

*1) Use **blue/black** ball point pen only.*
*2) **Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
*3) **All** questions are **compulsory**.*
*4) The number to the **right** indicates **full** marks.*
*5) Draw diagrams **wherever** necessary.*

SECTION "B"

2 . Long Answer Questions (Structured Case Based) (General Surgery) (2x15=30)

a) b)

3.Short Answer Questions (Any one should be Clinical reasoning, 1 from AETCOM) (General Surgery) (3x5=15)

a) b) c)

SECTION "C"

4. Long Answer Question (Structured Case Based) (General Surgery) (1 x15=15)

a)

3.Short Answer Questions (General Surgery) (Any 4 out of 5) (4 x5=20)

a) b) c) d) e)

Format / Skeleton of question paper for University Theory Examinations (III MBBS Part II) Paper II

(Subject names to be removed)

SECTION "A" MCQ

Instructions:

17) Put ☒ in the appropriate box below the question number once only.
18) Use blue ball point pen only.
*19) Each question carries **One mark.***
20) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.

SECTION "A" MCQ (20Marks)

1. Multiple Choice Questions (Total-20MCQ of One mark each - 15 General surgery , 2 orthopedics, 1 anesthesia, 1 dentistry and 1 radiology) (1 x20=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B" & "C"

Instructions:

*1) Use **blue/black** ball point pen only.*
*2) **Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
*3) **All** questions are **compulsory**.*
*4) The number to the **right** indicates **full** marks.*
*5) Draw diagrams **wherever** necessary.*

SECTION "B"

2 . Long Answer Questions (Structured Case Based) (General Surgery) (2x15=30)

a) b)

3.Short Answer Questions (any 5 out of 6) (1 Gen. Surgery, 2 Radiodiagnosis, 2 Anesthesia, 1 Dentistry) (5x5=25)

a) b) c) d) e) f)

SECTION "C"

4. Long Answer Question (Structured Case Based) (Orthopedics) (1 x15=15)

a)

3.Short Answer Questions (Any 2 out of 3) (Orthopedics) (2 x5=10)

a) b) c)

Paper wise distribution of topics for Prelim & MUHS Annual Examination

Year: **III-II MBBS** Subject: **_General Surgery and allied**

Paper	Section	Topics
I	A	MCQs on all topics of paper I of Surgery
	B	Metabolic response to injury, Shock, Blood and blood components, Burns, Wound healing and wound care, Surgical infections, Surgical Audit and Research, Nutrition and fluid therapy, Transplantation, Biohazard disposal, Trauma, Skin and subcutaneous tissue, Developmental anomalies of face, mouth and jaws, Oropharyngeal cancer, Disorders of salivary glands, Endocrine General Surgery: Thyroid and parathyroid, Adrenal glands, Breast, Vascular diseases, Ethics & AETCOM (module 4.3,4.5,4.6)
	C	Abdomen- including Hernia, Peritoneum, GIT tract including esophagus, stomach, small intestine, colon rectum and anal canal, Liver , Spleen, Pancreas, Biliary tract , Minimally invasive Surgery, Pediatric surgery
II	A	MCQs on all topics of the paper II including orthopaedics, anaesthesia, radiology , radiotherapy and dentistry .
	B	Cardio-thoracic - Chest - Heart and Lungs ,Urinary System- Kidney ureter and urinary bladder , Penis, Testis and scrotum, Plastic surgery, Oncology, Investigation of surgical patient, Pre, intra and post- operative management Radiology, Radiotherapy, Anesthesia and pain management , Dentistry
	C	Orthopedics ,

Name of the Institute

Department of General Surgery

Journal

Name of the Student: _____

Roll Number: _____

Batch: _____

Address: _____

_____

Mobile number: _____

Email id: _____

YOUR OPPORTUNITY

Here, for instance is a poor fellow who has just been through to the hospital, in an ambulance. A string of questions about himself and his family has been fired at him, his valuables and even his clothes, have been taken away from him and he is wheeled into the ward on stretcher miserable, scared, defenseless and in his nakedness, unable to run away. He is lifted into a bed, because conscious of the fact, that he is the center of interest in the ward, wishes that he had stayed at home among friends, and just as he is beginning to take stock, he finds a thermometer being stuck under his tongue. It is all strange and new and he wonders what is going to happen next. This thing that does happen is that a man in a long white coat sits down by his bedside and start to examine him. Do you seewhat an opportunity you have? This foundation of your whole relation with that patient is laid in those first few minutes of contact just as it happens in private practice. Here is a worried lonely, suffering man and if youbegin by approaching him with sympathy, tact, and consideration, you get his confidence and he becomes your patient intimate and visiting physicians may come and go and the hierarchy gives them a precedence; but if you make the most of your opportunities, he will regard you as his personal physician and all theres this more consultants.

Sayings of the great:

To study the phenomenon of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all.

-Sir William Osler

The good physician treats the disease, the great physician treats the patient who has the disease.

-Sir William Osler

Observe, record, tabulate, communicate. Use your five senses. Learn to see, learn to hear, learn to feel, learn to smell and know that by practice alone you can become expert.

-Sir William Osler

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Clinical Posting Completion Certificate

This is to certify that the candidateMr./Ms. _____
Registration no. _____ admitted in the year _____ in the _____
_____ Medical College has satisfactorily completed / hasnotcompleted all assignments /requirements/posting mentioned in
this journal and journal for final MBBS (II/III-I/III-II) in General Surgery during the period from .....to……She / He is / is not eligible to appear for thesummative(University) assessment as on the date given below.

Signature of Head of Department

Date

GENERAL INSTRUCTIONS

1) The journal is a record of the academic / co-curricular activities of the designatedstudent,whowouldberesponsibleformaintaininghis/herjournal.

2) The student is responsible for getting the entries in the journal verified by the Faculty in chargeregularly.

3) Entries in the journal will reflect the activities undertaken in the department& have to be scrutinized by the Head of the concerneddepartment.

4) The journal is a record of various activities by the studentlike:
- Overall participation &performance
- Attendance
- Participation insessions
- Record of completion of pre-determinedactivities.
- Acquisition of selectedcompetencies

5) The journal is the record of work done by the candidate in that department / specialty and should be verified by the college before submitting the application of the students for the Universityexamination.

6)*Proposednumberofcaserecordsshouldbementionedinthejournal-:

Phase 2- 1st clinical posting (4 weeks) = 4 General surgery cases + 2 Follow-up cases + OT record sheet minimum 6 cases (2 major and 4 minor) + Asepsis, Basic bandaging skill performed independently and to get it certified

Phase3- 2ndclinicalposting (4 weeks) = 4Generalsurgerycases+ 2follow-up cases + OT record sheet minimum 6 cases (2 major and 4 minor) + Basic wound care skill performed independently and to get it certified

Casualty posting- To write reflection on 2 cases seen in casualty.

Phase 4- 3rd Clinical Posting (8 weeks) = 10 General Surgery cases + 4 follow-up cases + OT record sheet minimum 8 cases (4 major and 4 minor) + Basic suturing, Incision & drainage of superficial abscess skill to be performed independently and to get it certified.

4th Clinical Posting (4 weeks) = 4 General Surgery cases + 2 follow-up cases + OT record sheet minimum 6 cases (2 major and 4 minor) + Early management of trauma skill to be performed independently and to get it certified + Demonstrates trauma life support

POSTING CERTIFICATE

Name: - Year of Admission: -

Year of appearing for Final M.B.B.S _____

TERM	From	To	Absent days	Case Histories Written	Remark	Signature of Unit Head
Gen Surgery I (4 weeks)						
Gen Surgery II (4 weeks)						
Gen Surgery III (8 weeks)						
Gen Surgery IV (4 weeks)						
Casualty (1week)						

N.B: - 1. Students must get the signature of the Unit In charge when posting is completed.

2. This certificate must be submitted before every Internal assessment & Preliminary. examination.

3. Completed record is mandatory for appearing for the Final Examination.

Template for Clinical Cases and Operative Notes

Name of Patient Age/Sex Ward no.

MRD No Head of the Unit

Occupation

Religion

Address

Date of admission Date of Discharge

Chief complaints

HOPI/ODP

Past H/O

Personal H/O

Family H/O

Menstrual History in females

Obstetrical History in females**General examination**

Built & Nourishment
Level of consciousness
Temperature.
Pulse rate
Respiratory rate
Blood Pressure
Pallor/ cyanosis/clubbing/oedema/Lymphadenopathy/ Icterus

Local examination:

Inspection

Palpation

Percussion

Auscultation

Systemic Examination:

CVS

RS

CNS

PA

Provisional Diagnosis

Differential Diagnosis

Investigations

Hematological

Biochemical

Radiological

Xray -
USG -
CT -
MRI -

Final Diagnosis

Treatment-

Plan

Pre-operative Workup

Template forOperative Notes

Date: -Time: - Surgeon: -

Indication And operation: The working Diagnosis on which the procedure was based and the name of the operation.

Type of Anesthesia: -

Position of patient: - Describe the position and precautions taken to avoid complications.

Incision: - Name the incision, shape and length including any extensile exposure. A drawing may be useful.

Findings: Describe what was found. List structures identified and protected.

Procedure: Report what was exactly done. Describe prosthetics or special instruments used.

Closure: Washout, Hemostasis and drains, Method used for closure and Dressing

Post-operative care: Clear instructions with frequency on (a) general observations, (b) Checks on function, (c) Wound care, (d) removal of drains, (e) Start of mobilization, (f) removal of stitches, (g) discharge, (h) follow up.

Complications: List of potential complications and actions to be taken under a 'What If' list

Specimen sent for Histopathology Examination: Yes/No

Histopathology report:

Daily progress note:

Post-Op Progress Report -

(To be filled everyday in serious cases and every third day in other. Mention observations pertaining to a case, any special investigations done and daily treatment administered)

Day (Post-op)	Gen. condition (Appearance, Pulse, BP, Temp Chest)	Fluid intake	Fluid Output			Complications- If any and their treatment and investigation
			Urine	Suction	Others	

Condition of Patient on discharge: -

Advices on discharge: -

Reflection by students in max. 200 words: -
(Write your overall impression of case at the time of discharge or when you leave the case)

Feedback by Faculty –

Signature by Student and Faculty: -

Operative Notes

Date: - Time: - Surgeon: -

Indication And operation:

Type of Anesthesia: -

Position of patient: -

Incision: -

Findings:

Procedure:

Closure:

Post-operative care

Complications:

Specimen sent for Histopathology Examination: Yes/No

Histopathology report:

Progress Report -

(To be filled everyday in serious cases and every third day in other. Mention observations pertaining to a case, any special investigations done and daily treatment administered)

Day (Post-op)	Gen. condition (Appearance, Pulse, BP, Temp Chest)	Fluid intake	Fluid Output			Complications- If any and their treatment and investigation
			Urine	Suction	Others	

Condition of Patient on discharge: -

Advices on discharge: -

PHASE-II INDEX OF THE CASE HISTORIES OF GENERAL SURGERY CASES AND FOLLOW UP CASES

(minimum 4 General surgery cases + 2 Follow-up cases)

Sr. No	Name of The Patient	Date	Diagnosis	Ward no.	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Case 1:

Case 2:

Case 3:

Case 4:

Case 5:

Case 6:

Case 7:

Case 8:

INDEX OF THE OPERATIVE PROCEDURES PHASE II

[OT record sheet minimum 6 cases (2 major and 4 minor) +Asepsis, Basic bandaging skill performed independently.]

Sr. no.	Name of the patient	Date	Diagnosis	Operative Procedures	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Case 1:

Case 2:

Case 3:

Case 4:

Case 5:

Case 6:

Case 7:

Case 8:

PHASE-III/I INDEX OF THE CASE HISTORIES OF GENERAL SURGERY CASES AND FOLLOW UP CASES

(minimum 4Generalsurgerycases+ 2follow-up cases)

Sr. No	Name of The Patient	Date	Diagnosis	Ward no.	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Case 1:

Case 2:

Case 3:

Case 4:

Case 5:

Case 6:

Case 7:

Case 8:

INDEX OF THE OPERATIVE PROCEDURES PHASE III/I

[OT record sheet minimum 6 cases (2 major and 4 minor) + Basic wound care skill performed independently]

Sr. no.	Name of the patient	Date	Diagnosis	Operative Procedures	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Case 1:

Case 2:

Case 3:

Case 4:

Case 5:

Case 6:

Case 7:

Case 8:

PHASE-III/II INDEX OF THE CASE HISTORIES OF GENERAL SURGERY CASES AND FOLLOW UP CASES

[3rd Clinical Posting minimum 10 General Surgery cases + 4 follow-up cases & 4th Clinical Posting minimum 4 General Surgery cases + 2 follow-up cases]

Sr. No	Name of The Patient	Date	Diagnosis	Ward no.	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						

15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						

Case 1:

Case 2:

Case 3:

Case 4:

Case 5:

Case 6:

Case 7:

Case 8:

Case 9:

Case 10:

Case 11:

Case 12:

Case 13:

Case 14:

Case 15:

Case 16:

Case 17:

Case 18:

Case 19:

Case 20:

Case 21:

Case 22:

Case 23:

Case 24:

INDEX OF THE OPERATIVE PROCEDURES PHASE III/II

[OT record sheet minimum 14 cases (6 major and 8 minor) + Basic suturing, Incision & drainage of superficial abscess, early management of trauma skills & demonstrates trauma life support]

Sr. no.	Name of the patient	Date	Diagnosis	Operative Procedures	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						

13.						
14.						
15.						
16.						

Case 1:

Case 2:

Case 3:

Case 4:

Case 5:

Case 6:

Case 7:

Case 8:

Case 9:

Case 10:

Case 11:

Case 12:

Case 13:

Case 14:

Case 15:

Case 16:

ANNEXURE 1

Paper wise distribution of topics for Prelim & MUHS Annual Examination
Year: **III-II MBBS** Subject: **_General Surgery and allied**

Paper	Section	Topics
I	A	MCQs on all topics of paper I of Surgery
	B	Metabolic response to injury, Shock, Blood and blood components, Burns, Wound healing and wound care, Surgical infections, Surgical Audit and Research, Nutrition and fluid therapy, Transplantation, Biohazard disposal, Trauma,Skin and subcutaneous tissue, Developmental anomalies of face, mouth and jaws, Oropharyngeal cancer,Disorders of salivary glands, Endocrine General Surgery: Thyroid and parathyroid, Adrenal glands, Breast, Vascular diseases, Ethics &AETCOM(module 4.3,4.5,4.6)
	C	Abdomen- including Hernia, Peritoneum, GIT tract including esophagus, stomach, small intestine, colon rectum and anal canal, Liver , Spleen, Pancreas, Biliary tract ,Minimally invasive Surgery, Pediatric surgery
II	A	MCQs on all topics of the paper II including orthopaedics, anaesthesia, radiology and dentistry .
	B	Cardio-thoracic - Chest - Heart and Lungs,Urinary System- Kidney ureter and urinary bladder , Penis, Testis and scrotum, Plastic surgery, Oncology,Investigation of surgical patient, Pre, intra and post- operative pain management management and Anesthesia, Radiology,
	C	Orthopedics ,

Annexure 2

Recommended books

Year: II/ III-I/ III-II MBBS
Subject: General Surgery

Sr.no.	Author	Title of book/ Material	Publisher
		TEXTBOOK	
1.	Norman S Williams P. Ronan O'Connell Andrew McCasksie	Bailey & Love's Short practice of Surgery 27th Edition 2018	CRC Press
2	Sriram Bhat	SRB's Manual of Surgery 6th Edition 2017	Jaypee Publishers
3	K Rajgopal Shenoy Anitha Shenoy	Manipal Manual of Surgery 5th Edition 2020	CBS Publishers
4	S Das	A Concise Textbook of Surgery 6th Edition 2018	DAS Publications
		CLINICAL SURGERY	
1.	S Das	A Manual on Clinical Surgery 9th Edition 2019	DAS Publications
2.	Sriram Bhat	SRB's Bedside Clinics in Surgery 1st Edition 2009	Jaypee Publishers
3.	Makhan Lal Saha	Bedside Clinics in Surgery 2nd Edition 2013	Jaypee Publishers
4.	J Kyle, JAK Smith, D Johnson	Pye's Surgical Handicraft 22nd Edition 1999	K. M. Vargheese Company (Indian edition)
5.	Margaret Farquharson, James Hollingshead, Brendan Moran	Farquharson's Textbook of Operative General Surgery 10th Edition 2015	CRC Press
6.	John S P Lumley, Anil K D'Cruz, Carol E Scott-Conner	Hamilton Bailey's Demonstration of Physical signs in Clinical Surgery 19th Edition 2014	CRC Press

		REFERENCES	
1.	Courteny Townsend, Daniel Beauchamp, B Mark Evers, Kenneth L Mattox	Sabiston Textbook of Surgery 1st South Asia Edition 2017	Elseiver
2.	F Charles Brunicardi, Mary L Brandt, Dana Anderson, Timothy Billar, David Dunn, John Hunter, Jeffery Matthews, Raphael Polllock	Schwartz's Principles of Surgery 10th Edition 2019	McGraw Hill
		APPLIED ANATOMY	
1.	Lee McGregor GAG Decker, DJ du Plessis	Lee McGregor's Synopsis of Surgical Anatomy 12th Edition 2018	K M Varghese Company
2.	John E Skandalkis, Gene Colborn, Thomas Weidman	Skandalkis Surgical Anatomy 2004	Broken hill Publishers
3.	Chummi S. Sinnatamby	Last's Anatomy Regional and Applied 12th Edition 2011	Churchill Livingstone
		PATHOLOGY	
1.	Kumar, Abbas, Aster	Robbin's Pathologic Basis of Disease 10th Edition, 2020	Elsiever
2.	Harsh Mohan	Textbook Of Pathology 8th Edition, 2018	Jaypee Publishers

		PHYSIOLOGY	
1.	Joh E Hall	Guyton and Hall Textbook of Medical Physiology 14th Edition 2020	Elsevier
2.	Kim E Barrett, Susan M. Barman, Heddwen L. Brooks, Jason Yuan	Ganong's Review of Medical Physiology 24thEdition 2019	Lange

****For Syllabus refer to MUHS Website**

Name of the Institute

LOG BOOK

DEPARTMENT OF GENERAL SURGERY

Sayings of the great:

To study the phenomenon of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all.

-Sir William Osler

The good physician treats the disease, the great physician treats the patient who has the disease.

-Sir William Osler

Observe, record, tabulate, communicate. Use your five senses. Learn to see, learn to hear, learn to feel, learn to smell and know that by practice alone you can become expert.

-Sir William Osler

CONTENTS

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LOGBOOK CERTIFICATE

This is to certify that this logbook is the bonafide record of Mr. / Ms. ..... Roll No……..Admission Year ……., of the Department of General Surgery at …….Medical College.

The logbook is as per the guidelines of Competency Based Undergraduate Medical Education Curriculum, Graduate Medical Regulation 2019.

He / She has satisfactorily attended/ completed all assignments mentioned in this logbook as per the guidelines prescribed by National Medical Commission.

_____

Head of Department of General Surgery

Signature with Date

BIODATA OF THE CANDIDATE

PHOTO

Name of the student:

Name of the course: MBBS

Date of birth:

Father's / Guardian's name:

Mother's name:

Blood group:

Permanent Address: Temporary Address:

…… ……

…… ……..

Student's contact no:

Father's/ Guardian's contact no:

Student's Email id:

Father's/ Guardian's Email id:

Candidates Signature: …….. Date: .....

GENERAL INSTRUCTIONS

1) The logbook is a record of the academic / non-academic activities of the student. Each Medical student is responsible for maintaining their logbook.

2) This logbook is prepared as per the guidelines of NMC for implementation of Competency Based Curriculum for 4TH Professional MBBS students in the subject of General Surgery.

3) Students are instructed to keep their logbook entries up to date. It is the responsibility of the student to enter their activity in respective pages & get them duly signed by the supervising faculty.

4) Entries in the logbook will be in accordance with activities done in the department & have to be scrutinized by the Head of the department.

5) The logbook assessment will be based on multiple factors like
   - Overall presentation
   - Active participation in the sessions
   - Quality of write up of reflections.
   - Timely completions
   - Attendance

6) The logbook shall be kept as record work of the candidate for the department & be submitted to department as a bonafide record of the candidate before appearing for the University examination.

NOTE:

1. A **clear record** of all components that add to the internal assessment marks needs to be maintained by the institution and retained by them for at least **2 years** after passing of the examination. Institutions may be asked to provide these details by the University as and when required.

The contents in the logbook are suggested guidelines. The institutions can make **necessary changes as per the needs.**

ATTENDANCE

Every candidate should have attendance not less than 75% of the total classes conducted in theory, practical and clinical jointly in each calendar year calculated from the date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed to be eligible to appear for the university examinations.

For appearing at the University Examination, student should have minimum 75% attendance in each subject.

A candidate lacking in the prescribed attendance in any subject(s) should not be permitted to appear for the examination in that subject(s)

Students cannot appear in part or separately in individual subjects during the first appearance at the Professional examination.

The Principal should notify the attendance details at the end of each professional phase without fail under intimation to this University.

Records of Internal Assessment Examinations

Sr. No.	Exam No.	Date	Theory	Date	Practical including Viva	Feedback provided	Signature of student	Signature of teacher
1	*Phase II		/100		/100			
2	*Phase III/I		/100		/100			
3	Phase III/II		/300		/300			
4	Total		/500		/500			
5	Conversion		/100		/100			
6	Final Internal Assessment Marks (to be submitted to University)		/100		/100			

[Orthopedics 25 marks, Anesthesia 10marks, Radiodiagnosis & Radiotherapy 10 marks, Dentistry 5 marks to be submitted to department of general surgery during respective phase of teaching.]

.....

Signature of Head of the Department

Self-Directed Learning, Seminars, Tutorials, Projects, Quizzes, extracurricular activities

Sr. No.	Self- directed learning (Seminars, Tutorials, Projects, Quizzes, Extracurricular activities)	Date	Phase III/I	Phase III/II	Signature of Teacher

Reflection (minimum 200 words) – 1 **Date :**

TOPIC:

Reflection (minimum 200 words) – 2

Date :

TOPIC:

LOGBOOK CLINICAL SKILLS : LIST OF COMPETENCIES

Clinical skills can be assessed by case presentation, case-based discussion, objective structured clinical assessment the checklist, MiniCex, as per the institutional preference.

Competency # addressed	**Name of Activity**
SU3.2	Observe blood transfusions.
SU5.2	Elicit, document and present a history in a patient presenting with wounds.
SU18.3	Describe and demonstrate the clinical examination of surgical patient including swelling and order relevant investigation for diagnosis. Describe and discuss appropriate treatment plan
SU22.3	Demonstrate and document the correct clinical examination of thyroid swellings and discus the differential diagnosis and their management
SU *24.3	Describe the principles of investigation and management of pancreatic disorders including pancreatitis and endocrine tumors
SU 25.5	Demonstrate the correct technique to palpate the breast for breast swelling in a mannequin or equivalent
SU 27.2	Demonstrate the correct examination of the vascular system and enumerate and describe the investigation of vascular disease
SU 27.6 *	Describe pathophysiology, clinical features, investigations and management of DVT and varicose veins.

SU27.8	Demonstrate the correct examination of the lymphatic system
SU28.2	Demonstrate the correct technique to examine the patient with hernia and identify different types of hernias.
SU 28.8 & SU28.9	Demonstrate the correct technique of examination of a patwith disorders of the stomach
SU28.18	Describe and demonstrate clinical examination of abdomen. Order relevant investigations. Describe and discuss appropriate treatment plan
SU 29.9*	Describe the clinical features, investigations and management of disorders of prostate
SU 30.1*	Describe the clinical features, investigations and principles of management of phimosis, paraphimosis and carcinoma penis.
SU 30.2*	Describe the applied anatomy, clinical features, investigations and principles of management of undescended testis
SU 30.3*	Describe the applied anatomy, clinical features, investigations and principles of management of epididymo- orchitis
SU 30.4*	Describe the applied anatomy, clinical features, investigations and principles of management of varicocele
SU 30.5*	Describe the applied anatomy, clinical features, investigations and principles of management of hydrocele
SU 30.6*	Describe the applied anatomy, clinical features, investigations and principles of management of tumours of testis

LOGBOOK PSYCHOMOTOR / PERFORMANCE SKILLS:

Skills can be assessed by objective structured clinical assessment with checklist, Global Rating Scale, Simulated patients as per the institutional preference.

Colleges are instructed prepare modules for skill training as per NMC guidelines.

Module 5 Skill Training.

I – independent certification

D- demonstration

LIST OF COMPETENCIES

Competency # addressed	Name of Activity
SU10.4**(I)**	Perform basic surgical skill such as First Aid including suturing and minor surgical procedures in simulated environment
(I)	Bandaging (Head bandaging, Ear bandaging, Eye Bandaging, Figure of 8 Bandaging around joints of upper limb and lower limb, Scrotal support, Crepe bandage application over upper limb and lower limb
(I)	Incision and Drainage
(I)	Wound Care (Clean surgical wound care, Wounds after trauma, Diabetic wound care)
SU11.3**(I)**	Demonstrate maintenance of an airway in a mannequin or equivalent
SU14.4**(I)**	Demonstrate the techniques of asepsis and suturing in simulated environment
SU17.2**(D)**	Demonstrate the steps in Basic Life support, Transport of injured patient in a simulated environment
SU17.10**(D)**	Demonstrate Airway maintenance. Recognize and manage tension pneumothorax, hemothorax and flail chest in simulated environment
S29.11	Demonstrate a digital rectal examination of the prostate in a mannequin or equivalent

LOGBOOK FOR AETCOM SKILLS

Counselling for Investigation, Treatment, Prognosis, Blood donation, Organ Donation, Breaking Bad news. All types of consent. Medicolegal aspects and Ethics, Empathy and professionalism as per the Phase of the MBBS. Include cases of Allied branches also.

Competency to be assessed during Clinical postings and /or small group discussions.

LIST OF COMPETENCIES FOR AETCOM

Competency addressed	Name of Activity
SU2.3	Communicate and counsel patients and families about the treatment and prognosis of shock demonstrating empathy and care.
SU3.3	Counsel patients and family/ friends for blood transfusion and blood donation.
SU4.4	Communicate and counsel patients and families on the outcome and rehabilitation demonstrating empathy and care.
SU9.2	Biological basis for early detection of cancer and multidisciplinary approach in management of cancer
SU9.3	Communicate the results of surgical investigations and counsel the patient appropriately
SU13.4	Counsel patients and relatives on organ donation in a simulated environment
SU25.2	Describe the etiopathogenesis, clinical features and principles of management of benign breast disease including infections of the breast

PHASE II-clinical (minimum four assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE II-Psychomotor

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
6.										
7.										
8.										
9.										
10.										
11.										
12.										

PHASE II- AetCom (Minimum four assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part I -clinical (Minimum four assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part I-Psychomotor skill

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
6.										
7.										
8.										
9.										
10.										
11.										
12.										

PHASE III Part I - AetCom (Minimum four assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part II -clinical (minimum four assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part II -Psychomotor skill

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
6.										
7.										
8.										
9.										
10.										
11.										
12.										

PHASE III Part II - AetCom (Minimum five assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										
7.										

REFLECTION ON AETCOM MODULE For PHASE III/IIs

Module 4.3 - Case studies in medico-legal and ethical situations

Competency addressed	Level
Identify and discuss medico-legal, socio-economic and ethical issues as it pertains to organ donation	KH

Reflection (minimum 200 words) -1 Date:

Signature of Teacher-in-charge

REFLECTION ON AETCOM MODULE

Module 4.6 - Case studies in ethics and the doctor-industry relationship

Competency addressed	Level
Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts	SH

Reflection (minimum 200 words)-2 Date:

Signature of Teacher-in-charge

ANNEXURE 1:

RECORDING FORM FOR MINI – CEX

EVALUATOR : DATE :

STUDENT :

YEAR :

PATIENT DIAGNOSIS :

SETTINGS :

AMBULATORY	NEW	COMPLEXITY :	LOW
IN PATIENT	FOLLOW UP		MODERATE
ED			HIGH
OTHER :			

PATIENT AGE PATIENT SEX

FOCUS : DATA GATHERING / DIAGNOSIS / THERAPY / COUNSELLING

1. **MEDICAL INTERVIEWING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

2. **PHYSICAL INTERVIEWING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

3. **HUMANISTIC QUALITIES** / PROFFESIONALISM (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

4. **CLINICAL JUDGEMENT** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

5. **COUNSELLING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

6. **ORGANIZATION / EFFICIENCY** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

7. **OVERALL CLINICAL COMPETENCE** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

MINI CEX TIME : OBSERVING : _____ MINS

PROVIDING FEEDBACK _____ MINS

UNSATISFACTORY 1,2,3

SATISFACTORY 4, 5, 6

SUPERIOR 7, 8, 9

EVALUATOR SATISFACTION WITH MINI CEX

LOW 1 2 3 4 4 5 6 7 8 9 HIGH

RESIDENT SATISFACTION WITH MINI CEX

LOW 1 2 3 4 4 5 6 7 8 9 HIGH

COMMENTS :

STUDENT SIGNATURE EVALUATOR SIGNATURE

ANNEXURE 2:

AetCom skills can be assessed by use of Kalamazoo consensus.

Criteria
Builds relationship
Opens the discussion
Gathers information
Understands the patient's perspective
Shares information
Manages flow
Overall rating
Signature of teacher

Communication skills rating scale adapted from Kalamazoo consensus statement.

Rating 1-3 - Poor, 4 -6 Satisfactory, 6 -10 Superior

Course Content

Subject: Obstetrics and Gynecology
Lectures

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 3; page nos. 102-129)

Integration: Upto 20% of the topics are to be taken in integration with other subjects as per directives.

Second MBBS phase II (from October 2020)
Total Teaching hours :
A. Lectures: 25 hours

Serial number	Competency Nos.	Integration	Lecture topics & Subtopics	Hours
1.	OG **2.1**	AN 48.8, 49.1, 49.2, FM 3.18	Anatomy of the female reproductive tract,	1
2.	OG 3.1.		Physiology of menstruation	1
3.	OG 3.1	AN 77.3,77.4	Physiology of gametogenesis, Ovulation, conception, implantation , & reproductive endocrinology	1
4.	OG 4.1	AN 80.3 80.5, 80.6	Early development of embryo and fetus, development of Placenta, amniotic fluid, cord	1
5.	OG 2.1	AN 52. 8, 79.4	Embryology and developmental defects of female genital tract	1
6.	OG 6.1	FM3.19, PY 9.10	Diagnosis of pregnancy	1
7.	OG 7.1	PY 9.8	Physiological changes in pregnancy	1
8.	OG 1.1, 1,2	CM10.1, 10.2	Maternal and perinatal mortality	1
9.	OG- 5.1, 5.2 An		Preconceptional counseling	1

Serial number	Competency Nos.	Integration	Lecture topics & Subtopics	Hours
	75.5			
10.	OG 8.1, 8.2(K), 8.3(K)		Antenatal Care, birth planning, and Obstetric examination	1
11.	OG 8.4, 16.3	AN 75.5	Antenatal screening, genetic counselling and antenatal monitoring of fetal well being	
12.	OG 8.7		Vaccines and medications in pregnancy, Teratology	1
13.	OG 14.1	AN 53.2, 53.3	Fetal skull, pelvis	1
14.	OG 13.1		Labor physiology	1
15.	OG 13.1		Labor mechanism	1
16.	OG 13.1		Management of labor 1st stage with, partogram, intrapartum monitoring of fetal well being and labor analgesia	1
17.	OG 13.1		Management of labor 2nd and third stage	1
18.	OG 19.1		Physiological changes in puerperium, Management of puerperium	1
19.	OG 17.1, 17.2	CM10.3	lactation physiology and management	1
20.	OG 9.5		Hyperemesis , vomiting in pregnancy management	1
21.	1.3, 9.1	AN 78.5	Hemorrhage in early pregnancy (abortions)	1
22.	9.3	AN 78.3	Hemorrhage in early pregnancy (ectopic pregnancy	1
23.	9.4		Hemorrhage in early pregnancy (Molar pregnancy)	1
24.			Recurrent pregnancy loss	1
25.	11.1	AN 80.4	Multifetal pregnancy	1

Third MBBS phase III

Total Teaching hours :

A. Lectures: **25 hours**

Serial number	Competency Nos.	Integration	Topics & Subtopics	Hours
1.	OG 12.1		Hypertensive disorders in pregnancy	1
2.	OG 12.1		Hypertensive disorders in pregnancy	1
3.	OG 13.2		Preterm and PROM	1
4.	OG 13.2		Prolonged pregnancy	1
5.	OG 16.3		Intrauterine growth restriction	1
6.			Disorders of amniotic fluid	1
7.			Abnormalities of placenta . cord	1
8.			Intrauterine fetal death	1
9.	OG 10.1		Antepartum hemorrhage 1 Placenta previa	1
10.	OG 10.1		Antepartum hemorrhage 2 Abruption+ vasa previa	1
11.	**OG 12.8**	PA 22.2	Rh negative pregnancy	1
12.	OG 12.2		Anemia (Iron deficiency + Megaloblastic)	1
13.	OG 12.2		Anemia (Others)	1
14.	OG 12.4		Heart disease in pregnancy	1
15.	**OG 12.3**		Diabetes in pregnancy	1
16.	OG 12.5		Infections in pregnancy UTI,(Incl Malaria etc)	1
17.	OG 12.6		Hepatic disorders in pregnancy	1
18.			Thyroid disorders in pregnancy	1
19.			Respiratory disorders in pregnancy including TB, COVID, Flu	1
20.			Viral infections in pregnancy (Viral)	1
21.	OG 12.7 ,27.3		HIV in Obstetrics and Gynecology	1
22.			Gynecological disorders in pregnancy	1
23.			Surgical disorders in pregnancy	1

Serial number	Competency Nos.	Integration	Topics & Subtopics	Hours
24.		CM 10.4	National Health programs-I safemotherhood, reproductive and child health	1
25.			National Health programs-II Respectful maternity care, Laqshya guidelines	1

Third MBBS phase IV

Total Teaching hours :

A. Lectures: **70 hours**

Serial number	Competency Nos.	Integration	Topics & Subtopics	Hours
1.	OG 14.4	FM 3.21	Malpositions: Occipito posterior presentation + DTA	1
2.	OG 14.4		Face, Brow Mechanism of labor in each	1
3.	OG 14.4		Malpresentations Breech	1
4.	OG 14.4		Unstable lie (Transverse/ oblique)	1
5.		AN 79.5,	Congenital anomalies of fetus	1
6.			Shoulder dystocia	1
7.	OG 14.4		Abnormal labor,classification, diagnosis and management.	1
8.	OG 14.1		Types of pelvis, Contracted pelvis, cephalopelvic disproportion	1
9.	OG 14.2		Obstructed labor, Rupture uterus causes, diagnosis and management .	1
10.	OG 15.1		Instrumental vaginal deliveries+ Ref to destructive operations	1
11.	OG 15.1		Cesarean section	1
12.			Pregnancy with previous cesarean section .	1
13.	OG 16.1		Third stage complications PPH	1
14.	OG 16,2		Third stage complications- inversion of uterus, Injuries to birth canal	1

15.	OG 19.1,17.3		Disorders of puerperium	1
16.	OG 13.1		Induction of labor,	1
17.	OG 13.1		Obstetric analgesia	1
18.	23.1		Physiology of Puberty and Abnormal puberty	1
19.	23.2, 23.3		Delayed puberty, precocious puberty	1
20.			Disorders of sexual development	1
21.	OG 23.1		Menstruation and common complaints (Dymenorrhea+ PMDD)	1
22.	OG 24.1, PA 30.9	PA 30.9	Abnormal uterine Bleeding Endometrial polyps , hyperplasia	1
23.	25.1		Amenorhea: Primary/ secondary	1
24.	OG 32.1	PY 9.11	Menopause & management , premature ovarian failure	1
25.	OG 22.1, 22.2	PA 30.6	Leucorrhea , cervical erosion, Cervicitis, vaginitis syndromic management	1
26.	OG 27.1,27.4		PID, Chronic pelvic pain ,	1
27.	27.2		Genital tuberculosis	1
28.	OG 30.1, 30.2		PCOS	1
29.	OG 28.1, 28.2	PY 9.12	Infertilty-Cervical & Uterine & Tubal Factors	1
30.	OG 28.3	PH 1.40	Infertilty- Ovulation Factors, Endocrine Factors, Galactorrhoea, Hirsuitism	1
31.	OG 28.4		ART in infertility	1
32.	OG 28.1		Infertility- Male & Unexplained	1
33.	OG 29.1		Benign tumors: Leiomyoma and polyps	1
34.	Pa 30.7. 30.8, OG 26.1	PA 30.7, 30.8	Endometriosis and adenomyosis	1
35.	OG 31.1		Displacements of uterus	1
36.			Urinary incontinence	1
37.	OG 26.2		Genitourinary fistulae	1

38.	26.2		Old healed perineal tear and rectovaginal fistula	1
39.	OG 33.2		Premalignant lesions of the female genital tract , Cervical intraepithelial neoplasia	1
40.	OG 33.3, 33.4		Screening and early detection of women's cancers including breast cancer	1
41.	OG 33.1	PA 30.1	Invasive cervical cancer	1
42.	OG 32.2		Approach to a patient of Post menopausal bleeding,	1
43.	OG 34.1	PA 30.2, PA 30.3	Uterine cancers	1
44.			Benign and malignant Lesions of vulva and vagina	1
45.	OG 34.3	PA 30.5	Gestational trophoblastic neoplasia	1
46.	OG 34,2		Benign ovarian tumors+ including non neoplastic enlargements of ovary	1
47.	OG 34.2	PA 30.4	Malignant ovarian tumors	1
48.		BI 10.2	Principles of Chemotherapy and Radiotherapy in Gynecology	1
49.	21.1		Contraception: male and female barrier methods	1
50.	21.1	PH 1.39	Hormonal contraception	1
51.	21.2		IUDs, PPIUCD program	1
52.	21.1		Female sterilization, postpartum sterlization	1
53.	21.1		Reversal of sterilization male and female	1
54.	21.1		Contracepton in special populations	1
55.	OG 20.1		MTP:Act, first trimester procedures	1
56.	OG 20.2		MTP second trimester procedures	1
57.	18.1, 18.3		Neonatal Asphyxia , , convulsions in the newborn	1
58.			Neonatal resuscitation	1
59.			Neonatal Jaundice + Birth injuries	1
60.	OG 8.8		Imaging in Obstetrics	1
61.			Imaging in gynecology	1
62.		PH 1.41	Pharmacotherapeutics in obstetrics	1
63.			Principles of gyn-surgical care- (pre op)	1

64.			Principles of gyn surgical care-(post op)	1
65.	OG 10.2		Critical care in Obstetrics , appropriate use of blood and blood products, their complication and management	1
66.	20.3	FM 3.13-17	PC PNDT act	1
67.		FM 3.13-17	Examination of the sexual assault survivor	1
68.			Domestic Violence act and role of gynecologist Gender	1
69.			Medicolegal issues related to Obstetrics and gynecology	1
70.			Adoption acts	1

Course Content

Subject: Obstetrics and gynecology Gyn skills

Clinical Postings: phase II 4 weeks – (Mon-Fri)
phase III-1 4 weeks – (Mon-sat)
phase III-2 12 weeks – (Mon-sat)

Competency Nos.	skill	topic	Suggested Teaching learning method	Hours	Student should complete this skill by end of mentioned phase
Phase II					
OG35.1	Obtain a logical sequence of history, and perform a humane and thorough clinical examination, excluding internal examinations (per rectal and per-vaginal) K/S SH	History taking in obstetrics	Bed side clinics	15 hours(1 week)	II
OG35.5	Determine gestational age, EDD and obstetric formula K/S SH				
OG35.7	Obtain informed consent for any examination / procedure S SH	Informed consent for examination			
OG35.2.	Arrive at a logical provisional diagnosis after examination K/S SH	obstetric examination and provisional diagnosis	Mannequin/demonstration on patient		
OG36.2	Organise antenatal clinics K/S KH	Antenatal clinic, (set up of OPD) Routine antenatal invesigations, Antenatal care	OPD tour, Demonstration of the set up and how OPD functioning is carried out	3 hrs	II

OG8.6	Assess and counsel a patient in a simulated environment regarding appropriate nutrition in pregnancy K/S SH	Nutritional counselling in pregnancy	Case based learning.	3 hrs	II
OG 35.12	History taking in gynecology, demonstrate P/S, P/V examination		Bed side clinic /OPD demonstration, skill lab for PS PV practice	3 hrs	II
OG8.5	Describe and demonstrate pelvic assessment in a model K/S SH	Maternal pelvis Pelvic assessment Fetal skull	Model,	3 hrs	II
OG8.4	Describe and demonstrate clinical monitoring of maternal and fetal well-being K/S SH	Antepartum monitoring of fetal well being- screening, USG doppler, NST, BPP,	Demonstration	3 hrs	II
OG13.4	Demonstrate the stages of normal labor in a simulated environment / mannequin	Mechanism of labor Management of Labor stage 1 Intrapartum monitoring of fetal well being- Partogram, CTG	Skill lab Models and mannequins Labor room demonstrations	15 hrs	II
OG35.13	Demonstrate the correct technique to perform artificial rupture of membranes in a simulated / supervised environment S SH	ARM			
OG35.14	Demonstrate the correct technique to perform and suture episiotomies in a simulated/ supervised environment S SH	Management of labor stage 2- Episiotomy			

OG35.16	Diagnose and provide emergency management postpartum hemorrhage in a simulated / guided environment K/S SH	Manage ment of labor stage 3 Emergency management of PPH oxytocics			
	Conduction of 2 exams and feedback			15 hours	
			Phase 2 clinical posting Total	**60 hours(4 weeks mon -fri)**	
Phase III-1					
OG37.6	Observe and assist in the performance of outlet forceps application of vacuum and breech delivery K/S/A/C SH	Forceps and vaccum, breech delivery	Mannequins and models skill lab	3 hrs 3 hrs	III-1
OG36.2	Organise postnatal and well-baby clinics K/S KH	Post natal clinic and well baby clinic. PNC case Normal and abnormal Puerperium,	OPD visit Bed side clinics, case based learning	3 hrs 3 hrs 3 hrs	III-1
OG17.2	Counsel in a simulated environment, care of the breast, importance and the technique of breast feeding S/A/C SH	Breast care, technique of breast feeding	Bed side clinic	3 hrs	III-1
OG35.17	Demonstrate the correct technique of urinary catheterisation in a simulated/ supervised environment S SH	Female urinary catheterizaion	Mannequin/ demonstration, Video demonstration	1 hr	III-1
OG37.4	Observe and assist in the performance of Dilatation & Curettage (D&C) K/S/A/C SH	Dialation and curettage	OT procedure, video	2 hrs	III-1

			demonstration		
OG37.5	Observe and assist in the performance of Endometrial aspiration - endocervical curettage (EA-ECC) K/S/A/C SH	Endometrial and endocervical curettage	OT procedure, video demonstration	3 hrs	III-1
OG36.1	Plan and institute a line of treatment, which is need based, cost effective and appropriate for common conditions taking into consideration (a) Patient (b) Disease (c) Socio-economic status (d) Institution/ Governmental guidelines. K/S SH	Cost effective approach	Case based learning	3 hrs	III-1
OG35.4	Demonstrate interpersonal and communication skills befitting a physician in order to discuss illness and its outcome with patient and family A/C SH	Doctor patient communication	Role play, OPD visit	3 hrs	III-1
OG35.6	Demonstrate ethical behavior in all aspects of medical practice. A/C SH	Ethics in medical practise	Case based learning	3 hrs	III-1
OG35.10	Write a proper referral note to secondary or tertiary centres or to other physicians with all necessary details. S SH	Referral note	Case based learning	3 hrs	III-1
OG38.4	Assess the need for and issue proper medical certificates to patients for various purposes K/S/A/C KH	Issue Medical certificates	Case based learning	3 hrs	III-1
		Cover 6 cases mentioned in III-2		18 hrs	
	Conduction of 2 exams and feedback			15 hours	
			Phase III-1 clinical posting Total	**72 hours(4 weeks -mon - sat)**	
Phase III-2					
	Revision of all topics in phase II			**45 hrs**	

	Revision of topic 14, 15 from phase III-1			**15 hrs**	
	Obtain history and on basis of examination findings(internal examination excluded) arrive at a logical provisional diagnosis for type of abortion	Abortions	**Case based learning**	**3 hrs**	
OG35.8	Write a complete case record with all necessary details S SH	Case record-…..10 cases over 3 phases, anemia. Drugs used in anemia Preeclampsia, Antihypertensives in prgnancy Eclampsia ,anticonvulsants in pregnancy IUGR,fetal well being tests Multifetal gestation, Breech, prev caesarean, preterm, tocolytics Prolonged labor induction of labor and drugs used in induction	Bed side clinics/ case based learning	3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 6 hrs	III-1, III-2
OG35.16	Diagnose and provide emergency management of antepartum in a simulated / guided environment K/S	placenta previa case	Bed side clinics/ case	6 hrs	III-1/2

	SH	abruptio placentae case Emergency management of APH with placenta previa case	based learning		
OG35.11	Demonstrate the correct use of appropriate universal precautions for self-protection against HIV and hepatitis and counsel patients S SH	HIV in pregnancy Universal precaution, PPTCT, counselling in HIV	Case based learning Demonstration PPTCT centre visit	3 hrs 3hrs	III-2
OG35.3	Recognize situations, which call for urgent or early treatment at secondary and tertiary centres and make a prompt referral of such patients after giving first aid or emergency treatment. K/S SH	Identifying a high risk pregnancy	Case based learning	3 hrs	III-2
OG13.5	Observe and assist the conduct of a normal vaginal delivery S P	Normal vaginal delivery-2 cases in log book	Labor room	6 hrs	III-2
OG37.1	Observe and assist in the performance of a Caesarean section K/S/A/C SH	Caesarean section	OT procedure/ video demonstration	3 hrs	III-2
OG35.9	Write a proper discharge summary with all relevant information S SH	Discharge summary..VD, CS, gyne case	Case based learning	3 hrs	III-2
OG35.12	Obtain a PAP smear in a stimulated environment S SH	PAP smear	Cancer detection OPD/ video demonstration	3 hrs	III-2
OG36.3	Demonstrate the correct technique of punch biopsy of uterus in a simulated/ supervised environment S SH	Cervical biopsy			III-2
OG33.3	Describe and demonstrate the screening for cervical cancer in a simulated environment K/S SH	Cervical cancer screening, VIA, VILI, Colposcopy			III-2
OG35.15	Demonstrate the correct technique to insert and remove	Contraception	Mannequin/	6 hrs	III-2

	an IUD in a simulated/ supervised environment S SH	methods, Intrauterine contraceptive device insertion and removal	video demonstration/ demonstration small group		
OG13.4	counsel on methods of safe abortion.	Counselling for safe abortion		3 hrs	III-2
OG20.2	In a simulated environment administer informed consent to a person wishing to undergo Medical Termination of Pregnancy S/A/C SH	Informed consent for MTP, MTP act, forms to be filled	Demonstration OT procedure	3 hrs	III-2
OG37.7	Observe and assist in the performance of MTP in the first trimester and evacuation in incomplete abortion K/S/A/C SH	Suction and evacuation(spontaneous abortion , first trimester MTP)			III-2
OG38.3	Lap sterilization K/S/A/C KH	Lap sterilization- 1 case of sterilization	OT procedure/ video demonstration	3 hrs	III-2
OG19.2	Counsel in a simulated environment, contraception and puerperal sterilisation S/A/C SH	Counselling for contraception sterilization. Puerperal sterilization(case based lerning)	Case based learning Family welfare clinic	3 hrs	III-2
OG36.2	Organise family welfare clinics K/S KH	Family welfare clinic			III-2
OG 35.12	History taking in gynecology, Reaching a provisional diagnosis	Gynecology case Vaginitis Fibroid uterus Genital prolapse Infertility	Case based learning	 3 hrs 3 hrs 3 hrs 3 hrs	II

		Adenexal mass Abnormal uterine bleeding(O) Post menopausal bleeding Cancer cervix		3 hrs 3 hrs 3 hrs 3 hrs	
OG37.2	Observe and assist in the performance of Laparotomy K/S/A/C SH	Exploratory laparotomy	OT procedure/ video demonstration	3 hrs	III-2
OG37.3	Observe and assist in the performance of Hysterectomy – abdominal/vaginal K/S/A/C SH	Vaginal hysterectomy, abdominal hysterectomy	OT procedure/ video demonstration	6 hrs	III-2
OG38.1	Laparoscopy K/S/A/C KH	laparoscopy	OT procedure/ video demonstration	3 hrs	III-2
OG38.2	Hysteroscopy K/S/A/C KH	hysteroscopy	OT procedure/ video demonstration	3 hrs	III-2
		Revision drugs in obstetrics and gynecology		3 hrs	

		Revision instruments		3 hrs	
		Revision contraception		3 hrs	
		specimen		3hrs	
OG18.2	Demonstrate the steps of neonatal resuscitation in a simulated environment S SH	Neonatal resuscitation			paeds
		Conduction of exams and feedback And miscellaneous		**24 hrs**	
		Phase III-2 clinical posting Total		**216 hrs(12 weeks mon-sat)**	

Course Content

Subject: Obstetrics and Gynecology

(Based on Indian Gazette on CBME and Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 3; page nos. 102-129)

Self directed learning(SDL)

Medical council directs to dedicate 5 hrs in third phase part 1 and 15 hrs in third phase part2 for self directed learning in OBGY.

University leaves it to the discretion of institute to plan the SDL using various methods in which students should be briefed about topic, guided towards learning resources, curiosity, innovation, motivation, competitiveness should be inculcated.
Life long learning capacity should be built.

The record of these SDL sessions should be included in Logbook as reflections of the session .

Small group teaching/tutorials

Medical council directs to dedicate 35 hrs in third phase part 1 and 125 hrs in third phase part2 for small group teaching/tutorials/ integrated teaching/ seminars in OBGY.

Suggested topics:
Dummy Pelvis 4
Obst specimens 4
Gynec specimens 4
X-rays & HSG 2
NST/ CTG 2
Obst Instruments 3
Gynec Instruments 4
Forceps 1
Vacuum 1
Partograph 2
NST, CTG 2
Drugs in obstetrics 3
Gynec drug 2
Contraception 4
Sterilization 2
Minor procedures 2

Apart from this SGT, can comprise of MCQ solving, group seminars, poster making, skit making,

Guidelines for Electives:

Medical council directs to dedicate 2 months of elective postingbetween third phase part 1 and part2

1. Each college can put up department wise lists of electives depending on facilities n resources available.
2. Electives modules should be designed well in advance with mention on specific learning objectives, daily work record, report amd assessment of the same.
3. Allotment of electives will be merit based on combined marks of previous 3 yrs.
4. Medical college can have MOU with other hospitals or centers for elective courses to student.
5. Student can opt for doing elective in any other hospital, city or abroad, provided facility of subject of interest is not available in his/her college, with prior permission of institute.
6. If opting for elective abroad then one month can be contact program and another month will be online program as for one month of elective student is supposed to attend clinical posting also.
7. Only 10% students will be allowed per subject for outside elective.
8. Student will have to apply to centre where he desires to do elective well in advance, application must go through concerned dept n through institute. The centre where student is doing elective must be government or semi government or teaching institute or center affiliated by university or National association of that subject of country.
9. Responsibility of applying, getting admission, expenses incurred for tuition fees n travel n stay will have to take care of by student.
10. At the end of electives Student should produce certificate of completing elective term from head of the institution or centre.

AETCOM

Medical council directs to dedicate 28 hrs + 16 hrs SDL in third phase part 2 for AETCOM. Out of these each subject gets 7 hours + 4 hrs SDL

As decided by university OBGY department will cover module 4.2 and 4.7 out of 9 modules mentioned in AETCOM booklet for phase III part 2.

Internal Assessment

Obst. & Gynaec.

Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019 onwards

Phase	IA – 1 -Exam			IA – 2 -Exam		
	Theory (January)	Practical EOP	Total Marks	Theory (May)	Practical	Total Marks
Second MBBS	50	50	100	50	50	100

Phase	IA – 3 Exam			IA – 4 - Exam		
	Theory (January)	Practical EOP	Total Marks	Theory (April)	Practical	Total Marks
Third MBBS Part I	50	50	100	50	50	100

Phase	IA – 5 - Exam			Prelim Examination		
	Theory (May)	Practical EOP (after 8 weeks posting)	Total Marks	Theory (November)	Practical	Total Marks
Third MBBS Part I	100	100	200	100 x 2 papers = 200	200	400

Internal Assessment Practical Examinations
II MBBS

Internal Assessment - 1

OBGY

Subject: OBGY Practical (IA – 1)					
Spotting	OSCE 1	OSCE 2	Viva	Journal & log book	Practical Total
10	10	10	10	10	50

OSCE Stations to include Signs of General examinations, Local examinations, Psychomotor skills and Communication skills.

Subject: OBGY Practical (IA – 2)					
Long Case					
History	Examination	Investigation	Treatment	AETCOM	Practical Total
10	10	10	10	10	50

Subject: OBGY Practical (IA – 3)					
Spotting	OSCE 1	OSCE 2	Viva	Journal & log book	Practical Total
10	10	10	10	10	50

OSCE Stations to include Signs of General examinations, Local examinations, Psychomotor skills and Communication skills.

Subject: OBGY Practical (IA – 4)					
Long Case					
History	Examination	Investigation	Treatment	AETCOM	Practical Total
10	10	10	10	10	50

Subject: OBGY Practical (IA –5)				
Long Case (Obstetrics)	Gynaecology Case	Family Planning	Journal & log book	Practical Total
50	20	20	10	100

Subject: OBGY Practical (Prelim)								
ANC Case	Gynaecology Case	PNC / Post – Op Case	Family Planning Viva	Obstetrics Table Viva	Gynaec Table Viva	Spotting (2 x 10 spots)	Journal & log book	Practical Total
50	25	20	25	20	20	20	20	200

Subject: OBGY Practical (MUHS Final)							
ANC Case	Gynaecology Case (Diagnosis and discussion)	PNC / Post – Op Case (Diagnosis and discussion)	Family Planning Viva	Obstetrics Table Viva	Gynaec Table Viva	Spotting (4 x 10 spots)	Practical Total
50 *	25	20	25	20	20	40	200

* 10 marks each for history, examination, AETCOM, investigation & treatment.

Assessment in CBME is ONGOING PRCESS,

No Preparatory leave is permitted.

1. There shall be 6 internal assessment examinations in OBGY.

2. The suggested pattern of question paper for internal assessment, except prelim examination is attached at the end. Pattern of the prelims examinations should be similar to the University examinations.

3. Internal assessment marks for theory and practical will be converted to out of 50 (theory) +50 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University. **Conversion Formula for calculation of marks in internal assessment examinations.**

	Theory	**Practical**
Phase II	**100**	**100**
Phase III/I	**100**	**100**
Phase III/II	**300**	**300**
Total	**500**	**500**
Conversion out of	**50**	**50**
Conversion formula	**Total marks in 6 IA theory examinations /10**	**Total marks in 6 IA Practical examinations /10**
Eligibility criteria after conversion	**20**	**20**
	Combined theory + Practical = 50	

4. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
33.01 to 33.49	33
33.50 to 33.99	34

5. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.
6. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

7. **Remedial measures**

A. Remedial measures for non-eligible students

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically.
ii) Extra classes for such students may be arranged. If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students. Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.
iii) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. The pattern for this repeat internal assessment examination shall be similar to the final University examination. Only the marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	**Practical**
Remedial examination (as per final examination pattern)	**200**	**200**
Conversion out of	**50**	**50**
Conversion formula	**Marks in remedial theory examinations /4**	**Marks in remedial Practical examinations /4**
Eligibility criteria after conversion	**20**	**20**
	Combined theory + Practical = 50	

B. <u>Remedial measures for absent students:</u>

i. If any of the students is absent for any of the 6 IA examinations due to any reasons, following measures shall be taken.
ii. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.
iii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.
iv. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator.

Format for Internal Assessment
Theory Examination
IA – 1, IA – 2, IA – 3 & IA - 4

Question No.	Type of Question	No. of Questions (no. To be solved)	Max. Marks
1.	MCQ	10	10 (1 marks each)
2.	SAQ	6 (Any 5 out of 6)	25 (5 marks for each question x 5 questions)
3.	LAQ	1 (Compulsory)	15
		Total	50

Format for Internal Assessment
Theory Examination IA - 5

Question No.	Section	Type of Question	No. of Questions	Max. Marks
1.	A	MCQ	20	20 (1 marks each)
2.	B	LAQ	4 (Any 3 out of 4)	45 (15 marks for each question x 3 LAQ)
3.	C	SAQ	7 (Any 6 out of 7)	30 (5 marks for each question x 6 SAQ)
4.	C	SAQ	1 question from AETCOM	5
			Total	100

Format for MUHS Final Theory Examination
Paper I & II

Question No.	Section	Type of Question	No. of Questions	Max. Marks
1.	A	MCQ	20	20 (1 marks each)
2.	B	LAQ	4 (Any 3 out of 4)	45 (15 marks for each question x 3 LAQ)
3.	C	SAQ	7 (Any 6 out of 7)	30 (5 marks for each question x 6 SAQ)
4.	C	SAQ	1 question from AETCOM	5
			Total	100

Maharashtra University of Health Sciences, Nashik

OBSTETRICS AND GYNECOLOGY

Journal

Name of the College

_____

_____

Admission Year : _____

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No. _____ has satisfactorily attended/completed all assignments mentioned in this journal as per the guidelines prescribed by Medical Council of India, for MBBS Competency Based Curriculum in the subject of Obstetrics and Gynaecology.

Date: ___/___/_____

Place: _____

Teacher -in-Charge **Professor and Head**

Instructions

The journal is a record of the cases seen by the designated student during her/his clinical postings in OBGY and during the labour room posting.

The student is expected to write down the details of:

1. Two normal low risk pregnant patients.
2. Five patients whose normal vaginal delivery the student has witnessed/assisted/conducted.
3. Two instrumental deliveries.
4. Three caeserean sections.
5. Pregnancies with complications.(12 Cases)
6. Three postnatal cases.
7. Eight gynaecology cases
8. Four family planning cases

Index

S. no	Topic	Page number	
	Normal pregnancy cases		
	Index of Antenatal Cases		
	Antenatal case record		
	Index of Labour cases		
	Labour case record		
	Index of postnatal cases		
	Postnatal case record		
	Index of Gynaecology cases		
	Gynaecology case record		
	Index of Family planning cases		
	Family planning case record		

Record of Attendance

Phase	Duration of posting	Posting from date	Posting to date	Attended days/out of days	Signature of Unit In charge
Phase II	4 weeks				
Phase III part 1	4 weeks				
Phase III part 2	12 weeks				

Teacher -in-Charge **Professor and Head**

Department of Obstetrics and Gynaecology

Antenatal Cases
(Seen and recorded)

Serial number	Case	Page number
1.	Anemia in pregnancy	
2.	Preeclampsia	
3.	Eclampsia	
4.	IUGR	
5.	Multifetal gestation	
6.	Breech	
7.	Previous caesarean	
8.	Preterm	
9.	Placenta praevia	
10.	Abruptio placentae	
11.	Heart disease in pregnancy	
12.	Diabetes in pregnancy	

Antenatal case-1(2+12 similar repetitions)

Name: Age:

Address: Occupation:

Socioeconomic status: Religion: Caste:

Education:

Booked/ registered (number of antenatal visits in pregnancy):

H/O Amenorrhoea

Chief complaints:

History of present pregnancy:

Menstrual history:

PMC:

LMP: EDD:

Obstetric history:

Past medical history:

Family history:

Diet history:

Personal history:

General examination:

Built: Height:

Weight: Nourishment:

General condition:

Temperature:

Pulse: Respiration:

BP:

Pallor:

Icterus, cyanosis, glossitis, angular stomatitis, JVP, Lymphadenopathy, clubbing,goitre

Breasts:

Systemic examination:

CVS

RS

CNS

Obstetric examination:

Inspection:

Palpation: Fundal height.....weeks

Symphysiofundal height:.....cms.Abdominal girth:.....cms

Leopold's 1st manoeuvre

Leopold's 2nd manoeuvre

Leopold's 3rd manoeuvre

Leopold's 4th manoeuvre

Auscultation

Provisional Diagnosis:

Investigations:

Routine:ANC Profile

Blood group, Rh Typing		Hb Platlet	
Blood sugar		HIV	
HBs antigen		VDRL	
Sickling/ Hb electrophoresis		Serum TSH	
Urine albumin Urine sugar		Urine culture senstivity	

USG:

Special investigations:

Final diagnosis:

Management:

Signature of teacher Date:

Labour Cases
(Attended and recorded)

Serial number	Case	Page numbers
1.	Normal Delivery: 5 cases	
2.	Instrumental delivery; 2 cases	
3.	Caesarean section: 3 cases	

Labour and delivery case-1(10 similar pages)

Name: Age:

Address: Occupation:

Socioeconomic status: Religion: Caste:

Education:

Booked/ registered (number of antenatal visits in pregnancy):

H/O Amenorrhoea:

Chief complaints:

History of present pregnancy:

Menstrual history:

PMC:

LMP: EDD:

Obstetric history :

Past medical history:

Family history:

Diet history:

Personal history:

General examination:

Built: Height:

Weight: Nourishment:

General condition:

Temperature:

Pulse: Respiration:

BP:

Pallor,icterus, cyanosis, glossitis, angular stomatitis, thyroid, JVP, Lymphadenopathy, clubbing

Breasts:

Systemic examination:

CVS

RS

CNS

Obstetric examination:

Inspection:

Palpation:

Fundal height Symphysio fundal height

Abdominal girth

Leopold's 1st manoeuvre

Leopold's 2nd manoeuvre

Leopold's 3rd manoeuvre

Leopold's 4th manoeuvre

Auscultation

Provisional Diagnosis:

Investigations:

Routine:

Blood group, Rh Typing		Hb Platelets	
PGBS		HIV	
HBs antigen		VDRL	
Sickling/ Hb electrophoresis		Serum TSH	
Urine albumin Urine sugar		Urine culture senstivity	

USG:

Final diagnosis:Labour :Induced/Spontaneous/Active management

Delivery details: Normal/Low Forceps/Ventouse

Presentation:Vertex/Face/Breech

Episiotomy:Yes/No

AMTSL;Yes/No: Details if yes:

Placental delivery: controlled cord traction/Manual removal of placenta

Delivery/Operations Notes:

Indication for Intervention in case of Instrumental delivery or Caeserean section:

Name of Obstetrician:

Assistant:

Anaesthesia

Anaesthesiologist:

PPH:Yes/No

Placental weight: Placental abnormality:

Cord length

Baby notes:

Date of birth

Sex of baby : Birth weight : Full term/ Preterm/Postterm

Apgar score:1 min 5 min

Congenital malformation

Postnatal period follow up including breast feeding:

Condition at the time of discharge:

Involution of uterus

Perineum

Lochia:

Treatment received:

Mother Baby

Treatment advised at discharge:

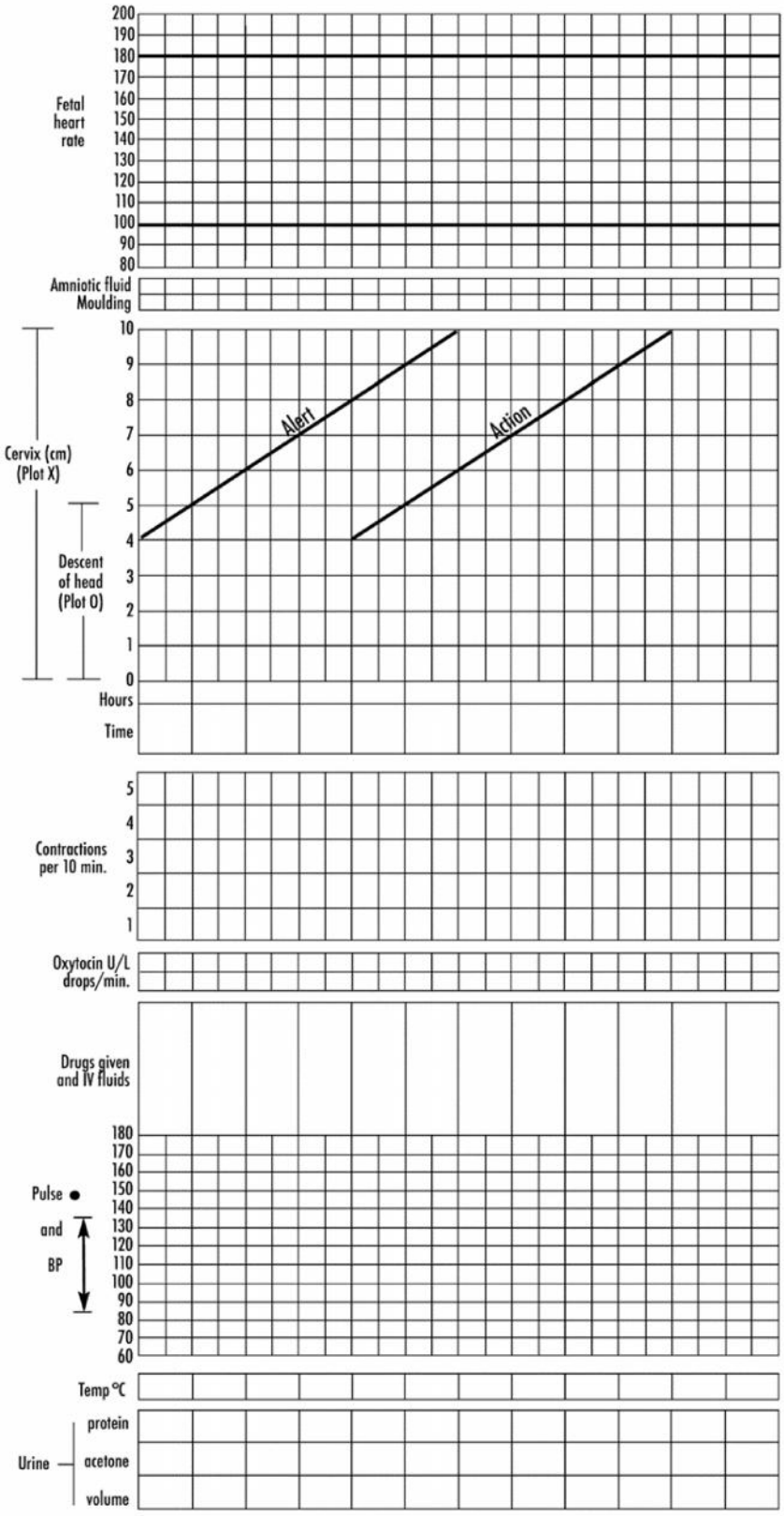
Contraception advised

Signature of teacher:

Date:

Name | Gravida | Para | Hospital number

Date of admission | Time of admission | Ruptured membranes | hours



Postnatal Cases

(Seen and recorded)

Serial number	Case	Page number
1.	Post vaginal delivery 1 case	
2.	Post caesarean section 1 case	
3.	Abnormal puerperium 1 case	

Postnatal case-1(3 similar repetitions)

Name: Age:

Address: Occupation:

Socioeconomic status: Religion: Caste:

Education:

Booked/ registered (number of antenatal visits in pregnancy):

Date and time of delivery:

Gestational age at delivery:

Intranatal history:

Relevant complaints at time of admission:

Examination findings at time of admission:

Duration of labour:

PPH:Yes/No

Any abnormal findings:

Type of delivery:

If caesarean or instrumental delivery: Indication

Condition of baby at birth:

Time of birth, sex of baby, birth weight:

Baby with mother /in NICU:

Postnatal history:

Lochia:

Pain:

Bowel/bladder:

Breast feeding or any problem:

Antenatal history:

Obstetric history :

Past medical history:

Family history:

Diet history:

Personal history:

General examination:

Built: Height:

Weight: Nourishment:

General condition:

Temperature:

Pulse: Respiration:

BP:

Pallor,icterus, cyanosis, glossitis, angular stomatitis, JVP, Lymphadenopathy, clubbing,goitre

Breasts:

Systemic examination:

CVS

RS

CNS

Abdominal examination:

Inspection:

Palpation:

Fundal height:

Involution of uterus:

Bowel sounds in case of caeser:

Abdominal wound/Perineum:

Bleeding PV/Lochia:

Urine Output:

Provisional Diagnosis:

Investigations:

Routine:

Blood group, Rh Typing		Hb	
BS		HIV	
HBs antigen		VDRL	
Sickling/ Hb electrophoresis		Serum TSH	
Urine albumin		Urine culture sensitivity	

Special investigations:

Treatment advised/given to

Mother :

Baby:

Treatment advised at discharge:

Contraception advised:

Signature of teacher:

Date:

Gynaecology Cases
(Seen and recorded)

Serial number	Case	Page number
1.	Vaginitis	
2.	Fibroid uterus	
3.	Genital prolapse	
4.	Infertility	
5.	Adenexal mass/Ovarian mass	
6.	Abnormal uterine bleeding(O)	
7.	Post menopausal bleeding	
8.	Cancer cervix	

Gynaecology case-1(8 similar repetitions)

Name: Age:

Address: Occupation:

Socioeconomic status: Religion: Caste:

Education:

Chief complaints:

History of present illness:

Menstrual history:

Obstetric history:

Past medical history:

Family history:

Diet history:

Personal history:

General examination:

Built: Height:

Weight: Nourishment:

General condition:

Temperature:

Pulse: Respiration:

BP:

Pallor,icterus, cyanosis, glossitis, angular stomatitis, goitre, JVP, Lymphadenopathy, clubbing

Breasts:

Systemic examination:

CVS

RS

CNS

Per Abdomen examination:

Per Speculum findings:

Per vaginum findings:

Provisional Diagnosis:

Investigations as indicated

Blood group, Rh Typing		CBC Hb TLC DLC Platelet	
BS- F, PP		LFT	
KFT		Serum TSH	
Sickling/ Hb electrophoresis		ECG	
Urine albumin		Urine culture senstivity	
ECG			
Pap smear			
USG			
Colposcopy			
Cervical biopsy			
Endometrial,endocervical			

biopsy	
CT/MRI	

Any other investigations:

Final diagnosis:

Operation notes:

Treatment received

Postoperative period

Histopathology:

Condition on discharge:

Treatment advised:

Signature of teacher: Date

Family planning Cases

(Seen and recorded)

Serial number	Case	Page number
1.	Tubectomy-Minilap or laparoscopic	
2.	MTP first trimester (suction and evacuation)	
3.	MTP second trimester	
4.	CuT insertion	

Family planning case-1(4 similar repetitions)

Name: Age:

Address: Occupation:

Socioeconomic status: Religion: Caste:

Education:

Menstrual history:

Obstetric history :

Previous Contraceptive history:

Past medical history:

Family history:

Personal history:

General examination:

Systemic examination:

Per Abdomen examination:

Per Speculum findings:

Per vaginum findings:

Investigations as indicated

Blood group, Rh Typing		Hb	
BS- F, PP		Urine albumin	
USG			

Any other investigations:

Operation notes:

Treatment received

Postoperative period

Condition on discharge:

Advice on discharge;

Signature of teacher:

Date:

Maharashtra University of Health Sciences Nashik

OBSTETRICS AND GYNECOLOGY

LOGBOOK - MBBS

AS PER COMPETENCY BASED CURRICULUM

Name of the College

Admission Year : _____

Index

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BIODATA OF THE CANDIDATE

PHOTO

Name of the student:

Name of the course: MBBS

Date of birth:

Father's / Guardian's name:

Mother's name:

Blood group:

Permanent Address: Temporary Address:

…… ……

…… …… .

Student's contact no:

Father's/ Guardian's contact no:

Student's Email id:

Father's/ Guardian' s Email id:

Candidates Signature: …….. Date: .....

LOG BOOK CERTIFICATE

This is to certify that,

Mr/Ms._____ _____

Roll No. _____ has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for MBBS Competency Based Curriculum in the subject of Obstetrics and Gynecology.

Date: ___/___/_____

Place: _____

Teacher -in-Charge

Professor and Head

Department of Obstetrics and Gynecology

Instructions

The undergraduate medical education program is designed with a goal to create an “Indian Medical Graduate” (IMG) p ossessing requisite knowledge, skills, attitudes, values and responsiveness, so that she or he may function appropriately and effectively as a physician of first contact of the community while being globally relevant.

This Logbook gives an opportunity to achieve goals pertaining to skill learning in Obstetrics and Gynecology, so that IMG becomes capable to provide respectful maternity and Gynecology care to the society.

1) Logbook is a record of the academic / co-curricular activities of the designated student, who would be responsible for maintaining his/her logbook.

2) The student is responsible for getting the entries in the logbook verified by the Faculty in charge regularly. Certifications for competencies to be taken on same day.

3)Refer to university course content for skill to ensure which competencies to be covered in which phase

4) Entries in the logbook will reflect the activities undertaken in the department & have to be scrutinized by the, teacher in c harge of session, Head of the concerned unit and department.

5) The logbook is a record of various activities by the student like:

- Overall participation & performance

- Attendance

- Participation in sessions

- Record of completion of pre-determined activities.

- Acquisition of selected competencies

6) The logbook is the record of work done by the candidate in that department / specialty and should be verified by the college before submitting the application of the students for the University examination.

Record of Attendance

Phase	Duration of posting	Posting from date	Posting to date	Attended days/out of days	Signature of Unit In charge
Phase II	4 weeks				
Phase III	4 weeks				
Phase IV	12 weeks				

.....

Signature of Head of theDepartment

Records of Internal Assessments

-	Exam No.	Date	Theory	Date	Practical including Viva	Signature of teacher
1	Phase II-1st exam		/50		/50	
2	Phase II-2nd exam		/50		/50	
3	Phase III-1st exam		/50		/50	
4	Phase III-2nd exam		/50		/50	
5	Phase IV-1st exam		/100		/100	
6	Prelims		/200		/200	
	Remedial if any					
	Total		/500		/500	
	Conversion= Total/5		/100		/100	

.....

Signature of Head of theDepartment

CLINICAL SKILLS : LIST OF COMPETENCIES

Clinical skills can be assessed by case presentation, case-based discussion, objective structured clinical assessment the checklist, MiniCex, as per the institutional preference.

Competency # addressed	Name of Activity
OG5.1	Describe, discuss and identify pre-existing medical disorders and discuss their management; discuss evidence-based intrapartum care
OG5.2	Determine maternal high risk factors and verify immunization status
OG6.1	Describe, discuss and demonstrate the clinical features of pregnancy, derive and discuss its differential diagnosis, elaborate the principles underlying and interpret pregnancy tests.
OG8.2	Elicit, document and present history in a OBGY patient including obstetric and menstrual history, last menstrual period, comorbid conditions and past medical history
OG8.3	Describe, demonstrate, document and perform a general,systemic and abdominal examination includingobstetrical examinations and clinical monitoring of maternal and fetal well-being.
OG8.4	Describe and demonstrate clinical monitoring of maternal and fetal well-being

OG8.5	Describe and demonstrate pelvic assessment in a model
OG35.1	Obtain a logical sequence of history, and perform a humane and thorough clinical examination, excluding internal examinations (perrectal and per-vaginal)
OG35.2	Arrive at a logical provisional diagnosis after examination.
OG35.3	Recognize situations, which call for urgent or early treatment at secondary and tertiary centres and make a prompt referral of such patients after giving first aid or emergency treatment.
OG35.5	Determine gestational age, EDD and obstetric formula
OG36.1	Plan and institute a line of treatment, which is need based, cost effective and appropriate for common conditions taking into consideration (a) Patient (b) Disease (c) Socio-economic status (d) Institution/ Governmental guidelines.
OG36.2	Organise antenatal, postnatal, well-baby and family welfare clinics
OG38.4	Assess the need for and issue proper medical certificates to patients for various purposes

PSYCHOMOTOR / PERFORMANCE SKILLS:

Skills can be assessed by objective structured clinical assessment with checklist, Global Rating Scale, Simulated patients as per the institutional preference.

Colleges are instructed prepare modules for skill training as per NMC guidelines.

Module 5 Skill Training.

I – independent certification

D - demonstration

LIST OF COMPETENCIES

Competency # addressed	Name of Activity
OG9.2	Describe the steps and observe/ assist in the performance of an MTP evacuation

OG13.3	Observe/ assist in the performance of an artificial rupture of membranes
OG13.4	Demonstrate the stages of normal labor in a simulated environment / mannequin
OG13.5	Observe and assist the conduct of a normal vaginal delivery
OG15.2	Observe and assist in the performance of an episiotomy and demonstrate the correct suturing technique of an episiotomy in a simulated environment. Observe/Assist in operative obstetrics cases – including - CS, Forceps, vacuum extraction, and breech delivery
OG18.2	Demonstrate the steps of neonatal resuscitation in a simulated environment
OG19.3	Observe/ assist in the performance of tubal ligation
OG19.4	Enumerate the indications for, describe the steps in and insert and remove an intrauterine device in a simulated environment
OG33.3	Describe and demonstrate the screening for cervical cancer in a simulated environment
OG34.4	Operative Gynaecology : Understand and describe the technique and complications: Dilatation & Curettage (D&C); EA-ECC, cervical biopsy; abdominal hysterectomy; myomectomy; surgery for ovarian tumours; staging laparotomy; vaginal hysterectomy including pelvic floor repair; Fothergill's operation, Laparoscopy; hysteroscopy; management of postoperative complications
OG35.7	Obtain informed consent for any examination / procedure
OG35.8	Write a complete case record with all necessary details

OG35.9	Write a proper discharge summary with all relevant information
OG35.10.	Write a proper referral note to secondary or tertiary centres or to other physicians with all necessary details
OG35.11	Demonstrate the correct use of appropriate universal precautions for self-protection against HIV and hepatitis
OG35.12	Obtain a PAP smear in a stimulated environment
OG35.13	Demonstrate the correct technique to perform artificial rupture of membranes in a simulated / supervised environment
OG35.14	Demonstrate the correct technique to perform and suture episiotomies in a simulated/ supervised environment
OG35.15	Demonstrate the correct technique to insert and remove an IUD in a simulated/ supervised environment
OG35.16	Diagnose and provide emergency management of antepartum and postpartum hemorrhage in a simulated / guided environment
OG35.17	Demonstrate the correct technique of urinary catheterisation in a simulated/ supervised environment
OG36.3	Demonstrate the correct technique of punch biopsy of uterus in a simulated/ supervised environment
OG37.1	Observe and assist in the performance of a Caesarean section
OG37.2	Observe and assist in the performance of Laparotomy
OG37.3	Observe and assist in the performance of Hysterectomy – abdominal/vaginal

OG37.4	Observe and assist in the performance of Dilatation & Curettage (D&C)
OG37.5	Observe and assist in the performance of Endometrial aspiration - endocervical curettage (EA-ECC)
OG37.6	Observe and assist in the performance of outlet forceps application of vacuum and breech delivery
OG37.7	Observe and assist in the performance of MTP in the first trimester and evacuation in incomplete abortion
OG38.1	Laparoscopy :observe
OG38.2	Hysteroscopy ;observe
OG38.3	Lap sterilization: observe

AETCOM SKILLS

Counselling for Investigation, Treatment, Prognosis, Blood donation, Organ Donation, Breaking Bad news. All types of consent. Medicolegal aspects and Ethics, Empathy and professionalism as per the Phase of the MBBS. Include cases of Allied branches also.

Competency to be assessed during Clinical postings and /or small group discussions.

LIST OF COMPETENCIES

Competency addressed	Name of Activity
OG8.6	Assess and counsel a patient in a simulated environment regarding appropriate nutrition in pregnancy
OG13.4	Counsel on methods of safe abortion.
OG17.2	Counsel in a simulated environment, care of the breast, importance and the technique of breast feeding
OG19.2	Counsel in a simulated environment, contraception and puerperal sterilisation

OG20.2	In a simulated environment administer informed consent to a person wishing to undergo Medical Termination of Pregnancy
OG35.4	Demonstrate interpersonal and communication skills befitting a physician in order to discuss illness and its outcome with patient and family
OG35.6	Demonstrate ethical behavior in all aspects of medical practice.
OG35.11	HIV and hepatitis- counselling patients

Log book record of clinical skills

Sr. no.	Phase	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty ,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B)expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.		OG5.1									
2.		OG5.2									
3.		OG6.1									
4.		OG8.2									
5.		OG8.3									
6.		OG8.4									
7.		OG8.5									
8.		OG35.1									
9.		OG35.2									
10.		OG35.3									
11.		OG35.5									
12.		OG36.1									

13.		OG36.2									
14.		OG38.4									

Psychomotor skills

Sr. no.	Phase	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty ,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B)expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.		OG9.2									
2.		OG13.3									
3.		OG13.4									
4.		OG13.5									
5.		OG15.2									
6.		OG18.2									
7.		OG19.3									
8.		OG19.4									
9.		OG33.3									

10.		OG34.4									
11.		OG35.7									
12.		OG35.8									
13.		OG35.9									
14.		OG35.10.									
15.		OG35.11									
16.		OG35.12									
17.		OG35.13									
18.		OG35.14									
19.		OG35.15									
20.		OG35.16									
21.		OG35.17									
22.		OG36.3									
23.		OG37.1									
24.		OG37.2									
25.		OG37.3									
26.		OG37.4									
27.		OG37.5									
28.		OG37.6									
29.		OG37.7									

30.		OG38.1									
31.		OG38.2									
32.		OG38.3									

AetCom skills

Sr. no.	Phase	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty ,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B)expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.		OG8.6									
2.		OG13.4									
3.		OG17.2									
4.		OG19.2									
5.		OG20.2									
6.		OG35.4									

7.		OG35.6									
8.		OG35.11									

REFLECTION ON AETCOM MODULE For PHASE IV

Module 4.2- Case studies in medico-legal and ethical situations

Competency addressed	Level
Identify and discuss medico-legal, socio-economic and ethical issues as it pertains to abortion/ Medical Termination of pregnancy and reproductive rights	KH

Reflection (minimum 200 words) -1 Date:

Signature of Teacher-in-charge

REFLECTION ON AETCOM MODULE

Module 4.9- Medical Negligence

Competency addressed	Level
1. Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues pertaining to medical negligence	KH
2. Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues pertaining to malpractice	KH

Reflection (minimum 200 words)-2
Date:

Signature of Teacher-in-charge

PAP smear obtaining and filling form for same.
(2 cases so 2 similar repetitions)

Signature of teacher:

Date:

Discharge summary(as per institutional format)

1. Vaginal delivery

Signature of teacher:Date:

Discharge summary

2. Caesarean section

Signature of teacher: Date:

Discharge summary

3. Hysterectomy abdominal

Signature of teacher: Date:

Discharge summary

4. Hysterectomy vaginal

Signature of teacher: Date:

Discharge summary

5. MTP

Signature of teacher:

Date:

Discharge summary

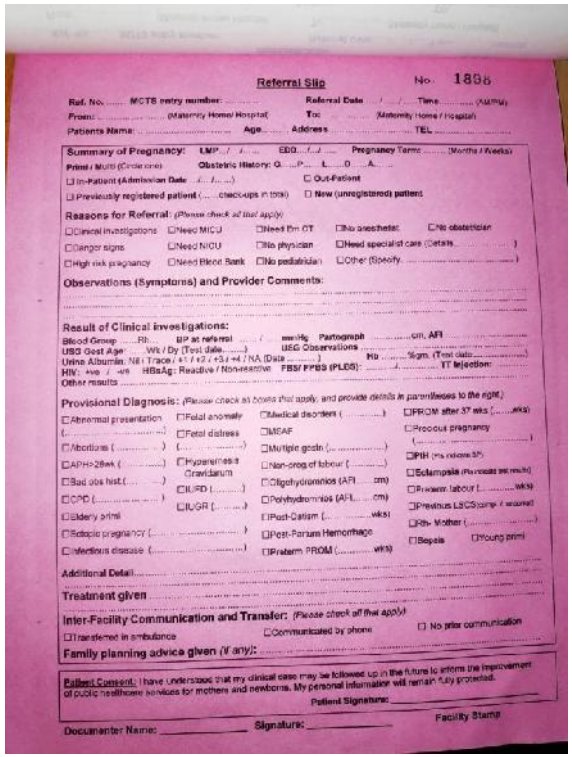
6. Tubal ligation

Signature of teacher:

Date

Referral note for a higher centre for obstetric patient

(this format to be typed in journal)



Referral Slip No. 1888

Ref. No. ..... MCTS entry number: ..... Referral Date ..../..../..... Time ..... (AM/PM)

From: ..... (Maternity Home/ Hospital) To: ..... (Maternity Home / Hospital)

Patients Name: ..... Age..... Address ..... TEL .....

Summary of Pregnancy: LMP.../.../..... EDD.../.../..... Pregnancy Terms ..... (Months / Weeks)

Primi / Multi (Circle one) Obstetric History: G.....P.....L.....O.....A.....

☐ In-Patient (Admission Date .../.../.....) ☐ Out-Patient

☐ Previously registered patient (.....check-ups in total) ☐ New (unregistered) patient

Reasons for Referral: *(Please check all that apply)*

☐Clinical investigations ☐Need MICU ☐Need for OT ☐No anesthetist ☐No obstetrician

☐Danger signs ☐Need NICU ☐No physician ☐Need specialist care (Details .....)

☐High risk pregnancy ☐Need Blood Bank ☐No pediatrician ☐Other (Specify .....)

Observations (Symptoms) and Provider Comments:

.....

.....

Result of Clinical Investigations:

Blood Group .....Rh..... BP at referral ...../..... mm Hg Partograph .....cm, AFI .....

USG Gest Age: ..... Wk / Dy (Test date.....) USG Observations .....

Urine Albumin: Nil / Trace / +1 / +2 / +3 / +4 / NA (Date .....) Hb .....%gm. (Test date.....)

HIV: +ve / -ve HBsAg: Reactive / Non-reactive FBS/ PPBS (PLDS): ...../..... TT Injection: .....

Other results .....

Provisional Diagnosis: *(Please check all boxes that apply, and provide details in parentheses to the right.)*

☐Abnormal presentation (.....) ☐Fetal anomaly ☐Fetal distress ☐Medical disorders (.....) ☐PROM after 37 wks (.....wks)

☐Abortions (.....) (.....) ☐MSAF ☐Precous pregnancy (.....)

☐APH>28wk (.....) ☐Hyperemesis Gravidarum ☐Multiple gests (.....) ☐PIH (Hb <above 5*)

☐Bad obs hist (.....) ☐IUFD (.....) ☐Non-progs of labour (.....) ☐Eclampsia (Pre-eclamptic results)

☐CPD (.....) ☐IUGR (.....) ☐Oligohydramnios (AFI.....cm) ☐Preterm labour (.....wks)

☐Elderly primi ☐Polyhydramnios (AFI.....cm) ☐Previous LSCS (one / several)

☐Ectopic pregnancy (.....) ☐Post-Datism (.....wks) ☐Rh- Mother (.....)

☐Infectious disease (.....) ☐Post-Partum Hemorrhage ☐Sepsis ☐Young primi

☐Preterm PROM (.....wks)

Additional Detail: .....

.....

Treatment given .....

.....

Inter-Facility Communication and Transfer: *(Please check all that apply)*

☐Transferred in ambulance ☐Communicated by phone ☐ No prior communication

Family planning advice given (if any): .....

Patient Consent: I have understood that my clinical case may be followed up in the future to inform the improvement of public healthcare services for mothers and newborns. My personal information will remain fully protected.

Patient Signature: _____

Documenter Name: _____ Signature: _____ Facility Stamp

Signature of teacher:

Date:

Medical certificate(for obstetric or gynaecological condition)

Signature of teacher:

Date:

Self-Directed Learning, Seminars, Tutorials, Projects, Quizzes, extracurricular activities

Sr. No.	Self- directed learning (Seminars, Tutorials, Projects, Quizzes, Extracurricular activities)	Date	Phase	Signature of Teacher

Reflection (minimum200words) – 1 **Date :**

TOPIC:

Reflection (minimum 200 words) – 2
Date :

TOPIC:

ANNEXURE 1:

RECORDING FORM FOR MINI – CEX

EVALUATOR : DATE :

STUDENT :

YEAR :

PATIENT DIAGNOSIS :

SETTINGS :

AMBULATORY	NEW	COMPLEXITY : LOW
IN PATIENT	FOLLOW UP	MODERATE
ED		HIGH
OTHER :		

PATIENT AGE PATIENT SEX

FOCUS : DATA GATHERING / DIAGNOSIS / THERAPY / COUNSELLING

1. **MEDICAL INTERVIEWING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

2. **PHYSICAL INTERVIEWING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

3. **HUMANISTIC QUALITIES** / PROFFESIONALISM (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

4. **CLINICAL JUDGEMENT** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

5. **COUNSELLING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

6. **ORGANIZATION / EFFICIENCY** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

7. **OVERALL CLINICAL COMPETENCE** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

MINI CEX TIME : OBSERVING : _____ MINS

PROVIDING FEEDBACK _____ MINS

UNSATISFACTORY 1,2,3

SATISFACTORY 4, 5, 6

SUPERIOR 7, 8, 9

EVALUATOR SATISFACTION WITH MINI CEX

LOW 1 2 3 4 4 5 6 7 8 9 HIGH

RESIDENT SATISFACTION WITH MINI CEX

LOW 1 2 3 4 4 5 6 7 8 9 HIGH

COMMENTS :

STUDENT SIGNATURE EVALUATOR SIGNATURE

ANNEXURE 2:

AetCom skills can be assessed by use of Kalamazoo consensus.

Criteria
Builds relationship
Opens the discussion
Gathers information
Understands the patient's perspective
Shares information
Manages flow
Overall rating
Signature of teacher

Communication skills rating scale adapted from Kalamazoo consensus statement.

Rating 3 - Poor, 4 -6 Satisfactory, 6 -10 Superior

MUHS Ophthalmology CBME U.G Curriculum

(a) **Competencies**: The student must demonstrate :

1. Knowledge of common eye problems in the community
2. Recognize, diagnose and manage common eye problems and identify indications for referral,
3. Ability to recognize visual impairment and blindness in the community and implement National programmes as applicable in the primary care setting.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in order to allow the student to understand the structural basis of ophthalmologic problems, their management and correlation with function, rehabilitation and quality of life.

TEACHING METHODS & HOURS

	Large Group Teaching	Small group teaching/Practical /Tutorials	SDL	AETCOM	Total	Clinical/Field Posting
	-	-	-	-	-	-
3rd part I/II	30 hours	60 hours	10 hours	MODULE 3.2	100 hours	PHASE 2 PHASE 3
Total	30 hours	60 hours	10 hours		100 hours	8 weeks

CURRICULUM

UG CURRICULUM FOR LARGE GROUP TEACHING

Topic code	Topic	No. of hours (30)	Integration	Method of Teaching
	Visual Acuity Assessment			
OP1.1	Describe the physiology of vision	1 hr	physiology	LGT
OP1.2	Define, classify and describe the types and methods of correcting refractive errors	2 hrs		LGT
OP1.4	Enumerate the indications and describe the principles of refractive surgery	1 hr		LGT
	Lids and Adnexa, orbit			
OP2.1	Enumerate the causes, describe and discuss the etiology, clinical presentations and diagnostic features of common conditions of the lid and adnexa including	2 hr	Human anatomy	LGT

	Hordeolumexternum / internum, blepharitis, preseptal cellulitis , dacryocystitis , hemangioma, dermoid, ptosis , entropion, lid lag, lagophthalmos			
OP2.6	Enumerate the causes and describe the differentiating features and clinical features of proptosis	1 hr		LGT
	Conjunctiva			
OP3.3	Describe the aetiology , pathophysiology, ocular features, differential diagnosis, complications and management of various causes of conjunctivitis	2hr		LGT
	Corneas			
OP4.1 & OP4.2	Enumerate, describe and discuss the types and causes of corneal ulceration Enumerate and discuss the differential diagnosis of infective Keratitis	3 hr	Human anatomy	LGT
OP4.4	Enumerate the causes and discuss the management of dry eye	1hr		LGT
OP4.5	Enumerate the causes of corneal blindness	1 hr		LGT
OP4.6	Enumerate the indications and types of keratoplasty	1 hr		LGT
OP4.9	Describe and discuss the importance and protocols involved in eye donation and eye banking	1 hr		LGT
	Iris and Anterior Chamber			
OP6.1 OP6.2	Describe clinical signs of intraocular inflammation and enumerate the features that distinguish granulomatous from non granulomatous inflammation. Identify and distinguish acute iridocyclitis from chronic iridocyclitis	2 hrs		LGT
OP6.7	Enumerate and discuss the aetiology, the clinical distinguishing features of shallow and deep anterior chamber . Choose appropriate investigations for patients with above conditions of anterior chamber	4 hr	Human Anatomy	LGT
	Lens			

OP7.2	Describe and discuss the aetio-pathogenesis , stages of maturation and complications of cataract	1 hr	Pathology	LGT
OP7.4	Enumerate the types of cataract surgey and describe the steps intraoperative and postoperative complications of extracapsular cataract extraction surgery	1 hr		LGT
	Retina & Optic Nerve			
OP8.1	Discuss the aetiology , pathology , clinical features and management of vascular occlusion of the retina	1 hr	Human Anatomy , Pathology	LGT
OP8.3	Demonstrate the correct technique of a fundus examination and describe and distinguish the funduscopic features in normal condition and in conditions causing abnormal retinal exam	1 hr		LGT
OP8.5	Describe and discuss the correlative anatomy , aetiology , clinical manifestations, diagnostic tests , imaging and management of diseases of optic nerve and visual pathway	2 hr		LGT
	Miscellaneous			
OP9.2	Classify , enumerate the types, methods of diagnosis and indications for referral in a patient with heterotropia/ strabismus	1 hr		LGT
OP9.5	Describe the evaluation and enumerate the steps involved in the stabilization , initial management and indication for referral in a patient with ocular injury	1 hr		LGT

UG CURRICULUM FOR SMALL GROUP TEACHING

Topic code	Topic	No. of hours (60)	Integration	Method of Teaching
	Visual Acuity Assessment			
OP1.5	Define, enumerate the types and the mechanism by which strabismus leads to amblyopia	2 hr		SGT
	Lids and Adnexa, orbit			
OP2.4	Describe the aetiology , clinical presentation, Discuus the complication and management of orbital cellulitis	2 hr		SGT
OP2.5	Describe clinical features on ocular examination and management of a patient with cavernous sinus thrombosis	2 hr		SGT
OP2.6	Enumerate the causes and describe the differentiating features and clinical features and management of proptosis	3 hr		SGT
OP2.7	Classify the various types of orbital tumors . Differentiate the symtoms and signs of the presentations of various types of ocular tumors	4 hr		SGT
OP2.8	List the investigations helpful in diagnosis of orbital tumors. Enumerate the indications of appropriate referral	2 hr		SGT
	Conjunctiva			
OP3.4	Describe the etiology, pathophysiology , ocular features, differential diagnosis , complication and management of trachoma	2hr		SGT
OP3.5	Describe the etiology, pathophysiology , ocular features, differential diagnosis , complication and management of vernal catarrh	2 hr		SGT
OP3.6	Describe the etiology, pathophysiology , ocular features, differential diagnosis , complication and management of pterygium	2 hr		SGT

OP3.7	Describe the etiology, pathophysiology , ocular features, differential diagnosis , complication and management of symblepharon	1 hr		SGT
	Cornea			
OP4.3	Enumerate the causes of corneal edema	2 hr		SGT
OP4.7	Enumerate the indications and describe the methods of tarsorraphy	2 hr		SGT
	Sclera			
OP5.1	Define, enumerate and Describe the etiology, associated systemic conditions , ocular features, indications for referral , complication and management of episcleritis	2 hr		SGT
OP5.2	Define, enumerate and Describe the etiology, associated systemic conditions , ocular features, indications for referral , complication and management of scleritis	2 hr		SGT
	Iris and anterior chamber			
OP6.3	Enumerate systemic conditions that can present as iridocyclitis and describe their ocular manifestations	3 hr		SGT
OP6.4	Describe and distinguish hyphema and hypopyon	3 hr		SGT
OP6.5	Describe and discuss the angle of the anterior chamber and its clinical correlates	3 hr		SGT
OP6.8	Enumerate and choose the appropriate investigations for patients with conditions affecting the uvea	3 hr		SGT
OP6.9	Choose the correct local and systemic therapy for conditions of anterior chamber and enumerate their indications , adverse events and interactions	2 hr		SGT
	Lens			
OP7.1	Describe the surgical anatomy and the metabolism of lens	2 hr	Anatomy & biochemistry	SGT
	Retina and Optic Nerve			SGT

OP8.2	Enumerate the indications for laser therapy in the treatment of retinal disease (including retinal detachment, retinal degeneration , diabetic retinopathy and hypertensive retinopathy)	4 hr		SGT
OP8.8	Enumerate and discuss treatment modalities in management of diseases of retina	5hr		SGT
	Miscellaneous			
OP9.3	Describe the role of refractive error correction in a patient with headache and enumerate the indications of refrral	2 hr		SGT
OP9.4	Enumerate, describe and discuss the causes of avoidable blindness and the national programs for control of blindness (including vision 2020)	3 hr		SGT

UG CURRICULUM FOR CLINICAL DEMONSTRATION/BED SIDE TEACHING / DOAP:

Topic code	Topic	No. of hours (10)	Integration	Method of Teaching
	Visual Acuity Assessment			
OP1.3	Demonstrate the steps in performing the visual acuity assessment for distance vision, near vision, color vision , the pin hole test and the menace and blink reflexes	1 hr	physiology	DOAP
	Lids and Adnexa , Orbit			
OP2.2	Demonstrate the symptoms and clinical signs of conditions enumerated in OP2.1	1 hr	Human Anatomy	DOAP
OP2.3	Demonstrate under supervision clinical procedure performed in the lid including : bells phenomenon, assessment of entropion / ectropion, perform the	1 hr		DOAP

	regurgitation test of lacrimal sac, massage technique in congdacryocystitis and trichiatic cilia removd by epilation			
	Conjunctiva			
OP3.1	Elicit document and present an appropriate history in a patient presenting with a " red eye" including congestion , discharge , pain	1 hr		DOAP
OP3.2	Demonstrate document and present the correct method of examination of a red eye including vision assessment , corneal lustre, pupil abnormality, ciliary tenderness			
OP3.8	Demonstrate the correct technique of removal of foreign body from the eye in a simulated environment	1 hr		DOAP
OP3.9	Demonstrate the correct technique of instillation of eye drops in a simulated environment			
	Cornea			
OP4.8	Demonstrate the correct technique of removal of foreign body in cornea in a simulated environment			
OP4.10	Counsel patient and family about eye donation in a simulated environment	1 hr		DOAP
	Iris and Anterior Chamber			
OP6.6	Identify and demonstrate the clinical features and distinguish and diagnose common clinical conditions affecting the anterior chamber	1 hr		DOAP
OP6.10	Counsel patients with condition of iris and anterior chamber about their diagnosis , therapy and prognosis in an empathetic manner in a simulated environment			
	Lens			
OP7.3	Demonstrate the correct technique of ocular examination ina patient with cataract	1 hr		DOAP
OP7.5	To participate in team for cataract surgery	1 hr		DOAP
OP7.6	Administer informed consent and counsel			DOAP

	patient for cataract surgery in a simulated enviroment			
	Miscellaneous			
OP9.1	Demonstrate the correct technique the examine extraocular movements (uniocular& binocular)	1 hr		DOAP

UG CURRICULUM FOR SDL

TOPIC CODE	TOPIC	TOTAL NO. OF HOURS	INTEGRATION	METHOD OF TEACHING
Competency OP 4.5	Enumerate the causes of corneal blindness Enumerate the indications and types of keratoplasty	1ST Hour – Introduction 2nd Hour – symposium 3rd Hour - feedback Total : 3 hours		SDL
Competency OP 9.4	Enumerate , describe and discuss the causes of avoidable blindness and the NPCB (Including VISION 2020)	1st hour – Horizontal integration with community medicine 2nd hour – orientation 3rd hour- quiz Total : 3 hours	Horizontal integration with community medicine	SDL
Competency OP 6.7	Enumerate and discuss the aetiology, clinical features of various glaucomas associated with shallow and deep anterior chamber. Choose appropriate investigations and treatment for patients with above mentioned conditions	1st hour – Introduction/ Orientation 2nd hour – tutorials Total : 2 hours		SDL
Competency OP	Define , enumerate	1st hour –		SDL

1.5	the types and the mechanism by which strabismus leads to amblyopia	introduction 2nd hour – role play Total : 2 hours		

Suggested books :

1. Parson's text book of Ophthalmology
2. Kanski' s clinical Ophthalmology
3. Khurana's text book of Ophthalmology
4. Textbook of Ophthalmology, S.K Mittal (Thieme), 2021 edition

Internal Assessment

Subject – Ophthalmology

Applicable w.e.f batches admitted from 2019 and onwards

Phase		
	Theory	Practical
Second MBBS	-	EOP Practical Examination may be conducted. However, these marks shall not be added to the Internal Assessment.

3rd Year (III MBBS, PART I)						
Phase	**I-Exam (March)**			**II-Exam Prelim (August)**		
	Theory	Practical	Total Marks	Theory	Practical	Total Marks
III/I MBBS	50	50	100	100	100	200

Assessment in CBME is ONGOING PRCESS,

No Preparatory leave is permitted.

1. There shall be 2 internal assessment examinations in Ophthalmology including Prelim.

2. The suggested pattern of question paper for internal assessment internal examinations, except prelim examination is attached at the end. Pattern of the prelims examinations should be similar to the University examinations.

3. Internal assessment marks for theory and practical will be converted to out of 25 (theory) + 25 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University. **Conversion Formula for calculation of marks in internal assessment examinations.**

	Theory	Practical
Phase II	**-**	**-**
Phase III/I	**150**	**150**
Total	**150**	**150**
Conversion out of	**25**	**25**
Conversion formula	**Total marks in 2 IA theory examinations /6**	**Total marks in 2 IA Practical examinations /6**
Eligibility criteria after conversion	**10**	**10**
	Combined theory + Practical = 25	

1. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
13.01 to 13.49	13
13.50 to 13.99	14

2. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.
3. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

4. Remedial measures

A. Remedial measures for non-eligible students

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically. Extra classes for such students may be arranged.

ii) If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students. Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.

iii) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. The pattern for this repeat internal assessment examination shall be similar to the final University examination. The marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	**Practical**
Remedial examination	**100**	**100**
Conversion out of	**25**	**25**
Conversion formula	**Marks in remedial theory examinations /4**	**Marks in remedial Practical examinations /4**
Eligibility criteria after conversion	**10**	**10**
	Combined theory + Practical = 25	

B. <u>Remedial measures for absent students:</u>

If any of the students is absent for any of the 2 IA examinations due to any reasons, following measures shall be taken.

i. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.

ii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.

iii. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator.

Format for Practical Examinations

Ophthalmology

Internal Assessment Practical

Seat No.	Long case including communication skills	OSCE (2 stations of 5 marks each)	Viva including Dark room instruments, Operative instruments	Log book and Journal viva	Practical Total
Max Marks	20	10	10	10	50

OSCE Stations to include Signs of General examinations, Local examinations, Psychomotor skills and Communication skills., history taking of a particular symptom.

Prelims and MUHS Final Practical

Seat No.	Long case including communication skills	OSCE (4 stations)	Log book and Journal viva	Dark room instruments	Operative instruments	Practical & Oral
Max. Marks	50	20	10	10	10	100

*Communication skills to be assessed by Kalamazoo Consensus, clinical signs to be assessed by either GLOBAL Rating Scale or OSCE, Psychomotor Skills to be assessed by OSCE with checklist. If the skills are small, 2 or 3 skills may be combined.

Internal Assessment Theory Examination (I)

Ophthalmology

Instructions:

SECTION "A" MCQ

1) *Put ☒ in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (10 Marks)

1. Multiple Choice Questions (Total 10 MCQ of One mark each) (1x10=10)

a) b) c) d) e) f) g) h) i) j)

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Use a common answer book for all sections.*

SECTION "B" (40 Marks)

2. Long Answer Questions structured clinical questions (15 x1=15)

a)

3.Short Answer Questions (Any 5 out of 6),(including 1 on AETCOM) (5 x 5=25)

a) b) c) d) e) f)

MUHS Final Theory Examination

Ophthalmology

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

SECTION "A" MCQ

Instructions:

5) Put ☒ in the appropriate box below the question number once only.
6) Use blue ball point pen only.
*7) Each question carries **One mark.***
8) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (1x20=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B" & "C"

Instructions:

*1) Use **blue/black** ball point pen only.*
*2) **Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
*3) **All** questions are **compulsory**.*
*4) The number to the **right** indicates **full** marks.*
*5) Draw diagrams **wherever** necessary.*
6) Use a common answer book for all sections.

SECTION "B" (40 Marks)

2. Long Answer Questions (Any 2 out of 3) structured clinical questions (15 x 2=30)

a) b) c)

3.Short Answer Questions (All 3),(including 1 on AETCOM) (5 x 3=15)

a) b) c)

SECTION C (40 Marks)

4 Long answer questions (15x1=15)

a)

5 Short answer questions(any 4 out of 5) (Clinical Reasoning) (5x4=20)

a) b) c) d) e)

College Logo

Name of the Institute

MUHS Logo

LOG BOOK

DEPARTMENT OF OPHTHALMOLOGY

CONTENTS

Sr.No.	Subject	Remarks
1	CERTIFICATE	
2	BIODATA OF THE CANDIDATE	
3	INTRODUCTION & OBJECTIVES OF CBME CURRICULUM	
4	SELF DIRECTED LEARNING / TUTORIALS / SEMINARS / EXTRA CURRICULAR ACTIVITIES	
5	CLINICAL SKILLS – LIST OF COMPETENCIES	
6	PSYCHOMOTOR SKILLS – LIST OF COMPETENCIES	
7	COMMUNICATION SKILLS – AETCOM	
8	PHASE III/I	
9	REFLECTION ON AETCOM MODULE	

LOGBOOK CERTIFICATE

This is to certify that this log book is the bonafide record of Mr. / Ms ..... Roll No……..Admission Year ……., of the Department of Ophthalmology at …….Medical College.

The log book is as per the guidelines of Competency Based Undergraduate Medical Education Curriculum, Graduate Medical Regulation 2019.

He / She has satisfactorily attended/ completed all assignments mentioned in this logbook as per the guidelines prescribed by National Medical Commission.

_____

Head of Department of Ophthalmology

Signature with Date

BIODATA OF THE CANDIDATE

PHOTO

Name of the student:

Name of the course: MBBS

Date of birth:

Father's / Guardian's name:

Mother's name:

Blood group:

Permanent Address:

……

…….

Temporary Address:

……

……..

Student's contact no:

Father's/guardian's contact no:

Student's mail id:

Father's/guardian's mail id:

Candidates Signature: …….. Date: .....

GENERAL INSTRUCTIONS

1) The log book is a record of the academic / nonacademic activities of the student. Each Medical student is responsible for maintaining their logbook.

2) This logbook is prepared as per the guidelines of NMC for implementation of Competency based curriculum for 3 RD Professional MBBS students in the subject of Ophthalmology.

3) Students are instructed to keep their logbook entries up to date. It is the responsibility of the student to enter their activity in respective pages & get them duly singed by the supervising faculty.

4) Entries in the logbook will be in accordance with activities done in the department & have to be scrutinized by the Head of the department.

5) The logbook assessment will be based on multiple factors like
   - Overall presentation
   - Active participation in the sessions
   - Quality of write up of reflections
   - Timely completions
   - Attendance

6) The logbook shall be kept as record work of the candidate for the department & be submitted to department as a bonafide record of the candidate before appearing for the University examination.

NOTE:

1. A **clear record** of all components that add to the internal assessment marks needs to be maintained by the institution and retained by them for at least **2 years** after passing of the examination. Institutions may be asked to provide these details by the University as and when required.

The contents in the log book are suggested guidelines. The institutions can make **necessary changes as per the needs**

ATTENDANCE

Every candidate should have attendance not less than 75% of the total classes conducted in theory, practical and clinical jointly in each calendar year calculated from the date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed to be eligible to appear for the university examinations.

For appearing at the University Examination, student should have minimum 75% attendance in each subject.

A candidate lacking in the prescribed attendance in any subject(s) should not be permitted to appear for the examination in that subject(s)

Students cannot appear in part or separately in individual subjects during the first appearance at the Professional examination.

The Principal should notify the attendance details at the end of each professional phase without fail under intimation to this University.

Records of Internal Assessment Examinations

Sr. No.	Exam No.	Date	Theory	Date	Practical including Viva	Feedback provided	Signature of student	Signature of teacher
1	I Internal Assessment		----/50		----/50			
2	II Internal Assessment		----/50		----/50			
3	III Internal Assessment		----/100		----/100			
4	Calculation of Internal Assessment Marks		200/4		200/4			
5	Final Internal Assessment Marks (to be submitted to University)		50		50			

	Theory	**Practical**
Phase II	**50**	**50**
Phase III/I	**50**	**50**
Phase III/II	**100**	**100**
Total	**200**	**200**
Conversion	**50**	**50**

.....

Signature of Head of the Department

Self Directed Learning, Seminars, Tutorials, Projects, Quizzes, extracurricular activities

Sr. No.	Self Directed Learning, Seminars,Tutorials, Projects, Quizzes, extracurricular activities	Date	Phase III/I	Phase III/II	Signature of Teacher

Reflection (minimum 200 words) - 1

TOPIC : **DATE :**

Reflection (minimum 200 words) - 2

TOPIC : **DATE :**

LOGBOOK CLINICAL SKILLS : LIST OF COMPETENCIES

Clinical skills can be assessed by case presentation, case-based discussion, objective structured clinical assessment the checklist, MiniCex, Simulated patients as per the institutional preference.

RECORDING FORM FOR MINI – CEX

EVALUATOR : DATE :

STUDENT :

YEAR :

PATIENT DIAGNOSIS :

SETTINGS : AMBULATORY NEW COMPLEXITY : LOW

IN PATIENT FOLLOW UP MODERATE

ED HIGH

OTHER :

PATIENT AGE PATIENT SEX

FOCUS : DATA GATHERING / DIAGNOSIS / THERAPY / COUNSELLING

1. **MEDICAL INTERVIEWING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

2. **PHYSICAL INTERVIEWING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

3. **HUMANISTIC QUALITIES** / PROFFESIONALISM (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

4. **CLINICAL JUDGEMENT** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

5. **COUNSELLING SKILLS** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

6. **ORGANIZATION / EFFICIENCY** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

7. **OVERALL CLINICAL COMPETENCE** (OBSERVED / NOT OBSERVED)

1 2 3 / 4 5 6 / 7 8 9

MINI CEX TIME : OBSERVING : _____ MINS

PROVIDING FEEDBACK _____ MINS

UNSATISFACTORY 1,2,3

SATISFACTORY 4, 5, 6

SUPERIOR 7, 8, 9

EVALUATOR SATISFACTION WITH MINI CEX

LOW 1 2 3 4 4 5 6 7 8 9 HIGH

RESIDENT SATISFACTION WITH MINI CEX

LOW 1 2 3 4 4 5 6 7 8 9 HIGH

COMMENTS :

STUDENT SIGNATURE EVALUATOR SIGNATURE

Competency # addressed	Name of Activity
OP1.2	Demonstrate the steps in performing the visual acuity assessment for distance vision,near vision,colour vision,the pin hole test ,the menace and blink reflexes
OP2.2	Demonstrate the symptoms and signs of lid conditions including hordeolum externum, blephritis,preseptal cellulitis,,dacryocystitis,dermoid ,ptosis, entropion,lid lag ,lagophthalmos
OP2.3	Demonstrate under supervision clinical procedures performed in the lid including Bell s phenomena assessment of entropion/ectrpion, regurgitation test, Creigler s massage, cilia removal by epilation
OP3.1	Elicit, document and present an appropriate history in a patient with a “red eye”including congestion,discharge and pain.
OP3.2	Demonstrate document and present the correct method of examination of a “red eye”incuding vision assessment ,corneal lustre, pupil abnormality, ciliary tenderness
OP3.8	Demonstrate the correct technique of removal of foreign body from the eye in a simulated environment
OP3.9	Demonstrate the correct technique of instillation of eye drops in a simulated environment
OP4.8	Demonstrate technique of removal of foreign body in the cornea in a simulated environment
OP6.6	Identify and Demonstrate the clinical features and distinguished diagnose common clinical conditions affecting the anterior chamber

OP7.3	Demonstrate the correct technique of ocular examination in a patient with a cataract
OP7.5	To participate in the team for cataract surgery
OP8.3	Demonstrate the correct technique of a fundus examination and describe and distinguish the funduscopic features in a normal condition and in conditions causing an abnormal retinal exam

LOGBOOK PSYCHOMOTOR / PERFORMANCE SKILLS :

Skills can be assessed by objective structured clinical assessment with checklist, Global Rating Scale, Simulated patients as per the institutional preference.

Colleges are instructed prepare modules for skill training as per NMC guidelines.

Module 5 Skill Training.

I – independent certification

D- demonstration

LIST OF COMPETENCIES

Competency # addressed	**Name of Activity**
	Perform basic surgical skill such as First Aid including suturing and minor surgical procedures in simulated environment
(I)	Eye patching (correct technique), Eye Bandaging (post-surgery)
(I)	Incision and Drainage

LOGBOOK FOR
AETCOM SKILLS

Counselling for Investigation, Treatment, Prognosis, Blood donation, Organ Donation, Breaking Bad news. All types of consent. Medicolegal aspects and Ethics, Empathy and professionalism as per the Phase of the MBBS. Include cases of Allied branches also.

Competency to be assessed during Clinical postings and /or small group discussions.

AetCom skills can be assessed by use of Kalamazoo consensus.

Criteria
Builds relationship
Opens the discussion
Gathers information
Understands the patient's perspective
Shares information
Manages flow
Overall rating
Signature of teacher

Communication skills rating scale adapted from Kalamazoo consensus statement

Rating 1-3 - Poor, 4 -6 Satisfactory, 6 -10 Superior

LIST OF COMPETENCIES-For AETCOM

Competency # addressed	Name of Activity
OP4.10	Counsel patients and families about the eye donation in a simulated environment
OP6.10	Counsel patients with conditions of the iris and anterior chamber about their diagnosis, therapy and prognosis in an empathetic manner in a simulated environment
OP 7.6	Administer informed consent and counsel patients for cataract surgery in a simulated environment

PHASE II-Clinical (minimum four assessment)

SR. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd, casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE II-Psychomotor

SR. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										

PHASE II- AetCom

SR. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										

PHASE III Part I -Clinical (minimum four assessments)

SR. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										

6.										

PHASE III Part I-Psychomotor skill

SR. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										

5.										

PHASE III Part I - AetCom (Minimum Four assessments)

SR. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										

REFLECTION ON AETCOM MODULE

Reflection (minimum 200 words)-2 Date:

Module 4.6 - Case studies in ethics and the doctor-industry relationship

Competency addressed	Level	Assessment
Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts	SH	Participation in SDL and discussion

Signature of Teacher-in-charge

Pediatrics

Course Content

(Based on Medical Council of India,
Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 2 / ~~3~~; page nos. 150-201)

1. Total Teaching hours: 105 hours (Lectures + Tutorials);
   15 hours (Self-directed learning);
   174 hours Clinical posting
2. A. Lectures(hours): 40(20 hours each in III MBBS Part I & Part II)
   B. Self-directed learning (hours): 15 (5 hours in III MBBS Part I & 10 hours in III MBBS Part II)

   C. Clinical Postings (hours): 174 (2 weeks/ 4 weeks/ 4 weeks)
   D. Small group teachings/tutorials/Integrated teaching/Practicals (hours)**:**
   65 hours (30 hours in III MBBS Part I and 35 hours in III MBBS Part II)

- 8 symposia will be conducted from theory topics in
  - 15 hours of Self-directed Learning (3 in III MBBS (Part I) and
  - 5 in III MBBS (Part II))
- Two (02) Full day workshops
  - IMNCI
  - NRP
- Module 4.7 AETCOM Module will be covered in III MBBS (Part II) (05 hours)

Tutorials/ Small Group Discussions III (Part I) MBBS (30 hours)

S. No	Topic	Hours	Lectures (Competency No.)	SLO	Horizontal Integration
1	Normal Growth and Development	01	Developmental milestones (PE 1.5, 1.6)	1. Definition of Development 2. Principals of development 3. Factors affecting Development 4. Domains of Development 5. Milestones in various domains	Psychiatry

				6. Developmental assessment	
2	Common problems related to growth	02	Failure to thrive (PE 2.1, 2.4)	1.Definition 2. Etiology 1. Clinical Features 2. Evaluation of a child with Failure to thrive 3. Management	
			Short stature (PE 2.6)	1. Definition 2. Etiology 3. Clinical Features 4. Evaluation of a child with Short stature 5. Management	
3.	Care of the Normal Newborn, and High-risk Newborn	02	Care of normal newborn (PE 20.1, 20.2, 20.6,)	1. Define the common neonatal nomenclatures including the classification 2. Describe the characteristics of a Normal Term Neonate and High-Risk Neonates. 3. Explain the care of a normal neonate	Obs & Gynae
			Temperature regulation and Neonatal hypothermia (PE 20.12)	1. Temperature regulation in neonates 2. Disorders of temperature regulation 3. Definition of hypothermia 4. Prevention of hypothermia 5. Clinical features of hypothermia 6. Management of hypothermia	
4.	To promote and support optimal Breast feeding for infants	01	Breast Feeding (PE 7.1, 7.2, 7.3, 7.4, 7.6)	1. Awareness on the cultural beliefs and practices of breast feeding. 2. Enumerate advantages of breast feeding 3. Explain the physiology of lactation. 4. Technique of breast feeding 5. Problems in breast feeding 6. Enumerate the baby friendly hospital initiatives 7. Describe the composition and types of breast milk 8. Discuss the differences between cow's milk and Human milk. 9. Discuss the advantages of breast milk. 10. Overview about expressed breast milk	Obs & Gynae
5.	Complementary Feeding	01	Complementary feeding and	1. Define the term Complementary Feeding. 2. Discuss the principles, the initiation,	

			IYCF (PE 8.1, 8.2, 8.3)	attributes, frequency, techniques and hygiene related to Complementary Feeding 3. IYCF 4. Enumerate the common complimentary foods	
6.	Provide nutritional support, assessment and monitoring for common nutritional problems	01	Protein Energy Malnutrition (PE 10.1, 10.2, 10.4, 10.6)	1. Define malnutrition 2. Classify malnutrition including WHO classification, 3. Describe the etio-pathogenesis, clinical features, complication of Severe Acute Malnourishment (SAM) and Moderate Acute Malnutrition (MAM). 4. Differentiate between kwashiorkor and marasmus 5. Outline the clinical approach to a child with SAM and MAM. 6. Management of a child with SAM and MAM. 7. Enumerate the role of locally prepared therapeutic diets and ready to use therapeutic diets. 8. Strategies to prevent malnutrition	
7.	Obesity in Children	01	Obesity (PE 11.1, 11.2, 11.6)	1. Define obesity 2. Describe the common etiology, clinical features and management of obesity in children. 3. Discuss the risk approach for obesity and criteria for referral 4. Discuss the prevention strategies	
8.	Micronutrients in health and disease 1: (Vitamins A,D,E,K, B Complex and C) Micronutrients in health and disease 2: Iron, Iodine,	04	Vitamin A Vitamin E, K (PE 12.1, 12.2, 12.4, 12.5, 12.11, 12.12, 12.13, 12.14)	**Vitamin A** 1. RDA, dietary sources of Vitamin A and their role in Health and disease. 2. Describe the causes, clinical features, diagnosis and management of Deficiency / excess of Vitamin A. 3. Discuss the Vitamin A prophylaxis program and their recommendations **Vitamin E** 1. Discuss the RDA, dietary sources of Vitamin E and their role in health and disease.	

	Calcium and Magnesium			2. Describe the causes, clinical features, diagnosis and management of deficiency of Vitamin E. **Vitamin K** 1. Discuss the RDA, dietary sources of Vitamin K and their role in health and disease. 2. Describe the causes, clinical features, diagnosis management and prevention of deficiency of Vitamin K	
			Vitamin B, C and Iodine deficiency disorders (PE 12.15, 12.16, 12.18, 12.19, 12.20, 13.7, 13.8, 13.10, 13.10)	**Vitamin B** 1. Discuss the RDA, dietary sources of Vitamin B and their role in health and disease 2. Describe the causes, clinical features, diagnosis and management of deficiency of B complex Vitamins. **Vitamin C** 1. Discuss the RDA , dietary sources of Vitamin C and their role in Health and disease 2. Describe the causes, clinical features, diagnosis and management of deficiency of Vitamin C (scurvy) **Iodine deficiency Disorder** 1. Discuss the RDA, dietary sources of Iodine and their role in Health and disease. 2. Describe the causes, clinical features, diagnosis and management of deficiency of Iodine. 3. Discuss the National Goiter Control program and their recommendations.	
			Iron deficiency anemia (PE 13.1, 13.2, 13.5, 13.6)	1. Discuss the RDA, dietary sources of Iron and their role in health and disease' 2. Describe the causes, clinical features,diagnosis and management of Fe deficiency 3. Discuss the National Anemia control program and its recommendations.	
			Vitamin D and Calcium & Magnesium deficiency (PE 12.6, 12.7,	**Vitamin D/Ca/Mg** 1. Discuss the RDA, dietary sources of Vitamin D and their role in health and disease. 2. Describe the causes, clinical features,	

			12.9, 12.10, 13.11, 13.12, 13.13, 13.14)	diagnosis and management of Deficiency / excess of Vitamin D (Rickets and Hypervitaminosis D). 3. Discuss the role of screening for Vitamin D deficiency 4. Discuss the RDA, dietary sources of Calcium and their role in health and disease 5. Describe the causes, clinical features, diagnosis and management of Ca Deficiency 6. Discuss the RDA, dietary sources of Magnesium and their role in health and disease**.** 7. Describe the causes, clinical features, diagnosis and management of Magnesium Deficiency	
29.	Anemia and other Hemato-oncologic disorders in children	02	Anemia (PE 29.1)	1. Definition 2. Etiopathogenesis 3. Classification 4. Approach to a child with anemia	
			Nutritional anemia (PE 29.2, 29.3, 29.5)	**Iron def anemia/ Megaloblastic anemia** 1. Etiopathogenesis 2. Clinical features 3. Lab investigations 4. Management 5. Discuss the National Anemia Control Program	
9.	Fluid and electrolyte balance	01	Fluid and electrolytes (PE 15.1, 15.2)	1. Composition of body fluids 2. Water balance and Osmolality 3. Normal maintenance fluid and electrolyte requirements 4. Sodium balance and its disorders 5. Potassium balance and its disorders 6. Overview of Acid-Base disorders	
10.	National Programs, RCH – Universal Immunizations program	02	Vaccines in children (PE 19.1, 19.2, 19.3, 19.4)	1. Components of the Universal Immunization Program and the National Immunization Program. 2. Epidemiology of Vaccine preventable diseases 3. Vaccine description with regard to classification of vaccines, strain used, dose, route, schedule, risks, benefits and side effects, indications and	

				contraindications. (BCG, OPV, IPV Hep B, DPT, Hib, MMR) 4. Define cold chain and discuss the methods of safe storage and handling of vaccines	
			Immunization in special situations and newer vaccines (PE 19.5, 19.16)	1. Immunization in special situations – HIV positive children, immunodeficiency, pre-term, organ transplants, those who received blood and blood products, splenectomised children, adolescents, travelers. 2. Enumerate available newer vaccines and their indications including pentavalent pneumococcal, rotavirus, JE, typhoid IPV & HPV. 3. Combination vaccines 4. AEFI	
11	Respiratory system	02	RTI GEM – I (PE 28.1, 28.2, 28.3, 28.4, 28.5, 28.6, 28.7, 28.8))	**Naso pharyngitis/ Pharyngo Tonsillitis/ Acute Otitis Media (AOM)** 1. Etio-pathogenesis 2. Clinical features 3. Management 4. Complications	
				Stridor/Epiglottitis/Acute laryngotracheobronchitis/Foreign Body Aspiration 1. Etiopathogenesis 2. Clinical features 3. Management	
			RTI GEM -II (PE 28.18)	**Bronchiolitis and wheeze associated LRTI/ Empyema/Lung Abscess** 1. Etio-pathogenesis 2. Clinical features 3. Diagnosis 4. Management 5. Prevention	
12.	Vaccine preventable Diseases& Tuberculosis	02	Fever &Exanthematous Fever (PE 34.14, 34.15)	1. Enumerate the common causes of fever 2. Etiopathogenesis 3. Clinical features 4. Complications 5. Management 6. Approach to a child with Exanthematous Fever	
			Measles, Mumps, Rubella &	1. Etiopathogenesis 2. Clinical features 3. Complications	

			Chicken pox (PE 34.15)	4. Management 5. Prevention 6. Measles, Mumps, Rubella & Chicken pox vaccines	
13.	Chromosomal Abnormalities	01	Down syndrome, Turner &Klinefelter syndrome (PE 32.1, 32.3, 32.4, 32.5, 32.6, 32.8, 32.9, 32.10, 32.11, 32.13)	1. Genetic basis 2. Risk factors 3. Clinical features 4. Complications 5. Prenatal diagnosis 6. Management 7. Genetic counselling.	General Medicine – PE 32.3, 32.9 Obs& Gynae – PE 32.9
14.	Diarrheal diseases and Dehydration	01	Diarrheal diseases & dehydration incl Persistent diarrhea, Chronic diarrhea and dysentery (PE 24.1, 24.2, 24.3, 24.4, 24.5, 24.6, 24.7, 24.8, 24.14)	1. Etio-pathogenesis 2. Classification 3. Clinical presentation 4. Management 5. Physiological basis of ORT 6. Types of ORS 7. Composition of various types of ORS 8. Classification and clinical presentation of various types of diarrheal dehydration 9. Types of fluid used in Pediatric diarrheal diseases and their composition 10. Role of antibiotics, antispasmodics, anti-secretory drugs, probiotics, anti-emetics in acute diarrheal diseases	
15.	Pediatric Emergencies – Common Pediatric Emergencies	02	Poisoning (PE 27.8, 14.1, 14.2, 14.3, 14.4)	1. Clinical approach to a child with suspected poisoning 2. **Common poisonings – Hydrocarbon/OP/PCM/Lead/Envenomation** 3. Etiopathogenesis 4. Clinical features 5. Lab investigations 6. Management	General Medicine
			Child abuse (PE 27.29)	1. Causes 2. Clinical presentation Medico-legal implications	
16.	Allergic Rhinitis, Atopic Dermatitis,	01	Allergy in children (PE 31.1, 31.3, 31.12)	**Allergic Rhinitis/Atopic Dermatitis/Urticaria Angioedema** 1. Etiology 2. Clinical features	

	Bronchial Asthma , Urticaria Angioedema			3. Management 4. Complications 5. Prevention	
17.	Adolescent health and common problems related to Adolescent Health.	01	Adolescence & Puberty (PE 6.10, 6.11)	1. Visit to the Adolescent Clinic. Discuss the objectives and functions of AFHS (Adolescent Friendly Health Services) and the referral criteria.	Psychiatry
18.	Common problems related to Development-1 (Developmental delay, Cerebral palsy)	01	Developmental delay (PE 3.5, 3.6, 3.7)	1. Visit a Child Developmental Unit and observe its functioning. Discuss the role of the child developmental unit in management of developmental delay. Discuss the referral criteria for children with developmental delay	
19.	Common problems related to Development-2 (Scholastic backwardness, Learning disabilities, Autism ADHD)	01	Scholastic backwardness and Learning Disabilities (LD) (PE 4.5, 4.6, 5.10,5.11)	1. Visit to child guidance clinic. Discuss the role of Child Guidance clinic in children with Developmental problems& Behavioral problems.	
TOTAL		**30**			

Theory III (Part I) MBBS (20 hours)

S. No	Topic	Hours	Lectures (Competency No)	SLO	Horizontal Integration
1.	Normal Growth and Development	01	Growth & Development (PE 1.1, 1.2, 1.3, 1.5)	1. Definition of Growth 2. Definition of Development 3. Physiology of Growth & Development 4. Normal Growth – Somatic and physical 5. Assessment of Growth	Psychiatry

				parameters; Growth charts 6. Factors affecting Growth & Development 7. Overview of disorders related to Growth & Development	
2.	Common problems related to Development-1 (Developmental delay, Cerebral palsy)	02	Developmental delay (PE 3.1, 3.2, 30.10)	1. Definition 2. Developmental delay vs Intellectual disability 3. Etiology 4. Clinical Features 5. Approach to developmental delay and ID 6. Prevention and management	
			Cerebral palsy (PE 3.8, 30.11)	1. Definition 2. Etiopathogenesis 3. Types of CP 4. Evaluation of a child with CP 5. Prevention and management	Physical Medicine & Rehabilitation
3.	Common problems related to Development-2 (Scholastic backwardness, Learning disabilities, Autism ADHD)	02	Scholastic backwardness and Learning Disabilities (LD) (PE 4.1, 4.2)	1. Causes of Scholastic backwardness 2. Approach to a child with Scholastic backwardness 3. Definition of LD 4. Types of LD and clinical features 5. Etiology 6. Approach to a child with LD and management	
			ADHD and Autism (PE 4.3, 4.4)	1. Etiology of ADHD 2. Clinical features of ADHD 3. Diagnosis and management of ADHD 4. Etiology of Autism 5. Clinical features of Autism 6. Diagnosis and management of Autism	
4.	Common problems related to behavior	01	Behavioral problems of children incl Enuresis & Encopresis (PE 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9)	1. Describe the clinical features, diagnosis and management of common behavioral problems like • Thumb sucking, • Feeding problems, • Nail biting • Breath Holding spells, • Pica,	Psychiatry

				• Fussy infant. 2. Definition of enuresis and encopresis 3. Differentiate between primary and secondary enuresis 4. Maturation of bowel and bladder control 5. Etiology of Enuresis and Encopresis 6. Clinical features of Enuresis and Encopresis 7. Management of Enuresis and Encopresis	
5.	Adolescent health and common problems related to Adolescent Health.	01	Adolescence & Puberty (PE 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.12, 6.13)	1. Define Adolescence 2. Stages of adolescence and SMR 3. Describe the physical, physiological and psychological changes during adolescence and Puberty. 4. Outline the general health problems during adolescence. 5. Describe adolescent sexuality and common problems related to it. 6. Explain the Adolescent Nutrition and common nutritional problems. 7. Outline the common Adolescent eating disorders (Anorexia Nervosa, Bulimia). 8. Describe the common mental health problems during adolescence. 9. Enumerate the importance of obesity and other NCD in adolescents. 10. Enumerate the prevalence and the importance of recognition of sexual drug abuse in adolescents and children.	Psychiatry
6.	Normal nutrition, assessment and monitoring.	01	Normal Nutrition (PE 9.1, 9.2, 9.3, 9.7)	1. Describe the age-related nutritional needs of infants, children and adolescents including micronutrients and	

				vitamins 2. Concept of RDA and balanced diet. 3. Describe the tools and methods for assessment and classification of nutritional status of infants, children and adolescents. 4. Explains the Calorific value of common Indian foods	
7.	Vaccine preventable Diseases& Tuberculosis	8	Tuberculosis in children (PE 34.1, 34.2, 34.12, 34.13)	1. Epidemiology 2. Clinical features and clinical types 3. Complications of Tuberculosis 4. Diagnostic tools for childhood tuberculosis. 5. Indications and discuss the limitations of methods of culturing M. Tuberculosis. 6. Newer diagnostic tools for Tuberculosis including BACTEC CBNAAT and their indications	Respiratory Medicine
			Management of tuberculosis (PE 34.3, 34.4)	1. Various regimens for management of Tuberculosis as per National Guidelines. 2. Preventive strategies adopted and the objectives and outcome of the National Tuberculosis Control Programme	Respiratory Medicine
			Diphtheria, Pertussis, Tetanus (PE 34.16)	1. Etiopathogenesis 2. Clinical features 3. Complications 4. Management 5. Prevention 6. Diphtheria, Pertussis, Tetanus vaccines	
			Enteric fever (PE 34.17)	1. Etiopathogenesis 2. Clinical features 3. Complications 4. Management 5. Prevention 6. Typhoid vaccines	
			Rickettsial diseases (PE 34.20)	1. Etiopathogenesis 2. Clinical features 3. Complications 4. Management 5. Prevention	
			Parasitic infections	**Common Parasitic infections - leishmaniasis, filariasis, helminthic**	

			(PE 34.19)	**infestations, amebiasis, giardiasis** 1. Etiopathogenesis 2. Clinical features 3. Complications 4. Management 5. Prevention	
			Malaria (PE 34.19)	1. Etiopathogenesis 2. Clinical features 3. Complications 4. Management 5. Prevention **6.** National Malaria Eradication Programme	
			Dengue Fever (PE 34.18)	1. Etiopathogenesis 2. Clinical features 3. Complications 4. Management 5. Prevention 6. Overview of Chikungunya	
8.	Systemic Pediatrics-Central Nervous system	01	Acute Flaccid Paralysis (AFP) and Poliomyelitis (PE 30.13)	1. Etiology 2. Approach to a child with AFP 3. Evaluation 4. Management 5. AFP Surveillance	
9.	Endocrinology	03	Hypothyroidism (PE 33.1)	1. Physiology of thyroid gland 2. Thyroid function test 3. Etiology 4. Congenital vs Acquired 5. Clinical features 6. Evaluation 7. Management 8. New-born Screening	
			Diabetes mellitus in children and DKA (PE 33.4)	1. Etiopathogenesis 2. Diagnostic criteria 3. Classification 4. Clinical features 5. Management 6. Complications incl DKA	
			Disorders of puberty (PE 33.8)	**Precocious and delayed Puberty** 1. Definition 2. Etiology 3. Clinical Features 4. Evaluation 5. Management	
TOTAL		**20**			

Self-Directed Learning III (Part I) MBBS (05 hours)

S. No	Topic	Hours	Lectures (Competency No.)	SLO	Horizontal Integration
1.	The National Health Programs, NHM The National Health Programs, RCH	02	National programs pertaining to maternal & child health, child survival & safe motherhood (PE 17.1, 17.2, 18.1, 18.2)	1. State the vision and outline the goals, strategies and plan of action of NHM and other important national programs pertaining to maternal and child health including RMNCH A+, RBSK, RKSK, JSSK mission Indra Dhanush and ICDS. 2. List and explain the components, plan, outcome of Reproductive Child Health (RCH) program and appraise its monitoring and evaluation 3. Explain preventive interventions for child survival and safe motherhood	Obs & Gynae
TOTAL		**02**			

Tutorials/ Small Group Discussions III (Part II) MBBS (35 hours)

S. No	Topic	Hours	Domain (Competency No.)	SLO	Horizontal Integration
1	Group Discussions	01	Fluids & Electrolytes, Nutrition (PE 15.3, 15.4, 15.5, 9.5)	1. Calculate fluid and electrolyte imbalance, Interpret electrolyte report, 2. Calculate the fluid and electrolyte requirement in health 3. Plan an appropriate diet in health & disease	
		01	Cardiac Failure (PE 23.11, 23.16, 23.17, 23.18)	1. Develop a treatment plan and prescribe appropriate drugs including fluids in cardiac diseases, anti -failure drugs, and inotropic agents. 2. Discuss the indications and limitations of Cardiac catheterization. 3. Enumerate some common cardiac surgeries like BT shunt, Potts and Waterston's and corrective surgeries 4. Demonstrate empathy while dealing with cardiac disease.	
		01	Oxygen Therapy (PE 27.9, 27.10, 14.5)	1. Discuss oxygen therapy in Pediatric emergencies and modes of administration. 2. Observe the various methods of administering Oxygen. 3. Discuss oxygen toxicity and free radical injury	
		01	Counselling (PE 2.3, 3.4, 8.5, 27.32, 27.33, 28.20)	1. Counselling a parent with failing to thrive child 2. Counselling a parent with developmental delay 3. Counsel & educate mothers on the best practices in complimentary feeding 4. Obtain Informed Consent.	

				5. Counsel parents of dangerously ill/terminally ill child to break bad news 6. Counsel the child with asthma on the correct use of inhalers in a simulated environment	
		01	Hemat (PE 29.18, 29.20)	1. Enumerate the referral criteria for Hematological conditions. 2. Enumerate the indications for splenectomy and precautions	
2.	Radiology	01	X-Ray/USG/Neuroimaging (PE 21.12, 21.13, 23.12, 26.9, 28.17, 30.21, 30.22, 31.9, 34.8)	1. Interpret report of Plain X Ray of KUB 2. Enumerate the indications for and Interpret the written report of Ultra sonogram of KUB 3. Interpret a chest X ray and recognize Cardiomegaly 4. Interpret Liver USG 5. Interpret X-ray of the paranasal sinuses and mastoid; and /or use written report in case of management 6. Interpret CXR in foreign body aspiration and lower respiratory tract infection, understand the significance of thymic shadow in pediatric chest X-rays 7. Enumerate the indication and limitations &Interpret the reports of CT, MRI Brain & Spine 8. Interpret CX Ray in Asthma 9. Interpret a Chest Radiograph in pediatric TB	
3.	Cards (Case Scenario based)	01	(PE 21.11, 23.13, 23.14. 24.13, 26.9, 26.11, 28.16, 29.14, 19.15, 29.16, 30.20, 30.21, 30.22, 33.3, 33.6, 33.9, 34.9, 34.10)	1. Interpret Hemogram and Iron Panel 2. interpret the common analytes in a Urine examination 3. Interpret Pediatric ECG 4. Choose and Interpret blood reports in Cardiac illness 5. Interpret RFT and electrolyte report 6. Interpret Liver Function Tests,	

				viral markers. 7. Enumerate indications of UGI Endoscopy 8. Interpret blood tests relevant to upper respiratory problems. 9. Interpret CBC, LFT in anemia 10. Perform and interpret peripheral smear 11. Discuss the indications for Hemoglobin electrophoresis and interpret report 12. Interpret and explain the findings in a CSF analysis 13. Interpret and explain neonatal thyroid screening report 14. Perform and interpret Urine Dip Stick for Sugar. Interpret Blood sugar reports and explain the diagnostic criteria for Type 1 Diabetes 15. Interpret the reports of EEG 16. Perform Sexual Maturity Rating (SMR) and interpret 17. Interpret blood tests in the context of laboratory evidence for tuberculosis. Discuss the various samples for demonstrating the organism e.g. Gastric Aspirate, Sputum, CSF, FNAC.	
4.	Skills Lab	02	(PE 15.6, 15.7, 19.9, 19.13, 20.3, 24.15, 24.16, 24.17, 26.10, 27.20, 29.17, 30.23)	1. Demonstrate the steps of inserting an IV cannula in a model 2. Demonstrate the steps of inserting an interosseous line in a mannequin 3. Demonstrate the correct administration of different vaccines in a mannequin. 4. Describe the components of safe vaccine practice – Patient education/ counselling; adverse events following immunization, safe injection practices, documentation and Medico-legal implications 5. Perform Neonatal resuscitation	AETCOM – PE 19.9

				in a manikin 6. Perform NG tube insertion in a manikin 7. Perform IV cannulation in a model 8. Demonstrate the technique of liver biopsy or perform Liver Biopsy in a simulated environment. 9. Demonstrate performance of bone marrow aspiration in manikin 10. Perform in a mannequin lumbar puncture. Discuss the indications, contraindication of the procedure	
5.	Genito-Urinary system	02	Hypertension in children (PE 21.17)	1. Definition 2. Etiopathogenesis 3. Grading 4. Clinical features 5. Management 6. Complications 7. Acute severe hypertension	
			Voiding Disorders (PE 21.15)	1. Discuss & Enumerate the referral criteria for children with genitourinary disorder 2. Counsel & educate patients regarding referral	
6.	Cardiovascular system: Heart disease	04	Congestive cardiac failure in infants and children (PE 23.3)	1. Etiology 2. Pathogenesis 3. Clinical presentation 4. Management	
			Acyanotic congenital heart diseases (PE 23.1)	**VSD, ASD and PDA** 1. Etiology 2. Hemodynamic changes 3. Clinical features 4. Investigations 5. Management	
			Cyanotic congenital heart diseases (PE 23.2)	1. Classify Cyanotic congenital heart disease **Fallot's Physiology** 2. Etiology 3. Hemodynamic changes 4. Clinical features 5. Investigations	

				6. Management	
			Acquired Heart Disease (PE 23.4, 23.5, 23.6)	**Infective endocarditis** 1. Etio-pathogenesis 2. Clinical features 3. Diagnosis 4. Management **Acute rheumatic fever** 1. Etio-pathogenesis 2. Clinical features 3. Diagnosis 4. Management and prevention 5. Complications	
7.	Pediatric Emergencies – Common Pediatric Emergencies	03	Shock in children (PE 27.5)	1. Definition 2. BP regulation 3. Pathophysiology 4. Classification 5. Monitoring 6. Management	
			Status epilepticus (PE 27.6, 30.9)	1. Definition 2. Etiology 3. Approach to a child with status epilepticus 4. Evaluation 5. Management	
			Unconscious child and Coma (PE 27.8)	1. Definition 2. Etiopathogenesis 3. Evaluation 4. Management 5. Brain death	
8.	Care of the Normal Newborn, and High-risk Newborn	04	Care of low birth weight (LBW) babies (PE 20.11)	1. Definition 2. Etiology 3. Explain the terminologies – IUGR/SGA 4. Clinical features 5. Issues in LBW care 6. Feeding in LBW babies 7. Management of LBW babies 8. Growth monitoring of LBW babies	
			Neonatal hypoglycemia & hypocalcemia (PE 20.13, 20.14)	**Hypoglycemia and hypocalcemia** 1. Definition 2. Etiology 3. Clinical features 4. Management	
			Neonatal Seizures (PE 20.15)	1. Etiology 2. Clinical features 3. Management	

			Perinatal infections (PE 20.17)	TORCH/Tuberculosis/Hep B/Varicella 1. Etiology 2. Transmission 3. Clinical features 4. Management	
9.	Anemia and other Hemato-oncologic disorders in children	02	Hemolytic anemia (PE 29.4)	1. Etiology 2. Classification 3. Approach to a child with hemolytic anemia 4. Management 5. Overview of HS, AIHA and HUS	
			Thalassemia and Sickle Cell Anemia (PE 29.4)	1. Etiology 2. Clinical features 3. Lab investigations 4. Management incl Iron Chelation therapy 5. Complications	
10.	Acute and chronic liver disorders	02	Acute liver disease & Fulminant hepatic failure (PE 26.1, 26.2)	**Acute hepatitis in children – Viral (Hep A,B,C), Autoimmune and Wilsons disease** 1. Etio-pathogenesis 2. Clinical features 3. Management **Fulminant Hepatic Failure in children** 1. Etio-pathogenesis 2. Clinical features 3. Management	
			Chronic liver disease & Portal hypertension (PE 26.3, 26.4, 26.11, 26.12)	**Chronic liver diseases in children** 1. Etio-pathogenesis 2. Clinical features 3. Evaluation 4. Complications – hepatic encephalopathy and ascites 5. management **Portal Hypertension in children** 1. Etio-pathogenesis 2. Clinical features 3. Management 4. Complications	
11.	Respiratory system	01	Pneumonia and ARDS (PE 27.3, 27.4)	1. Etio-pathogenesis 2. Clinical features 3. Diagnosis 4. Management	

				5. Prevention	
4.	Malabsorption	01	Malabsorption (PE 25.1)	1. Etio-pathogenesis 2. Clinical presentation 3. Management 4. Overview of celiac disease	
TOTAL		**28**			

Theory III (Part II) MBBS (20 hours)

S. No	Topic	Hours	Lectures (Competency No.)	SLO	Horizontal Integration
1.	Care of the Normal Newborn, and High-risk Newborn	05	Birth asphyxia (PE 20.7)	1. Definition 2. Etiology 3. Clinical features 4. Management **5.** Prevention	
			Respiratory distress in newborn (PE 20.8)	**RDS/TTNB/MAS** 1. Etiology 2. Clinical features incl scoring systems 3. Management	
			Birth injuries &Hemorrhagic disease of newborn (HDN) (PE 20.9, 20.10)	**Birth Injuries** 1. Etiology 2. Clinical features 3. Management **HDN** 1. Definition and classification 2. Etiology 3. Clinical features 4. Management 5. Prevention	
			Neonatal Sepsis (PE 20.16)	1. Classification 2. Etiology 3. Clinical features 4. Investigations **5.** Management	
			Surgical conditions in newborn (PE 20.20)	TEF, esophageal atresia, anal atresia, cleft lip and palate, congenital diaphragmatic hernia 1. Etiology 2. Clinical presentation 3. Management 4. Causes of acute abdomen in	

				neonates	
2.	Genito-Urinary system	03	UTI (PE 21.1)	1. Etiology and predisposing factors 2. Clinical features 3. Diagnosis 4. Management 5. VUR	
			Approach to hematuria& Acute glomerulonephritis (PE 21.2, 21.4)	Hematuria 1. Definition 2. Diagnostic evaluation 3. Referral criteria Acute Glomerulonephritis 1. Definition 2. Etiology 3. Clinical features of PSGN 4. Management of PSGN 5. Complications	
			Acute kidney injury (AKI) and Chronic kidney disease (CKD) (PE 21.5, 21.6)	1. Definition and classification 2. Etiology and pathophysiology 3. Approach to a child with AKI 4. Management 5. Complications 6. Renal replacement therapy	
3.	Approach to and recognition of a child with possible rheumatologic problem	02	Approach to Rheumatological Problems incl JIA and SLE (PE 22.1)	1. Enumerate the common Rheumatological problems in children. 2. Approach to a child with arthritis 3. Referral criteria for a child with possible rheumatologic problem **JIA/SLE** 1. Definition 2. Etiopathogenesis 3. Clinical subtypes/Clinical features 4. Diagnosis 5. Management	
			Vasculitic disorders in children (PE 22.3)	Enumerate common Vasculitic disorders in children and its classification **Kawasaki disease/HSP** 1. Etiology 2. Clinical features 3. Diagnosis 4. Management	
4.	Anemia and other Hemato-	02	Thrombocytopenia and Hemophilia (PE 29.6, 29.7)	**Thrombocytopenia** **1.** Causes of thrombocytopenia **2.** Etiology of ITP	

	oncologic disorders in children			**3.** Clinical features and management of ITP **Hemophilia** **1.** Approach to a child with bleeding disorder **2.** Etiology and types of hemophilia 3. Clinical features and management of hemophilia	
			Leukemia, Lymphomas and Solid Tumors in children (PE 29.8, 29.9, 21.17)	**ALL/Lymphoma/Wilm'sTumor** 1. Etiology 2. Clinical features **3.** Management	
5.	Systemic Pediatrics-Central Nervous system	08	Meningitis in children (PE 30.1, 30.2)	1. Etio pathogenesis 2. Clinical features 3. Lab investigations 4. Management 5. Prevention 6. Differentiate between Bacterial, Viral and TB Meningitis **7.** Approach to a child with acute febrile encephalopathy	
			Hydrocephalus (PE 30.3)	1. Etio pathogenesis 2. Clinical features 3. Investigations 4. Complications 5. Management 6. Overview of IIH	
			Microcephaly and Neural tube defects (PE 30.4, 30.5)	1. Etio pathogenesis 2. Classification/Types 3. Clinical features 4. Complications 5. Management	
			Infantile hemiplegia/ Stroke (PE 30.6)	1. Etio pathogenesis 2. Clinical features 3. Investigations 4. Management	
			Epilepsy in children (PE 30.8)	1. Definition 2. Pathogenesis 3. Types of Epilepsy 4. Clinical presentation 5. Management 6. Overview of status epilepticus	
			Muscular	**DMD/BMD**	

			dystrophy (PE 30.14)	1. Etiology 2. Clinical features 3. Differential diagnosis 4. Evaluation 5. Management	
			Ataxia in children (PE 30.15)	1. Definition 2. Etiology 3. Clinical features 4. Differential Diagnosis 5. Management	
			Approach to headache in children (PE 30.16)	1. Pathophysiology of headache 2. Approach to a child with headache 3. Types of Headache 4. Management	
TOTAL		**20**			

Self-Directed Learning III (Part II) MBBS (10 hours)

S. No	Topic	Hours	Lectures (Competency No.)	SLO	Horizontal Integration
1.	Systemic Pediatrics-Central Nervous system	04	Floppy infant (PE 30.12)	1. Etiology 2. Clinical features 3. Differential diagnosis 4. Evaluation **5.** Management	
			Febrile seizures (PE 30.7)	1. Definition 2. Types 3. Etio pathogenesis 4. Clinical features 5. Investigations 6. Complications 7. Management	
2.	Care of the Normal Newborn, and High-risk Newborn	02	Neonatal hyperbilirubinemia (PE 20.19)	1. Physiological vs pathological jaundice 2. Etiology 3. Clinical features 4. Approach to a neonate with jaundice 5. Management 6. Follow-up	
3.	Genito-Urinary system	02	Approach to Proteinuria &Nephrotic	Proteinuria 1. Definition 2. Diagnostic evaluation	

			syndrome (PE 21.3)	3. Referral criteria Nephrotic Syndrome 1. Definition 2. Etiology 3. Terminologies – Remission/Relapse/Steroid dependence/Steroid resistance 4. Clinical features 5. Management 6. Complications 7. SDNS/SRNS/Congenital nephrotic syndrome	
4.	Respiratory system	02	Asthma in children (PE 28.19, 28.20, 31.5, 31.7, 31.8, 31.10)	1. Pathophysiology incl Triggers 2. Clinical features 3. Diagnosis and differential diagnosis 4. Management 5. Inhalational therapy 6. Monitoring and modification of treatment 8. Management of acute exacerbation of bronchial asthma	
TOTAL		**10**			

Internal Assessment

Subject – Pediatrics

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Phase		
	Theory	Practical
Second MBBS	-	EOP Practical Examination may be conducted. However, these marks shall not be added to the Internal Assessment.

3rd Year (III MBBS, PART I)

Phase	I-Exam (January)			II-Exam (April)		
	Theory	Practical	Total Marks	Theory	Practical	Total Marks
III/I MBBS	50	50	100	50	50	100

4th Year (III MBBS, PART II)

Clinical posting- 4 weeks

Theory- lectures- 20, tutorials- 35, self-directed learning-10. Total 65 hrs

Phase	III-Exam (May)			IV-Exam (Preliminary examination) (November)		
	Theory	Practical	Total Marks	Theory	Practical	Total Marks
III/II MBBS	50	50	100	100	100	200

Assessment in CBME is ONGOING PRCESS,

No Preparatory leave is permitted.

1. There shall be 4 internal assessment examinations in Pediatrics including Prelim.

2. The suggested pattern of question paper for internal assessment examinations, except prelim examination is attached at the end. Pattern of the prelims examinations should be similar to the University examinations.

3. Internal assessment marks for theory and practical will be converted to out of 25 (theory) + 25 (practical). Internal assessment marks, after conversion, should be submitted to university within the stipulated time as per directives from the University. **Conversion Formula for calculation of marks in internal assessment examinations.**

	Theory	**Practical**
Phase II	**-**	**-**
Phase III/I	**100**	**100**
Phase III/II	**150**	**150**
Total	**250**	**250**
Conversion out of	**25**	**25**
Conversion formula	**Total marks in 4 IA theory examinations /10**	**Total marks in 4 IA Practical examinations /10**
Eligibility criteria after conversion	**10**	**10**
	Combined theory + Practical = 25	

1. While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table.

Total Internal Assessment Marks	Final rounded marks
13.01 to 13.49	13
13.50 to 13.99	14

2. Students must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination of that subject.

3. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

4. Remedial measures

A. Remedial measures for non-eligible students

i) At the end of each internal assessment examination, students securing less than 50% marks shall be identified. Such students should be counseled at the earliest and periodically. Extra classes for such students may be arranged.

ii) If majority of the students found to be weak in a particular area then extra classes must be scheduled for all such students. Even after these measures, if a student is failed to secure 50% marks combined in theory and practical (40% separately in theory and practical) after prelim examination, the student shall not be eligible for final examination.

iii) Non eligible candidates are offered to reappear for repeat internal assessment examination/s, which must be conducted 2 months before next University examination. The pattern for this repeat internal assessment examination shall be similar to the final University examination. The marks in this examination shall be considered for deciding the eligibility criteria. Following conversion formula shall be used for converting the marks.

	Theory	Practical
Remedial examination	**100**	**100**
Conversion out of	**25**	**25**
Conversion formula	**Marks in remedial theory examinations /4**	**Marks in remedial Practical examinations /4**
Eligibility criteria after conversion	**10**	**10**
	Combined theory + Practical = 25	

B. <u>Remedial measures for absent students:</u>

If any of the students is absent for any of the 4 IA examinations due to any reasons, following measures shall be taken.

i. The student is asked to apply to the academic committee of the college for reexamination, through HOD, to ascertain the genuineness of the reason for absentee.

ii. If permitted by academic committee, an additional examination for such students is to be conducted after prelims examination. Marks for such additional examination shall be equal to the missed examination.

iii. Even if a student has missed more than one IA examination, he/she can appear for only one additional IA examination. In such scenario, eligibility should be determined by marks obtained in internal assessment examinations for which the candidate has appeared, without changing the denominator.

Internal Assessment Practical Examinations

Pediatrics

Internal Assessment Practical – I, II and III

Subject: Pediatrics Practical (IA – I, II and III)				
Case	OSCE 1	OSCE 2	Journal & log book	Practical Total marks
20	10	10	10	50

OSCE Stations to include Signs of General examinations, Local examinations, Psychomotor skills and Communication skills., history taking of a particular symptom; nutrition history, developmental history, immunization history.

Prelim Practical

Subject: Pediatrics Practical (Prelims)					
Long Case (Including clinical skills demonstration)	Short Case (Including communication skills)	OSCE (4 stations x 10 marks each)	Viva	Journal & log book	Practical Total marks
25	15	40	10	10	100

OSCE 1 – Clinical Skills , OSCE 2 – Anthropometry assessment, OSCE 3 – Certifiable procedural skills , OSCE 4 – AETCOM related skills

MUHS Final Practical

Subject: Pediatrics Practical (Prelims)				
Long Case (Including clinical skills demonstration)	Short Case (Including communication skills)	OSCE (4 stations x 10 marks each)	Viva	Practical Total marks
30	20	40	10	100

OSCE 1 – Clinical Skills , OSCE 2 – Anthropometry assessment, OSCE 3 – Certifiable procedural skills , OSCE 4 – AETCOM related skills

Internal Assessment Examination (I, II and III) Pediatrics

SECTION "A" MCQ

Instructions:

1) *Put ☐ in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (10 Marks)

1. Multiple Choice Questions (Total 10 MCQ of One mark each) (_10_x_1_=_10__)

a) b) c) d) e) f) g) h) i) j)

SECTION "B" & "C"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Use a common answerbook for all sections.*

SECTION "B" (20 Marks)

2 Short Answer Questions (Five marks each) (Any 5 out of 6) (5x5= 25)

a) b) c) d) e) f)

3 Long Answer Questions (15x1=15)

a)

MUHS Final Theory Examination

Paediatrics

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

SECTION "A" MCQ

Instructions:

5) Put ☐ in the appropriate box below the question number once only.
6) Use blue ball point pen only.
*7) Each question carries **One mark.***
8) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (1x20=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B" & "C"

Instructions:

*1) Use **blue/black** ball point pen only.*
*2) **Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
*3) **All** questions are **compulsory**.*
*4) The number to the **right** indicates **full** marks.*
*5) Draw diagrams **wherever** necessary.*
6) Use a common answer book for all sections.

SECTION "B" (40 Marks)

2. Long Answer Questions (Any 2 out of 3) structured clinical questions (15 x 2=30)

a) b) c)

3.Short Answer Questions (All 3),(including 1 on AETCOM) (5 x 3=15)

a) b) c)

SECTION C (40 Marks)

4 Long answer questions (15x1=15)

a)

5 Short answer questions(any 4 out of 5) (Clinical Reasoning) (5x4=20)

a) b) c) d) e)

Journal of Paediatrics

College Logo	NAME OF THE COLLEGE **DEPARTMENT OF PAEDIATRICS**	MUHS,Nasik Logo

Journal of Paediatrics

Name of the Student: - _____

Batch Year: - _____

Roll No. :- _____

Phase: II (Year-)

Phase: III-I (Year-)

Phase: III-II (Year-)

College Logo	NAME OF THE COLLEGE **DEPARTMENT OF PAEDIATRICS**	MUHS,Nasik Logo

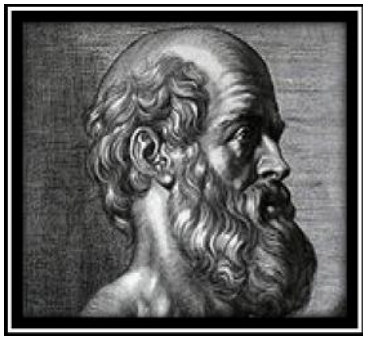
POSTING CERTIFICATE

Date- / /

Term	From	To	Absent days	Case- Histories Written	Skills achieved	Remark	Signatureof Unit Head
Phase: II (2 weeks)							
Phase:III-I (4 weeks)							
Phase: III-II (4 weeks)							
Date- Name of college- Seal-				- Signature- Professor and Head Department of Paediatrics.			

Note-

- Students must get the signature of the Unit In charge when posting is completed.
- This certificate must be submitted before every Internal assessment and Preliminary examination.
- Completed Record is Mandatory for appearing for the Final Examination.



HIPPOCRATIC OATH

"I swear by Apollo, the healer, Asclepius, Hygieia, and Panacea, and I take to witness all the gods, all the goddesses, to keep according to my ability and my judgment, the following Oath and agreement:

To consider dear to me, as my parents, him who taught me this art; to live in common with him and, if necessary, to share my goods with him; To look upon his children as my own brothers, to teach them this art; and that by my teaching, I will impart a knowledge of this art to my own sons, and to my teacher's sons, and to disciples bound by an indenture and oath according to the medical laws, and no others.

I will prescribe regimens for the good of my patients according to my ability and my judgment and never do harm to anyone.

I will give no deadly medicine to any one if asked, nor suggest any such counsel; and similarly I will not give a woman a pessary to cause an abortion.

But I will preserve the purity of my life and my arts.

I will not cut for stone, even for patients in whom the disease is manifest; I will leave this operation to be performed by practitioners, specialists in this art.

In every house where I come I will enter only for the good of my patients, keeping myself far from all intentional ill-doing and all seduction and especially from the pleasures of love with women or men, be they free or slaves.

All that may come to my knowledge in the exercise of my profession or in daily commerce with men, whom ought not to be spread abroad, I will keep secret and will never reveal.

If I keep this oath faithfully, may I enjoy my life and practice my art, respected by all humanity and in all times; but if I swerve from it or violate it, may the reverse be my life.



MEDICAL STUDENT

"The medical student must exhibit a calm and generous disposition, besides being virtuous and of noble mind.

He must be tolerant of others and exhibit patience and perseverance in his academic pursuits.

Although of sharp intellect, he must be both rotational and modest.

He should possess a pleasant appearance and good looks, well-proportioned body which should free from physical defect or obvious diseases.

Above all, he must be compassionate.

He must exhibit deep interest in the art and science of healing.

He must use his intelligence to discuss facts about the disease and to understand the clinical significance of symptoms.

Such knowledge he must use not only for his own intellectual enrichment, but also for acquiring requisite skills in practical management.

He must be humble and loyal to his teachers and instructors.

He should be free from any addictions, greed, arrogance, and intolerance."

- Charaka Samhita (1000 BC)

Sequence of workbook

No	Topic	Page no.
	Hippocratic Oath	-
	Medical Students	-
1	General instructions	07
2	Index	08
3	Templates	
A.	Long Case	10
B.	Short Case	15
C.	Newborn	19
D.	Immunisation Clinics Attended	23
E.	Emergency Cases Observed	24
F.	Paediatrics Procedures Observed	26
G.	Common Drugs Used In Paediatrics	27
H.	Instruments Used In Paediatrics	29
I.	Nutrition Related To Paediatrics	30
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5	Annexure-2 : Course Content- Phase III-I	32
6	Annexure-3 : Course Content- Phase III-II	33
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GENERAL INSTRUCTIONS

1. This Journal is a record of the academic activities of the designated student, who would be responsible for maintaining his/her Journal.

2. The student is responsible for getting the entries in the Journal verified by the Faculty in charge regularly.

3. Entries in the Journal will reflect the activities undertaken in the department and have to be scrutinized by the Head of the concerned department.

4. The Journal is a record of various activities by the student like:

   - Overall participation and performance
   - Attendance
   - Participation in sessions
   - Record of completion of pre-determined activities.
   - Acquisition of selected competencies.

5. The Journal is the record of work done by the candidate in that department / specialty and should be verified by the college before submitting the application of the students for the Universityexamination.

6. Proposednumberofcaserecordsshouldbementionedinthejournal-:

   Phase: II- first clinical posting (Two weeks)-
   Phase: III-I-second clinical posting in Third Minor (Fourweeks)-
   Phase: III-II Third Clinical postingin Third Major (Four weeks)-

INDEX

1. Long Cases:

Sr. No.	Date	Name of Patient	Diagnosis	Page No.	Sign of Teacher
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

2. Short Cases:

Sr. No.	Date	Name of Patient	Diagnosis	Page No.	Sign of Teacher
1					
2					
3					
4					
5					
6					

3. New Born Cases:

Sr. No.	Date	Name of Patient / New Born	Diagnosis	Page No.	Sign of Teacher
1					
2					
3					
4					
5					
6					

4. Immunization O.P.D. attended:

Sr. No.	Date	Immunization Attended	Sign of Teacher
1			
2			
3			
4			
5			

5. Procedures observed:

Sr. No.	Date	Name of Procedure Observed	Sign of Teacher
1			
2			
3			
4			
5			

6. Emergencies attended:

Sr. No.	Date	Name of Patient	Diagnosis	Sign of Teacher
1				
2				
3				
4				
5				

7. Drug information:

Sr. No.	Date	Name of Drugs	Sign of Teacher
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

8. **Nutrition-**

Sr. No.	Date	Name of food item	Sign of Teacher
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

9. **X-Ray**

Sr. No.	Date	Diagnosis of X-Ray	Sign of Teacher
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

10. **Instruments-**

Sr. No.	Date	Name of Drugs	Sign of Teacher
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Template for Clinical Cases of Paediatrics

A. LONG CASE-

Informant-

Reliability – Good/Bad, consistent/ non consistent

OPD/IPD no.-

Name of the child-

Birth date- / /

Age -

Gender - M/F

Religion and caste.

Address-

Date of admission- / /

Date of examination- / /

- **Chief Complaints** – (in chronological order)
  1)
  2)
- **History of Present Illness –**
- **Past History –**
- **Personal History** -

  Bladder- Bowel-

  Sleep- Appetite-

  Addictions- Habits-

  Menstrual cycle-

  Relation with friends- Sports participation-

- **Family history- Pedigree chart:**
- **Birth History-**

➢ Antenatal history -

- Age of mother at marriage-
- Age of mother at pregnancy-
- Registration of pregnancy.
- Medication taken like iron, folic acid and calcium-
- Drug intake during pregnancy -
- Immunization of mother –
- History of trauma.
- Any illness or infection-
- Radiation exposure-
- Hospitals stay during pregnancy.
- History of smoking, drinking alcohol, any other-

➢ Natal history –

- Gestational age-
- Duration of Labor-

- Place of delivery- Home/ Hospital
- Person conducting the delivery-
- Mode of delivery-
- Babies cry immediately after birth-
- Birth weight of the baby-
- Date and time of birth-
- Any congenital malformation noted

➢ Post-natal history

➢ Neonatal history -

- Time of first breast feeding-
- Top feeds given-
- Any feeding difficulty-
- Prelacteal feeds given-
- NICU stay-
- Time of passage of first meconium- urine-
- History of neonatal convulsions or jaundice-

- **Developmental history-**

1) Motor milestones-
   - ✓ Grossmotormilestones
   - ✓ Finemotormilestones

2)Adoptivemilestones-

3)Socialmilestones

4)Languagemilestones-

- **Immunization History –**

BCG- given/ not, Scar- present/absent	OPV 0, 1,2, 3, booster
DPT- 1,2 3, booster	Measles
Vitamin-A	MMR-
Other vaccines-	

- **Dietary History-**

Protein intake– Actual----------Expected----------

Calorie intake- Actual----------Expected----------

- **Socioeconomic History -**

Total no. of members in the family-

Floor space area-

Per capita income-

Education of the Father ---------- Mother----------

Occupation of the Father ---------- Mother----------

Housing type- kaccha/pakka

Ventilation- Water supply-

Sanitation – toilet facilities / open air defecation.

Socio economic status.-

General Examination:

- **Anthropometry:**

No.	**Parameter**	**Actual**	**Expected**
1	Weight		
2	Height / Length:		
3	Head circumference:		
4	Chest circumference:		
5	Mid arm circumference:		
6	Upper segment: lower segment ratio:		
7	Body mass index:		
8	Arm span:		
9	Midpoint of stature:		

- **Vital Parameters: -**

1. Temperature: ----------F/ ----------C

2. Pulse –

- Rate- beats/min. Rhythm-Regular /Irregular
- Character- Volume-
- Radio femoral Delay- Capillary refill-

3. Respiration- Rate---- - cycles/min

4. Blood pressure -

- Right upper limb- / mmHg Left upper limb- / mmHg
- Right upper limb- / mmHg Left upper limb- / mmHg

5. Jugular venous pressure-

Head to Toe Examination-

a. Head-

- Size- normal/ microcephaly/macrocephaly
- Shape-
- Cephalic index-
- Craniosynostosis-
- Bossing / prominence-
- Fontanel- anterior- open (size-)/closed
- Post. Fontanels- (size-)/closed
- Scalp swelling -
- Transillumination of skull

b. Hair-

Colour- Texture Pigmentation-
Luster - Hair line –Low/normal/high

c. Face-

d. Eyes-

- Eyelids- Intercanthal distance-
- Eyebrows- Eyelashes-
- Conjunctiva- Cornea –
- Lens- Sclera-
- Fundus Conjunctiva -

e. Ear-

- Setting of ears –Low/normal Ear tag –
- Large prominent ear- Pinna –
- External auditory canal- Tympanic membrane

f. Mouth-

- Oral cavity- Buccal mucosa-
- Dentition: Gums:
- Tongue : Examination of throat-
- Lips : Cyanosis- Philthrum- other-
- Tonsil- Uvula-
- Posterior pharyngeal wall-

g. Neck-

- Swelling of neck : Webbing of neck
- Enlarged distended neck veins- Short neck
- cervical group of lymph nodes- Thyroid gland-
- Position of trachea - Neck stiffness

h. Skin-

- Colour- Turgor- Infections - Rash
- Subcutaneous nodules- Xanthoma and xanthelasma- Stria-

i. Hand-

- Congenital malformation -
- Single Palmar crease -
- Finger – Clubbing- Nails-

j. External gentile –

- Tanner staging sexual maturity score-
- Penile length:

k. Bones, Joints, Spine and Back-

l. Any Obvious Congenital Anomalies:

Systemic Examination:
Provisional Diagnosis-

1)
2)
3)
4)

Investigations-

Final Diagnosis-

Treatment-

Case Summary-

Date- **Signature of Teacher**

B. SHORT CASE

- Informant-
- Reliability –
- Consistent/ non consistent
- OPD/IPD no.-
- Name of the child-
- Birth date- / / Age -
- Gender - M/F Religion and caste.
- Address –
- Date of admission- / / Date of examination- / /

Chief Complaints – (in chronological order)

1)
2)
3)

General Examination:

- **Anthropometry:**

No.	Parameter	Actual	Expected
1	Weight		
2	Height / Length:		
3	Head circumference:		
4	Chest circumference:		
5	Mid arm circumference:		
6	Upper segment: lower segment ratio:		
7	Body mass index-		
8	Arm span-		
9	Midpoint of stature-		

- **Vital Parameters: -**

1. Temperature: ----------F/ ----------C

2. Pulse –

- Rate- beats/min. Rhythm-Regular /Irregular
- Character- Volume-
- Radiofemoral Delay- Capillary refill-

3. Respiration- Rate---- - cycles/min

4. Blood pressure -

- Right upper limb- / mmHg Left upper limb- / mmHg
- Right upper limb- / mmHg Left upper limb- / mmHg

5. Jugular Venous Pressure-

Head to Toe Examination-

a) **Head-**
   - Size- normal/ microcephaly/macrocephaly Shape-
   - Cephalic index-
   - Craniosynostosis- Bossing / prominence-
   - Fontanel- anterior- open (size-)/closed
   - Post. Frontanelle- (size-)/closed
   - Scalp swelling -
   - Transillumination of skull

b) **Hair-**
   Colour- Texture Pigmentation-
   Luster - Hair line –Low/normal/high

c) **Face-**

d) **Eyes-**
   - Eyelids- Intercanthal distance-
   - Eyebrows- Eyelashes-
   - Conjunctiva- Cornea –
   - Lens- Sclera-
   - Fundus Conjuctiva -

e) **Ear-**
   - Setting of ears –Low/normal Ear tag –
   - Large prominent ear- Pinna –
   - External auditory canal- Tymphanic membrane

f) **Mouth-**
   - Oral cavity- Buccal mucosa-
   - Dentition: Gums:
   - Tongue : Examination of throat-
   - Lips : Cyanosis- Philthrum- other-
   - Tonsil- Uvula-
   - Posterior pharyngeal wall-

g) **Neck-**
   - Swelling of neck : Webbing of neck
   - Enlarged distended neck veins- Short neck
   - cervical group of lymph nodes- Thyroid gland-
   - Position of trachea - Neck stiffness

h) **Skin-**
   - Colour- Turgor- Infections - Rash
   - Subcutaneous nodules- Xanthoma and xanthelasma- Stria-

i) **Hand-**
   - Congenital malformation -
   - Single Palmar crease -

- Finger –Clubbing- Nails

j. External Gentile –
Tanner staging sexual maturity score-
Penile length:

k. Bones, Joints, Spine and Back-

l. Any Obvious Congenital Anomalies:

Systemic Examination-

Provisional Diagnosis-
1)
2)
3)
4)
5)

Investigations-

Final Diagnosis-

Treatment-

Case Summary-

Date- **Signature of Teacher**

C. NEONATAL CASE

OPD/IPD NO. - Date-
Name of mother-
Name of father-
Date of delivery-
Sex of baby- m/f caste /religion-
Place of delivery- date of examination-

Maternal History-
Antenatal history -

- Age at marriage- Age at pregnancy-
- Registration of pregnancy- P- , G- , L- ,A-
- Family history-
- Consanguity- yes/no grade-
- Medication taken like iron, folic acid and calcium supplements-
- Drug intake during pregnancy –
- Immunization status of mother –
- Any illness or infection during pregnancy –
- Radiation exposure- Hospitals stay during pregnancy-
- History of smoking, drinking alcohol, any other.-
- History of trauma-

Natal history –

- Apgar score-
- Gestational age- Duration of Labor-
- Place of delivery- Home/ Hospital
- Person conducting the delivery-Mode of delivery-
- Babies cried immediately after birth-
- Birth weight of the baby-
- Date and time of birth-
- Any congenital malformation noted-

Postnatal history –
Neonatal history -

- Time of first breast feeding-
- Top feeds given-
- Any feeding difficulty-
- Prelacteal feeds given-
- NICU stay-
- Time of passage of first meconium- first urine-
- History of convulsions or jaundice-
- Inj. Vit. K given/not-
- Anyotherproblems-

Feeding History -

Immunization History –

- BCG- OPV '0' dose Any Other vaccines-

General Examination:

- **Anthropometry:**

No.	Parameter	Actual	Expected
1	Weight		
2	Length		
3	Head circumference:		
4	Chest circumference:		

- **Vital Parameters: -**

1. Temperature: ----------F/ ----------C

2. Pulse –

- Rate- beats/min.
- Rhythm-Regular /Irregular
- Character-
- Volume-
- Radio-femoral Delay-
- Capillary refill-

3. Respiration-Rate---- - cycles/min

4. Blood Pressure -

- Right upper limb- / mmHg
- Left upper limb- / mmHg
- Right upper limb- / mmHg
- Left upper limb- / mmHg

5.Pulse Oximetry- (Pre and Post Ductal Saturation)

- **Head to Toe Examination-**

a) Head-

- Size- normal/ microcephaly/macrocephaly Shape-
- Cephalic index-
- Craniosynostosis- Bossing / prominence-
- Fontanel- anterior- open (size-)/closed
- Post. Frontanelle- (size-)/closed
- Scalp swelling - Transillumination of skull

b) Hair-

Colour- Texture Pigmentation-

Luster - Hair line –Low/normal/high

c) Face-

d) Eyes-

- Eyelids- Intercanthal distance-
- Eyebrows- Eyelashes-

- Conjunctiva- Cornea –
- Lens- Sclera-
- Fundus Conjuctiva -

e) Ear-

- Setting of ears –Low/normal Ear tag –
- Large prominent ear- Pinna –
- External auditory canal- Tymphanic membrane

f) Mouth-

- Oral cavity- Buccal mucosa-
- Dentition: Gums:
- Tongue : Examination of throat-
- Lips : Cyanosis- Philthrum- other-
- Tonsil- Uvula-
- Posterior pharyngeal wall-

g) Neck-

- Swelling of neck : Webbing of neck
- Enlarged distended neck veins- Short neck
- cervical group of lymph nodes- Thyroid gland-
- Position of trachea - Neck stiffness

h) Skin-

- Colour- Turgor- Infections - Rash
- Subcutaneous nodules- Xanthoma and xanthelasma- Stria-

i) Hand-

- Congenital malformation -
- Single Palmar crease -
- Finger – Clubbing- Nails-

j. **External Gentile –**
Tanner staging sexual maturity score-
Penile length:

k. **Bones, Joints, Spine And Back**

l. **Any Obvious Congenital Anomalies:**

Neonatal Reflexes-

1) Rooting reflex:
2) Suckling reflex:
3) Doll's eye response:
4) Light reflex:
5) Glabellar tap:
6) McCarthy's reflex:
7) Gallant's reflex:
8) Perez reflex:
9) Landau's reflex:
10) Moro's reflex-
11) Stepping reflex
12) Placing reflex-
13) Prone crawl reflex :

14) Plantar & palmar grasp:
15) Crossed adductor reflex: :
16) Magnet reflex:
17) Asymmetric tonic neck reflex:-
18) Symmetric tonic neck reflex:-
19) Pull-to-sit-
20) Babinski or plantar reflex :-
21) Righting reflexes-

Systemic Examination—

Provisional Diagnosis-
1)
2)
Investigations-
Final Diagnosis-
Treatment-

Case Summary-

DateSignature of Teacher

D. IMMUNIZATION O.P.D. ATTENDED

Date-

Paste picture of vaccine

Name of vaccine –

Dose-

Route-

Special precautions-

Indications-

Contraindications-

Side effects-

Storage-

Any other Details of vaccine-

Sign of vaccinator-

E. EMERGENCY CASES OBSERVED-

Common Paediatrics Emergencies-

1. Basic Paediatrics and Neonatal Life Support and Advanced Cardiac Life Support.
2. Organophosphorous Poisoning
3. Kerosene Poisoning
4. Iron Poisoning
5. Dhatura Poisoning
6. Snake Bite
7. Scorpion Bite
8. Anaphylactic Shock
9. Hematemesis
10. Shock
11. Severe Dehydration
12. Acute Respiratory Failure
13. Acute Renal Failure
14. Status Asthamaticus
15. Severe Hypokalemia
16. Status Epilepticus
17. Hepatic Encephalopathy
18. Diabetic Ketoacidosis
19. Coma
20. Hypoglycemia

Template-

- OPD/IPD no.-
- Name of the child-
- Birth date- / / Age -
- Gender - M/F
- Date of admission- / /
- Date of examination- / /

Chief Complaints – (in chronological order)

1)
2)
3)
4)

History of Present Illness –

Vital Parameters: -

1. Temperature: ----------F/ ----------C

2. Pulse –

- Rate- beats/min. Rhythm-Regular /Irregular
- Character- Volume-
- Radio femoral Delay- Capillary refill-

3. Respiration-Rate---- - cycles/min

4. Blood Pressure -

- Right upper limb- / mmHg Left upper limb- / mmHg
- Right upper limb- / mmHg Left upper limb- / mmHg

5. Jugular Venous Pressure-

Head to Toe Examination- Any positive findings

Systemic Examination- positive findings only

Details of emergency attended

Final Diagnosis-

Treatment-

Case Summary-

Date- **Signature of Teacher**

F. PAEDIATRIC PROCEDURES OBSERVED

Requires certification-

- Anthropometry
- Development assessment
- Breast feeding, observation and counseling
- BMI calculation
- Prescription of Immunizations schedule
- Naso-gastric tube passage in manikin
- IV line in manikin
- Interosseous insertion in manikin
- Airway management
- Oxygen administration
- Bag ventilation
- Monitoring of shock
- IV access
- Calculation of fluid requirements
- Monitoring of unconscious
- Dehydration assessment
- BLS in manikin
- Urine dipstick
- Identification of BCG scar
- Interpret Mantoux

Following procedures to be only observed-

- Lumbar Puncture
- Liver biopsy
- Renal biopsy
- Bone marrow
- Bladder Catheterization
- Peripheral IV Insertion
- Insertion of Umbilical Venous and Arterial Lines
- Insertion of Naso -Gastric Feeding Tubes/Ryles tube
- Neonatal Intubation
- Neonatal Resuscitation
- Pediatric Resuscitation
- Intramuscular, intra-dermal, subcutaneous injections
- Bag and mask use

Template-

Name of Procedure

- OPD/IPD no.-
- Name of the child-

- AGE- SEX-
- Address –
- Date of admission- / /
- Date of procedure- / /

Chief Complaints – (in chronological order)

1)
2)
3)
4)

History of Present Illness –

Prerequisites-

Preparation-

Procedure details-
Post Procedure Care-

Complications Known-

Any Other-

Date- **Signature of Teacher**

G. COMMON DRUGS USED IN PAEDIATRICS

- **Name of drug-**
- **Class/ Group of Drug-**
- **Doses-**
- **Mechanism of action-**
- **Uses-**
- **Side effects-**
- **Contraindications-**
- **Any other-**

Paste picture of drug here

Date- **Signature of Teacher**

H. INSTRUMENTS USED IN PAEDIATRICS

Name of instrument-

Photograph of Instrument

Uses-

Precautions-

Describe procedure where it is used-

Any other –

Sign of Teacher

I. NUTRITION RELATED TO PAEDIATRICS

Name of food item-

Class-

Photograph

Nutritive contents –

Nutritive values-

Medicinal use-

Contraindications

Any other details-

Sign of Teacher-

Annexure- 1.--

Course Content Phase II(October 2020)

Subject: PAEDIATRICS

Theory / Practical

(Based on National Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 2 / 3.)

1. Total Teaching hours:
   A. Lectures(hours): **No**
   B. Self-directed learning (hours):
   C. Clinical Postings(hours):
      - Weeks- 2 wks
      - Hours per week-15
      - Monday to Friday- 3 hours per day.
   D. Small group teachings/tutorials/Integrated teaching/Practical(hours)**:**No

Tentative Clinical posting schedule-

Day	Topic	Day	Topic
1	Round to Paediatric ward, Maternal ward, Kangaroo Mother Care, PICU, NICU, Labour room, OPD, Immunisation room etc.	6	Systemic examination of child- CVS
2	History taking in Paediatrics	7	Systemic examination of child- RS and PA
3	Assessment of growth and development	8	Neonatal examination
4	General examination of child.	9	Elicitation of neonatal reflexes
5	Systemic examination of child- CNS	10	Posting ending exam

Competency Nos.	Topics, Subtopics and Lectures

Annexure- 2.

Course Content Phase III-I(October 2020)

Subject: PAEDIATRICS (Theory / Practical)

(Based on National Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 2 / 3.)

Total Teaching hours:

A. Lectures (hours): 20
B. Self-directed learning (hours): 5
C. Clinical Postings (hours):
- Weeks- 4
- Hours per week- 15
- Monday to Friday- 3 hours per day.

D. Small group teachings/tutorials/Integrated teaching/Practical (hours)**: 30**

Tentative Clinical posting schedule-

Day	Topic	Day	Topic
1	Round to Paediatric ward, Maternal ward, Kangaroo Mother Care, PICU, NICU, Labour room, OPD, Immunisation room etc.	11	Elicitation of neonatal reflexes
2	History taking in Paediatrics	12	Immunisation clinic
3	Assessment of growth and development	13	Immunisation clinic
4	General examination of child.	14	Immunisation clinic
5	Systemic examination of child- CNS	15	Immunisation clinic
6	Systemic examination of child- CNS	16	Paediatric Emergencies
7	Systemic examination of child- RS	17	Paediatric Emergencies
8	Systemic examination of child- Per Abdomen	18	Paediatric Emergencies
9	Systemic examination of child- CVS	19	Paediatric Emergencies
10	Neonatal case taking and examination.	20	Posting ending exam

Competency Nos.	**Topics, Subtopics and Lectures**

Annexure- 3.

Course Content Phase: III-II(October 2020)

Subject: PAEDIATRICS (Theory / Practical)

(Based on National Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 2 / 3.)

Total Teaching hours:

A. Lectures (hours): 20
B. Self-directed learning (hours): 10
C. Clinical Postings (hours):
- Weeks- 4
- Hours per week- 15
- Monday to Friday- 3 hours per day.

D. Seminars/Small group teachings/tutorials/Integrated teaching/Practical (hours)**:** 35

Tentative Clinical posting schedule-

Day	Topic	Day	Topic
1	History taking and General examination of child.	11	Neonatal case taking, examination and Elicitation of neonatal reflexes
2	Systemic examination of child- CNS	12	Demonstration of Common procedures related to Paediatrics
3	Systemic examination of child- CNS	13	Demonstration of Common procedures related to Paediatrics
4	Systemic examination of child- RS	14	Common Drugs used in Paediatrics
5	Systemic examination of child- Per Abdomen	15	Common Drugs used in Paediatrics
6	Systemic examination of child- CVS	16	Common Instruments used in Paediatrics
7	Systemic examination of child- CVS	17	X-Ray film reading related to Paediatrics.
8	Short case discussion	18	Nutrition
9	Neonatal case taking, examination and Elicitation of neonatal reflexes	19	Nutrition
10	Neonatal case taking, examination and Elicitation of neonatal reflexes	20	Posting ending exam

Competency Nos.	**Topics, Subtopics and Lectures**

Annexure- 4.

Exam Pattern – Paediatrics

Theory Paper (100 marks)

- Section A- MCQ-:
- Section B-
- Section C-

Practical exam (100 marks)

- Long case-
- Short case/ New born-
- Table viva- (Drugs, Instruments, Nutrition, Vaccines and X-Rays-
- OSCE-

Internal Assessment:

- 50% combined in theory and practical (not less than 40% in each) for eligibility for appearing for University

University Examination

- Mandatory 50% marks separately in theory and practical (practical = practical/ clinical + viva)

Annexure- 5
Distribution of journal marks
Total- 10 marks

Parameter	Total	Marks	Phase
Long cases	-	-	Phase: II (Second year)
	6 (CNS-2, RS-1, PA-1, CVS-2)	1	Phase: III-1 (Third Minor)
	66 (CNS-2, RS-1, PA-1, CVS-2)	1	Phase: III-II (Third Major)
Short cases	3	1/2	Phase: II (Second year)
	3	1/2	Phase: III-1 (Third Minor)
	3	1/2	Phase: III-II (Third Major)
Newborns	3	1/2	Phase: II (Second year)
	3	1/2	Phase: III-1 (Third Minor)
	3	1/2	Phase: III-II (Third Major)
Emergencies	5	1	Phase: III-1 (Third Minor)
Procedures	5	1	Phase: III-II (Third Major)
Vaccines	All vaccines as per Government of India.	1	Phase: III-I
Drugs	10	1	Phase: III-II
Instruments	10	1/2	Phase: III-II
Nutrition	10	1/2	Phase: III-II
Total- 10 marks			

Recommended books

Sr.no.	Author	Title of book/ Material	Publisher
1.	Vinod Paul, Arvind Bagga	Ghai Essential Pediatrics	CBS Publishers
2.	Meherban Singh	Pediatric Clinical Methods	CBS Publishers
3.	Michael Glynn William M Drake	Hutchison's Clinical Methods	Elsevier
4.	A Parthasarathy	IAP Colour Atlas of Pediatrics	Jaypee
5.	Tom Lissauer Will Carroll	Illustrated Textbook of Pediatrics	Elsevier
6.	Meherban Singh	Care of newborn	CBS Publishers

PEDIATRICS (CODE: PE) IN GENERAL

Competencies: The student must demonstrate:

1. Ability to assess and promote optimal growth, development and nutrition of children and adolescents andidentify deviations from normal,
2. Ability to recognize and provide emergency and routine ambulatory and First Level Referral Unit care forneonates, infants, children and adolescents and refer as may be appropriate,
3. Ability to perform procedures as indicated for children of all ages in the primary care setting,
4. Ability to recognize children with special needs and refer appropriately,
5. Ability to promote health and prevent diseases in children,
6. Ability to participate in National Programmes related to child health and in conformation with the IntegratedManagement of Neonatal and Childhood Illnesses (IMNCI) Strategy,
7. Ability to communicate appropriately and effectively.

Integration: The teaching should be aligned and integrated horizontally and vertically in order to provide comprehensive care for neonates, infants, children and adolescents based on a sound knowledge of growth, development, disease and their clinical, social, emotional, psychological correlates in the context of national health priorities.

Table 1: Time distribution of MBBS Programme & Examination Schedule

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
							Foundation Course	I MBBS			
I MBBS								Exam I MBBS	II MBBS		
II MBBS								Exam II MBBS	III MBBS		
III MBBS Part I									Exam III MBBS Part I	Electives & Skills	
III MBBS Part II											
Exam III MBBS Part II		Internship									
Internship											

- One month is provided at the end of every professional year for completion of examination and declaration of results.

Table 2: Distribution of subjects by Professional Phase

Phase & year of MBBS training	Subjects & New Teaching Elements	Duration#	University examination
First Professional MBBS	• Foundation Course (1 month) • Human Anatomy, Physiology & Biochemistry, introduction to Community Medicine, Humanities • Early Clinical Exposure	1 + 13 months	I Professional
	• Attitude, Ethics, and Communication Module (AETCOM)		
Second Professional MBBS	• Pathology, Microbiology, Pharmacology, Forensic Medicine and Toxicology, • Introduction to clinical subjects including Community Medicine • Clinical postings • Attitude, Ethics & Communication Module (AETCOM)	12 months	II Professional
Third Professional MBBS Part I	• General Medicine, General Surgery, Obstetrics & Gynecology, Pediatrics, Orthopedics, Dermatology, Psychiatry, Otorhinolaryngology, Ophthalmology, Community Medicine, Forensic Medicine and Toxicology, Respiratory medicine, Radiodiagnosis & Radiotherapy, Anesthesiology • Clinical subjects /postings • Attitude, Ethics & Communication Module (AETCOM)	13 months	III Professional (Part I)
Electives	• Electives, Skills and assessment*	2 months	
Third Professional MBBS Part II	• General Medicine, Pediatrics, General Surgery, Orthopedics, Obstetrics and Gynecology including Family welfare and allied specialties • Clinical postings/subjects • Attitude, Ethics & Communication Module (AETCOM)	13 months	III Professional (Part II)

*Assessment of electives shall be included in Internal Assessment.

Table 6: Third Professional Part I teaching hours

Subjects	Teaching Hours	Tutorials/ Seminars /Integrated Teaching (hours)	Self- Directed Learning (hours)	Total (hours)
General Medicine	25	35	5	65
General Surgery	25	35	5	65
Obstetrics and Gynecology	25	35	5	65
Pediatrics	20	30	5	55
Orthopaedics	15	20	5	40
Forensic Medicine and Toxicology	25	45	5	75
Community Medicine	40	60	5	105
Dermatology	20	5	5	30
Psychiatry	25	10	5	40
Respiratory Medicine	10	8	2	20
Otorhinolaryngology	25	40	5	70
Ophthalmology	30	60	10	100
Radiodiagnosis and Radiotherapy	10	8	2	20
Anesthesiology	8	10	2	20
Clinical Postings*	-	-	-	756
Attitude, Ethics & Communication Module (AETCOM)		19	06	25
Total	303	401	66	1551

** The clinical postings in the third professional part I shall be 18 hours per week (3 hrs per day from Monday to Saturday).*

Table 7: Third Professional Part II teaching hours

Subjects	Teaching Hours	Tutorials/Seminars / Integrated Teaching (hours)	Self - Directed Learning (hours)	Total* (hours)
General Medicine	70	125	15	210
General Surgery	70	125	15	210
Obstetrics and Gynecology	70	125	15	210
Pediatrics	20	35	10	65
Orthopaedics	20	25	5	50
Clinical Postings**				792
Attitude, Ethics & Communication Module (AETCOM)***	28		16	43
Electives				200
Total	250	435	60	1780

* 25% of allotted time of third professional shall be utilized for integrated learning with pre- and para- clinical subjects and shall be assessed during the clinical subjects examination. This allotted time will be utilized as integrated teaching by para-clinical subjects with clinical subjects (as Clinical Pathology, Clinical Pharmacology and Clinical Microbiology).

Table 8: Clinical postings

Subjects	Period of training in weeks			Total weeks
	II MBBS	III MBBS Part I	III MBBS Part II	
Electives	-	-	8* (4 regular clinical posting)	4
General Medicine[1]	4	4	8+4	20
General Surgery	4	4	8+4	20
Obstetrics &Gynaecology[2]	4	4	8 +4	20
Pediatrics	2	4	4	10
Community Medicine	4	6	-	10
Orthopedics - including Trauma[3]	2	4	2	8
Otorhinolaryngology	4	4	-	8
Ophthalmology	4	4	-	8
Respiratory Medicine	2	-	-	2
Psychiatry	2	2	-	4
Radiodiagnosis[4]	2	-	-	2
Dermatology, Venereology & Leprosy	2	2	2	6
Dentistry & Anesthesia	-	2	-	2
Casualty	-	2	-	2
	36	42	48	126

* In four of the eight weeks of electives, regular clinical postings shall be accommodated.

Clinical postings may be adjusted within the time framework.

[1] This posting includes Laboratory Medicine (Para-clinical) & Infectious Diseases (Phase III Part I).

[2] This includes maternity training and family welfare (including Family Planning).

[3] This posting includes Physical Medicine and Rehabilitation.

[4] This posting includes Radiotherapy, wherever available.

List of abbreviations

A	Attitude
AETCOM	Attitude Ethics and Communication
Anat	Anatomy
Biochem	Biochemistry
Cardio	Cardiology
Com Med	Community Medicine
Derm	Dermatology
DOAP	Demonstrate Observe Assist Perform
ENT	ENT
Forensic	Forensic Medicine
Gastro	Gastroenterology
K	Knows
KH	Know How
S	Shows
C	Communication
Med	Gen Medicine
Micro	Microbiology
N	No
OBG	Obstetrics & Gynecology
Ophthal	Ophthalmology
OSCE	Objective Structured Clinical Examination
OSPE	Objective Structured Practical Examination
Psych	Psychiatry
PMR	Physical Medicine Rehabilitation
Path	Pathology
Physio	Physiology
Pharm	Pharmacology
SAQ	Short Answer Question
SGD	Small Group Discussion
Surg	Gen Surgery
RadioD	Radio diagnosis
Resp Med	Respiratory Medicine
Y	Yes

- Pages for all the phases will be added and color coded as follows-
  Phase II : yellow
  Phase III-I: Green
  Phase III-II: Brown.

PAEDIATRIC LOGBOOK for MBBS STUDENTS AS PER COMPETENCY BASED CURRICULUM

PHASE II to PHASE III/II MBBS

Preface

The Medical Council of India has revised the undergraduate medical education curriculum so that the Indian Medical Graduate (IMG) is able to recognize **"Health for all"** as a national goal. He/she should also be able to fulfil his/her societal obligations. The revised curriculum has specified the competencies that a student must attain and clearly defined teaching learning strategies for the same. With this goal in mind, integrated teaching, skill development, AETCOM and self-directed learning have been introduced. There would be emphasis on communication skills, basic clinical skills and professionalism. There is a paradigm shift from the traditional didactic classroom-based teaching to learning environments where there is emphasis on learning by exploring, questioning, applying, discussing, analysing, reflecting, collaborating and doing. The recognition of this need is enshrined by a greatly enhanced allocation of time to these methods and also the assessment techniques. With this view in mind the log book has been designed as per the guidelines of competency Based curriculum.

Name of the College

_____

_____

Admission Year: _____

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No. _____ has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for MBBS Competency Based Curriculum in the subject of PAEDIATRICS

Date: ___/___/_____

Place: _____

Teacher In charge **Professor and Head**

Department of PAEDIATRICS

Instructions

1) This logbook is prepared as per the guidelines of MCI for implementation of Competency based curriculum for MBBS students in the subject of Paediatrics.

2) Students are instructed to keep their logbook entries up to date.

3) Students are expected to write minimum 2 reflections on any two activities each of Clinical Paediatrics skills & Self-Directed Learning (SDL).

4) Students also have to write reflections on AETCOM Module. Reflections should be structured using the following guiding questions:

- What happened? (What did you learn from this experience)
- So what? (What are the applications of this learning)
- What next? (What knowledge or skills do you need to develop so that you can handle this type of situation?)

5) The logbook assessment will be based on multiple factors like

- Attendance
- Active participation in the sessions
- Timely completions
- Quality of write up of reflections
- Overall presentation

INDEX

Sr. No	Description	Page No's	REMARK	Signature of Teacher
1	Clinical Paediatrics Skills			
2	Self-Directed Learning, Seminars, Projects, Quizzes			
3	AETCOM Module			
4	Attendance Records			
5	Records of Internal Assessment			

* AETCOM – Competencies for IMG, 2018, Medical Council of India.

Record of Clinical PediatricsSkills

Clinical skills can be assessed by case presentation, case based discussion, objective structured clinical assessment the checklist, MiniCex, as per the institutional preference.

I) SECOND PHASE MBBS

Competency # addressed	**Name of activity**	**Site WARD, skill lab, OPD , Casualty ,**	**Date completed**	Attempt at activity First (F) Repeat (R)	Sign of faculty	Sign of Learner	**Method of assessment**	**SCORE**

II) THIRD PHASE MBBS PART I

Competency # addressed	**Name of activity**	**Site WARD, skill lab, opd casualty,**	**Date completed**	Attempt at activity First (F) Repeat (R)	Sign of faculty	Sign of Learner	**Method of assessment**	**SCORE**

II) THIRD PHASE MBBS PART II

Competency # addressed	**Name of activity**	**Site WARD, skill lab, OPD , casualty ,**	**Date completed**	Attempt at activity First (F) Repeat (R)	Sign of faculty	Sign of Learner	**Method of assessment**	**SCORE**

Reflection on Clinical Paediatrics Skills

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Clinical Paediatrics Skills

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Clinical PAEDIATRICS Skills

Topic: **Date:**

Signature of Teacher-in- charge

2. Self Directed Learning, Seminars, Tutorials, Projects, Quizzes

S.No	PHASE	Self Directed Learning, Seminars, Tutorials, Projects, Quizzes	Date	Signature of Teacher

Reflection on self directed learning activities

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on self directed learning activities

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on self directed learning activities

Topic: **Date:**

Signature of Teacher-in- charge

3: AETCOM Module

Counselling for Investigation, Treatment, Prognosis, Blood donation, Breaking Bad news. All types of consent. Medicolegal aspects and Ethics, Empathy and professionalism as per the Phase of the MBBS. Include cases of Allied branches also.

Competency to be assessed during Clinical postings and /or small group discussions.

AetCom skills can be assessed by use of Kalamazoo consensus.

Criteria	Phase II Score	Phase III/I Score	Phase III/II Score	
Builds relationship				
Opens the discussion				
Gathers information				
Understands the parent's perspective				
Shares information				
Manages flow				
Overall rating				
Signature of teacher				

Communication skills rating scale adapted from Kalamazoo consensus statement

Rating 1-3 - Poor, 4 -6 Satisfactory, 6 -10 Superior

PHASE II- AETCOM (Two assessments)

Competency # addressed	**Name of competency**	**Site WARD, skill lab, opd , casualty,**	**Date completed**	Attempt at activity First (F) Repeat (R)	Sign of faculty	Sign of Learner	**Method of assessment**	**SCORE**

PHASE III PART 1 (TWO ASSESSMENTS)

Competency # addressed	Name of Competency	Site WARD, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R)	Sign of faculty	Sign of Learner	Method of assessment	SCORE

PHASE III PART 2 (TWO ASSESSMENTS)

Competency # addressed	**Name of Competency**	**Site** **WARD, skill lab, opd , casualty,**	**Date completed**	Attempt at activity First (F) Repeat (R)	Sign of faculty	Sign of Learner	**Method of assessment**	**Score**

Reflection on AETCOM module

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM module

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM module

Topic: **Date:**

Signature of Teacher-in- charge

4A: Attendance Record of the Student

S. No	Term	Theory (%)	Practical (%)	Signature of the Student	Signature of the Teacher
A	II PHASE				
B	III PHASE PART 1				
C	III PHASE PART 2				
E	OVER ALL ATTENDANCE				

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

SECTION 4B: Details of attending extra classes [For poor attendance (if any)]

S.No	Date	Period	Total hrs	Signature of student	Signature of Teacher
Total hours					

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

Section 5. Records of Internal Assessment Examinations

Records of Internal Assessment examinations

S.No	Exam	Theory	Practical including log book	Signature of student	Signature of Teacher
1	I Internal Assessment	/50	/ 50		
2	II Internal Assessment	/ 50	/ 50		
3	III Internal Assessment	/ 50	/ 50		
4	IV Internal Assessment (Prelim)	/100	/100		
4	Internal Assessment marks	/ 250	/ 250		
5	Converted marks	/25	/25		
	Total Converted marks	/50			

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

Dentistry

For theory Competencies included in Surgery Syllabus

Clinical Postings-3 days

Day	Competency no.	Topic	Hours
1	DE1.3, DE1.5, DE2.3, DE2.5, DE3.3, DE3.4	Identify dental caries, malocclusion, complete compliment of teeth and identify missing teeth, counsel the patients with respect to correction of malocclusion and the role it might have on oral health specifically on the TMJ, counsel the patients with respect to oral hygiene, diet and the direct bearing on systemic health and vice versa, Counsel the patients on the importance of restoring missing teeth with respect to benefits on oral and systemic hygiene.	3 hrs
2	DE4.3, DE4.4	Identify potential precancerous/cancerous lesions, Counsel patients about oral cancers with respect to tobacco smoking, alcohol and other causative factors.	3 hrs
3	DE5.3, DE5.4, DE5.5	Identify periodontal disease, discuss the role of periodontal disease as a focus of sepsis, counsel the patients with respect to oral hygiene, diet and the direct bearing on systemic health and vice versa	3 hrs

INTERNAL ASSESSMENT EXAM IN DENTISTRY

Please refer General Surgery Syllabus (available on https://www.muhs.ac.in/upload/syllabus/Third%20MBBS%20General%20Surgery%20Syllabus%20030621.pdf) for details internal assessment in dentistry.

Format / Skeleton of question paper for University

Please refer General Surgery Syllabus (available on https://www.muhs.ac.in/upload/syllabus/Third%20MBBS%20General%20Surgery%20Syllabus%20030621.pdf) for details question paper for university in dentistry.

ORTHOPAEDICS

Subject: Orthopedics

Lectures

MBBS phase III- part I

Total Teaching hours: 15 hours

Competencies written in red is of alignment and integration

S. NO	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Skeletal Trauma, Poly trauma**				
		OR1.1	**Lecture**: 1		1
			Principles of pre-hospital care and Casualty management of a trauma victim including principles of triage		
		OR1.2	**Lecture** : 2		1
		SU2.1	The aetiopathogenesis, clinical features, investigations, and principles of management of shock Describe Pathophysiology of shock, types of shock & principles of resuscitation including fluid replacement and monitoring.	General Surgery	
		OR1.3	**Lecture**: 3		1

			Aetiopathogenesis, clinical features, investigations, and principles of management of soft tissue injuries		
		OR1.4	**Lecture**: 4		1
			Describe and discuss the Principles of management of soft tissue injuries		
		OR1.5	**Lecture**: 5		1
		AN10.12	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of dislocation of major joints, shoulder, knee, hip Describe and demonstrate shoulder, hip, knee joint for– type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy	Human Anatomy	
4.	**Fractures**				
		OR2.1	**Lecture**: 6		1
		AN8.3	Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of fracture of clavicle Enumerate peculiarities of clavicle	Human Anatomy	
		OR2.2	**Lecture**: 7		1
			Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of fractures of proximal		

			humerus		
		OR2.3	**Lecture**: 8		1
			Select, prescribe and communicate appropriate medications for relief of joint pain		
		OR2.4	**Lecture**: 9		1
			Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of fracture of shaft of humerus and intercondylar fracture humerus with emphasis on neurovascular deficit		
		OR2.5	**Lecture**: 10		1
			Describe and discuss the aetiopathogenesis, clinical features, mechanism of injury, investigation & principles of management of fractures of both bones forearm and Galeazzi and Monteggia injury		
		OR2.6	**Lecture**: 11		1
			Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of fractures of distal radius		
		OR2.7	**Lecture**: 12		1
		AN48.2	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of pelvic injuries with emphasis on hemodynamic instability Describe & demonstrate the (position, features, important peritoneal	Human Anatomy	

			and other relations, blood supply, nerve supply, lymphatic drainage and clinical aspects of) important male & female pelvic viscera		
		OR2.8	**Lecture**: 13		1
			Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of spine injuries with emphasis on mobilisation of the patient		
		OR2.9	**Lecture**: 14		1
			Describe and discuss the mechanism of injury, Clinical features, investigations and principle of management of acetabular fracture		
		OR2.10	**Lecture**: 15		1
			Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of fractures of proximal femur		

MBBS Phase III- Part II

Total Teaching hours: 20 hours

Competencies written in red is of alignment and integration

S. NO	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Fractures**				
		OR2.11	**Lecture**: 1		**1**
			Describe and discuss the aetiopathogenesis, mechanism of injury,		

			clinical features, investigations and principles of management of (a)Fracture patella (b) Fracture distal femur (c) Fracture proximal tibia with special focus on neurovascular injury and compartment syndrome		
		OR2.12	**Lecture**: 2		**1**
			Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Fracture shaft of femur in all age groups and the recognition and management of fat embolism as a complication		
		OR2.13	**Lecture**: 3		**1**
			Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of: (a) Fracture both bones leg (b) Calcaneus (c) Small bones of foot		
		OR2.14	**Lecture**: 4		**1**
		AN20.1	Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of ankle fractures Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles	Human Anatomy	

			involved, blood and nerve supply of tibiofibular and ankle joint		
		OR2.15	**Lecture**: 5		**1**
			Plan and interpret the investigations to diagnose complications of fractures like malunion, non-union, infection, compartmental syndrome		
		OR2.16	**Lecture**: 6		1
			Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of open fractures with focus on secondary infection prevention and management		
2	Musculoskeletal Infection				
		OR3.1	**Lecture**: 7		**1**
		PA33.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Bone and Joint infections a) Acute Osteomyelitis b) Subacute osteomyelitis c) Acute Suppurative arthritis d) Septic arthritis & HIV infection e) Spirochaetal infection f) Skeletal Tuberculosis	Pathology	

			Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of osteomyelitis		
3	Skeletal Tuberculosis				
		OR4.1	**Lecture**: 8		**1**
			Describe and discuss the clinical features, Investigation and principles of management of Tuberculosis affecting major joints (Hip, Knee) including cold abcess and caries spine		
4	Rheumatoid Arthritis and associated inlammatory disorders				
		OR5.1	**Lecture**: 9		**1**
			Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of various inflammatory disorder of joints		
5	Degenerative disorders				
		OR6.1	**Lecture**: 10		**1**
			Describe and discuss the clinical features, investigations and principles of management of degenerative condition of spine (Cervical Spondylosis, Lumbar Spondylosis, PID)		
6	Metabolic bone				

	disorders				
		OR7.1	**Lecture**: 11		**1**
			Describe and discuss the aetiopathogenesis, clinical features, investigation and principles of management of metabolic bone disorders in particular osteoporosis, osteomalacia, rickets, Paget's disease		
7	Poliomyelitis				
		OR8.1	**Lecture**: 12		**1**
			Describe and discuss the aetiopathogenesis, clinical features, assessment and principles of management a patient with Post Polio Residual Paralysis		
8	Cerebral Palsy				
		OR9.1	**Lecture**: 13		**1**
			Describe and discuss the aetiopathogenesis, clinical features, assessment and principles of management of Cerebral palsy patient		
9	Bone Tumors				
		OR10.1	**Lecture**: 14		**1**
		PA33.2	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of benign and malignant bone tumours and pathological fractures Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications and metastases of bone tumors	Pathology	

10	Peripheral nerve injuries				
		OR11.1	**Lecture**: 15		**1**
			Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of peripheral nerve injuries in diseases like foot drop, wrist drop, claw hand, palsies of Radial, Ulnar, Median, Lateral Popliteal and Sciatic Nerves		
11	Congenital lesions				
		OR12.1	**Lecture**: 16		**1**
		AN19.6	Describe and discuss the clinical features, investigations and principles of management of Congenital and acquired malformations and deformities of: a. limbs and spine - Scoliosis and spinal bifida b. Congenital dislocation of Hip,Torticollis, c. congenital talipes equino varus Explain the anatomical basis of Flat foot & Club foot	Human Anatomy	
12	**ProceduralSkills**				
		OR13.1	**Lecture**: 17		**1**
			Participate in a team for procedures in patients and demonstrating the ability to perform on mannequins / simulated patients in the following: i. Above elbowplaster ii. Below kneeplaster iii. Above kneeplaster iv. Thomassplint v. splinting for long bonefractures		

			Strapping for shoulder and clavicletrauma		
		OR13.2	**Lecture**: 18		**1**
			Participate as a member in team for Resuscitation of Polytrauma victim by doing all of the following : (a) I.V. access central -peripheral (b) Bladdercatheterization (c) Endotrachealintubation Splintage		
13	**CounsellingSkills**				
		OR14.1	**Lecture**: 19		**1**
			Demonstrate the ability to counsel patients regarding prognosis in patients with various orthopedic illnesses like a. fractures with disabilities b. fractures that require prolonged bed stay c. bone tumours d. congenital disabilities		
		OR14.2	**Lecture**: 20		**1**
			Demonstrate the ability to counsel patients to obtain consentfor various orthopedic procedures like limp amputation, permanent fixationsetc..		

Subject: Orthopaedics

Small Group Discussion

MBBS phase III/I-

Small group teachings/ Tutorials/ Integrated teaching/ Practical's: 20 hours

***These are suggested topics which can be modified at institutional level and SLO (Specific learning objectives) can be designed for each topic at institutional level**

S. NO	TOPICS*	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Skeletal Trauma, Poly trauma**				
		OR1.1	SGD: 1		1
			Describe and discuss the Principles of pre-hospital care and Casualty management of a trauma victim including principles of triage		
		OR1.1	SGD: 2		1
			Describe the Principles of triage in case of trauma victim		
		OR1.2	SGD: 3		1
			Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of		

			management of shock		
		OR1.3	SGD: 4		1
			Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of soft tissue injuries		
		OR1.4	SGD: 5		1
			Describe and discuss the Principles of management of soft tissue injuries		
		OR1.5	SGD: 6		1
		AN10.12	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of dislocation of shoulder joint Describe and demonstrate shoulder joint for– type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy	Human Anatomy	
		OR1.5	SGD: 7		1
		AN18.4	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of dislocation of knee joint Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments,	Human Anatomy	

			relations, movements and muscles involved, blood and nerve supply, bursae around the knee joint		
		OR1.5	SGD: 8		1
		AN17.1	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of dislocation of hip joint Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, bursae around the hip joint	Human Anatomy	
		OR1.6	SGD: 9		1
			Discuss and demonstrate methods of closed reduction of shoulder dislocation / hip dislocation / knee dislocation		
2.	**Fractures**				
		OR2.1	SGD: 10		1
		AN8.3	Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of fracture of clavicle Enumerate peculiarities of clavicle	Human Anatomy	
		OR2.2	SGD: 11		1

			Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of fractures of proximal humerus		
		OR2.3	SGD: 12		1
			Select, prescribe and communicate appropriate medications for relief of joint pain		
		OR2.4	SGD: 13		1
			Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of fracture of shaft of humerus and intercondylar fracture humerus with emphasis on neurovascular deficit		
		OR2.5	SGD: 14		1
		AN8.1	Describe and discuss the aetiopathogenesis, clinical features, mechanism of injury, investigation & principles of management of fractures of both bones forearm Identify the given bone, its side, important features & keep it in anatomical position	Human Anatomy	
		OR2.5	SGD: 15		1
			Describe and discuss the aetiopathogenesis, clinical features, mechanism of injury, investigation & principles of management of Galeazzi injury		
		OR2.5	SGD: 16		1

			Describe and discuss the aetiopathogenesis, clinical features, mechanism of injury, investigation & principles of management of fractures of Monteggia injury		
		OR2.6	SGD: 17		1
			Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of fractures of distal radius		
		OR2.7	SGD: 18		1
		AN48.2	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of pelvic injuries with emphasis on hemodynamic instability Describe & demonstrate the (position, features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and clinical aspects of) important male & female pelvic viscera	Human Anatomy	
		OR2.8	SGD: 19		1
			Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of spine injuries with emphasis on mobilisation of the patient		

		OR2.9	SGD: 20		1
			Describe and discuss the mechanism of injury, Clinical features, investigations and principle of management of acetabular fracture		

MBBS Phase III/II-

Small group teachings/ Tutorials/ Integrated teaching/ Practical's: 25 hours

***These are suggested topics which can be modified at institutional level and SLO (Specific learning objectives) can be designed for each topic at institutional level**

SR. NO.	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Fracture**				
		OR2.10	SGD: 1		1
		AN17.2	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of fractures of proximal femur Describe anatomical basis of complications of fracture neck of femur	Human Anatomy	

		OR2.11	SGD: 2		1
			Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of (a) fracture patella (b) Fracture distal femur (c) Fracture proximal tibia		
		OR2.11	SGD: 3		1
			Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of neurovascular injury and compartment syndrome in fractures around knee		
		OR2.12	SGD: 4		1
			Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Fracture shaft of femur in all age groups and the recognition and management of fat embolism as a complication		
		OR2.13	SGD: 5		1

			Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of: (a) Fracture both bones leg (b) Calcaneus (c) Small bones of foot		
		OR2.14	SGD: 6		1
		AN20.1	Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of ankle fractures Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply of tibiofibular and ankle joint	Human Anatomy	
		OR2.15	SGD: 7		1
			Plan and interpret the investigations to diagnose complications of fractures like malunion, non-union, infection, compartmental syndrome		

		OR2.16	SGD: 8		1
			Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of open fractures with focus on secondary infection prevention and management		
3.	**MusculoskeletalInfection**				
		OR3.1	SGD: 9		1
			Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Bone and Joint infections a) Acute Osteomyelitis b) Subacute osteomyelitis c) Acute Suppurative arthritis		
		OR3.1	SGD: 10		1
		PA33.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Bone and Joint infections	Pathology	

			a)Septic arthritis & HIV infection b)Spirochaetal infection c)Skeletal Tuberculosis Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of osteomyelitis		
		OR3.2	SGD: 11		1
			Describe and discuss aspiration of joints		
		OR3.3	SGD: 12		1
			Describe and discuss procedures like drainage of abscess, sequestrectomy/ saucerisation and arthrotomy		
4.	**SkeletalTuberculosis**				
		OR4.1	SGD: 13		1
			Describe and discuss the clinical features, Investigation and principles of management of Tuberculosis affecting major joints (Hip, Knee) including cold abcess		

			and caries spine		
5.	**Rheumatoid Arthritis and associatedinlammatorydisorders**				
		OR5.1	SGD: 14		1
			Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of various inflammatory disorder of joints		
6.	**Degenerativedisorders**				
		OR6.1	SGD:15		1
			Describe and discuss the clinical features, investigations and principles of management of degenerative condition of spine (Cervical Spondylosis, Lumbar Spondylosis, PID)		
7.	**Metabolicbonedisorders**				
		OR7.1	SGD:16		1
		PA33.4	Describe and discuss the aetiopathogenesis, clinical features, investigation and principles of management of metabolic bone disorders in particular osteoporosis, osteomalacia, rickets, Paget's disease	Pathology	

			Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of Paget's disease of the bone		
8.	**Poliomyelitis**				
		OR8.1	SGD:17		1
			Describe and discuss the aetiopathogenesis, clinical features, assessment and principles of management a patient with Post Polio Residual Paralysis		
9.	**CerebralPalsy**				
		OR9.1	SGD:18		1
			Describe and discuss the aetiopathogenesis, clinical features, assessment and principles of management of Cerebral palsy patient		
10.	**BoneTumors**				
		OR10.1	SGD:19		1
		PA33.2	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of benign and malignant bone tumours and pathological fractures	Pathology	

			Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications and metastases of bone tumors		
11.	**Peripheralnerveinjuries**				
		OR11.1	SGD:20		1
			Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of peripheral nerve injuries in diseases like foot drop, wrist drop, claw hand, palsies of Radial, Ulnar, Median, Lateral Popliteal and Sciatic Nerves		
12.	**Congenitallesions**				
		OR12.1	SGD: 21		1
			Describe and discuss the clinical features, investigations and principles of management of Congenital and acquired malformations and deformities of: a. limbs and spine - Scoliosis and spinal bifida b. Torticollis		

		OR12.1	SGD: 22		1
			Describe and discuss the clinical features, investigations and principles of management of Congenital and acquired malformations and deformities of: a. Congenital dislocation of Hip b. congenital talipes equino varus		
13.	**ProceduralSkills**				
		OR13.1	SGD: 23		1
			Participate in a team for procedures in patients and demonstrating the ability to perform on mannequins / simulated patients in the following: i. Above elbow plaster ii. Below knee plaster iii. Above knee plaster iv. Thomas splint v. splinting for long bone fractures vi. Strapping for shoulder and clavicle trauma		
		OR13.2	SGD: 24		1
			Participate as a member in team for Resuscitation of Polytrauma victim		

			by doing all of the following : (a)I.V. access central - peripheral (b)Bladder catheterization (c)Endotracheal intubation (d)Splintage		
14	**CounsellingSkills**	OR14.1	SGD: 25		1
			Demonstrate the ability to counsel patients regarding prognosis in patients with various orthopedic illnesses like a.fractures with disabilities b.fractures that require prolonged bed stay c.bonetumours d.congenital disabilities		

Subject: Orthopaedics

Self-Directed Learning

MBBS phase III/I

Total Teaching hours : 5 hours

***These are suggested topics which can be modified at institutional level**

Sr. No.	TOPICS	COMPETENCIES	SUBTOPICS	AIT	HOURS
1.	**Counselling Skills**				
		OR14.3	SDL:1		3
			Demonstrate the ability to convince the patient for referral to a higher centre in various orthopedic illnesses, based on the detection of warning signals and need for sophisticated management		
		OR14.2	SDL:2		2
			Describe the ability to counsel patients to obtain consent for various orthopedic procedures like limp amputation, permanent fixations etc..		

MBBS phase III/II

Total Teaching hours : 5 hours

***These are suggested topics which can be modified at institutional level**

Sr. No	TOPICS	COMPETENCIES	SUBTOPICS	HOURS
1.	**Musculoskeletal Infection**			
		OR3.1	SDL:1	3
			Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Bone and Joint infections a) Acute Osteomyelitis b) Subacute osteomyelitis c) Acute Suppurative arthritis d) Septic arthritis & HIV infection e) Spirochaetal infection f) Skeletal Tuberculosis	
2.	**Metabolic bone disorders**			
		OR7.1	SDL:2	2
			Describe and discuss the aetiopathogenesis, clinical features, investigation and principles of management of metabolic bone disorders in particular osteoporosis, osteomalacia, rickets, Paget's disease	

Internal Assessment Orthopedics

Please refer General Surgery Syllabus (available on https://www.muhs.ac.in/upload/syllabus/Third%20MBBS%20General%20Surgery%20Syllabus%20030621.pdf) for details internal assessment in orthopedics.

Format / Skeleton of question paper for University

Please refer General Surgery Syllabus (available on https://www.muhs.ac.in/upload/syllabus/Third%20MBBS%20General%20Surgery%20Syllabus%20030621.pdf) for details question paper for university in orthopedics.

Name of the Institute

Department of Orthopaedics

Journal

Name of the Student: _____

Roll Number: _____

Batch: _____

Address: _____

Mobile number: _____

Email id: _____

Sayings of the great:

To study the phenomenon of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all.

-Sir William Osler

The good physician treats the disease, the great physician treats the patient who has the disease.

-Sir William Osler

Observe, record, tabulate, and communicate. Use your five senses. Learn to see, learn to hear, learn to feel, learn to smell and know that by practice alone you can become expert.

-Sir William Osler

INDEX

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1.	Clinical Posting Completion Certificate
2.	General Instructions
3.	Posting Certificate
4.	Template of case histories and operative notes
5.	Phase II
6.	Phase III/I
7.	Phase III/II

Clinical Posting Completion Certificate

This is to certify that the candidateMr./Ms. _____ Registration no. _____admitted in the year _____in the _____ _____ Medical College has satisfactorily completed / has not completed all assignments / requirements/ posting mentioned in this journal and journal for final MBBS (II/III-I/III-II) in Orthopaedics during the period from .....to…… She / He is / is not eligible to appear for the summative (University) assessment as on the date given below.

Signature of Head of Department
Date

GENERAL INSTRUCTIONS

1) The journal is a record of the academic / co-curricular activities of the designated student, who would be responsible for maintaining his/her journal.

2) The student is responsible for getting the entries in the journal verified by the Faculty in charge regularly.

3) Entries in the journal will reflect the activities undertaken in the department& have to be scrutinized by the Head of the concerned department.

4) The journal is a record of various activities by the student like:
- Overall participation &performance
- Attendance
- Participation in sessions
- Record of completion of pre-determined activities.
- Acquisition of selected competencies

5) The journal is the record of work done by the candidate in that department / specialty and should be verified by the college before submitting the application of the students for the University examination.

6)*Proposed number of case records should be mentioned in the journal-:

Phase 2- 1st clinical posting (2 weeks) = 2 Orthopaedics cases + 1 Follow-up cases + OT record sheet minimum 3 cases (2 major and 1 minor) + Asepsis, Basic bandaging and dressing skill performed independently and to get it certified

Phase3- 2ndclinicalposting (4 weeks) = 4Orthopaedics cases+ 2follow-up cases + OT record sheet minimum 4 cases (2 major and 2 minor) + Basic splinting and slab application skill performed independently and to get it certified

Phase 4- 3rd Clinical Posting (2 weeks) = 4 Orthopaedics cases + 2 follow-up cases + OT record sheet minimum 4 cases (2 major and 2 minor) + Basic suturing, aseptic joint aspiration skill to be performed independently and to get it certified.

POSTING CERTIFICATE

Name: - Year of Admission: -

Year of appearing for Final M.B.B.S _____

TERM	From	To	Absent days	Case Histories Written	Remark	Signature Of Unit Head
Orthopaedics (II Phase) (2 weeks)						
Orthopaedics (III Phase – Part I) (4 weeks)						
Orthopaedics (III Phase – Part II) (2 weeks)						

N.B: -

1. Students must get the signature of the Unit In charge when posting is completed.
2. This certificate must be submitted before every internal assessment & Preliminary examination.
3. Completed record is mandatory for appearing for the Final Examination.

Template for Clinical Cases and Operative Notes		
Name of Patient	Age/Sex	Ward no.
MRD No	Head of the Unit	
Occupation		
Religion		
Address		
Date of admission		Date of Discharge
Chief complaints		
HOPI/ODP		

Past H/O

Personal

H/O

Family

H/O

Menstrual History in females

Obstetrical History in females

General examination

Built &
Nourishment
Level of
consciousness
Temperature.

Pulse rate
Respiratory
rate Blood
Pressure
Pallor/ cyanosis/clubbing/oedema/Lymphadenopathy/ Icterus

Local examination:

Inspection

Palpation

Movements

Measurements

Systemic Examination:

CV

S

RS

CN

S

PA

Provisional

Diagnosis

Differential

Diagnosis

Investigations

Hematological

Biochemical

Radiological

Xray
-
USG
- CT
-
MRI
-

Final Diagnosis

Treatment-Plan

Pre-operative Workup

Template for Operative Notes

Date: - Time: - Surgeon: -

Indication And operation: The working Diagnosis on which the procedure was based and the name of the operation.

Type of Anesthesia: -

Position of patient: - Describe the position and precautions taken to avoid complications.

Incision: - Name the incision, shape and length including any extensile exposure. A drawing may be useful.

Findings: Describe what was found. List structures identified and protected.

Procedure: Report what was exactly done. Describe prosthetics or special instruments/ implants used.

Closure: Washout, Hemostasis and drains, Method used for closure and Dressing

Post-operative care: Clear instructions with frequency on (a) general observations, (b) Checks on function, (c) Wound care, (d) removal of drains, (e) Start of mobilization, (f) removal of stitches, (g) discharge, (h) follow up.

Complications: List of potential complications and actions to be taken under a 'What If' list

Specimen sent for Histopathology Examination: Yes/No

Histopathology report:

Daily progress note:

Post-Op Progress Report -

(To be filled everyday in serious cases and every third day in other. Mention observations pertaining to a case, any special investigations done and daily treatment administered)

Day (Post-op)	Gen. condition (Appearance, Pulse, BP, Temp Chest)	Fluid intake	Fluid Output			Complications- If any and their treatment and investigation
			Urine	Suction	Others	

Condition of Patient on discharge: -

Advices on discharge: -

Reflection by students in max. 200 words: -
(Write your overall impression of case at the time of discharge or when you leave the case)

Feedback by Faculty –

Signature by Student and Faculty: -

Operative Notes

Date: - Time: -

Surgeon: -

Indication And operation:

Type of Anesthesia: -

Position of patient: -

Incision: -

Findings:

Procedure:

Closure:

Post-operative care

Complications:

Specimen sent for Histopathology Examination: Yes/No

Histopathology report:

Progress Report -

(To be filled everyday in serious cases and every third day in other. Mention observations pertaining to a case, any special investigations done and daily treatment administered)

Day (Post-op)	Gen. condition (Appearance, Pulse, BP, Temp Chest)	Fluid intake	Fluid Output			Complications- If any and their treatment and investigation
			Urine	Suction	Others	

Condition of Patient on discharge: -

Advices on discharge: -

PHASE-II INDEX OF THE CASE HISTORIES OF
ORTHOPAEDICS CASES AND FOLLOW UP CASES
(minimum 2 Orthopaedics cases + 1 Follow-up cases)

Sr. No	Name of The Patient	Date	Diagnosis	Ward no.	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						

Case 1:

Case 2:

Case 3:

Case 4:

Case 5:

Case 6:

INDEX OF THE OPERATIVE PROCEDURES
PHASE II
[OT record sheet minimum 3 cases (2 major and 1 minor) +Asepsis, Basic bandaging and dressing skills performed independently.]

Sr. no.	Name of the patient	Date	Diagnosis	Operative Procedures	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						

Case 7:

Case 9:

Case 1:

Case 4:

PHASE-III/I INDEX OF THE CASE HISTORIES OF ORTHOPAEDICS CASES AND FOLLOW UP CASES
(minimum 4 Orthopaedics cases+ 2 follow-up cases)

Sr. No	Name of The Patient	Date	Diagnosis	Ward no.	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						
7.						

Case 1:

Case 8:

Case 3:

Case 2:

Case 4:

Case 6:

Case 8:

INDEX OF THE OPERATIVE PROCEDURES
PHASE III/I
[OT record sheet minimum 4 cases (2 major and 4 minor) + Basic splinting and slab application skill performed independently]

Sr. no.	Name of the patient	Date	Diagnosis	Operative Procedures	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						

Case 1:

Case 3:

Case 5:

Case 7:

Case 9:

PHASE-III/II INDEX OF THE CASE HISTORIES OF ORTHOPAEDICS CASES AND FOLLOW UP CASES

[minimum 4 Orthopaedics cases + 2 follow-up cases]

Sr. No	Name of The Patient	Date	Diagnosis	Ward no.	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						
6.						
7.						

Case 1:

Case 4:

Case 6:

Case 8:

Case 5:

Case 6:

Case 7:

INDEX OF THE OPERATIVE PROCEDURES

PHASE III/II

[OT record sheet minimum 4 cases (2 major and 2 minor) + Basic suturing, aseptic joint aspiration skill, early management of trauma skills & demonstrates trauma life support]

Sr. no.	Name of the patient	Date	Diagnosis	Operative Procedures	Page No.	Signature of Faculty
1.						
2.						
3.						
4.						
5.						

Case 1:

Case 2:

Case

Case

Case

Name of the Institute





LOG BOOK

DEPARTMENT OF ORTHOPAEDICS

CONTENTS

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1	LOGBOOK CERTIFICATE	03
2	BIODATA OF THE CANDIDATE	04
3	GENERAL INSTRUCTIONS	05
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8	COMMUNICATION SKILLS – AETCOM	17
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LOGBOOK CERTIFICATE

This is to certify that this logbook is the bonafide record of Mr. / Ms. ..... Roll No.……..Admission Year ……..……., of the Department of Orthopaedics at .....Medical College.

The logbook is as per the guidelines of Competency Based Undergraduate Medical Education Curriculum, Graduate Medical Regulation 2019.

He / She has satisfactorily attended/ completed all assignments mentioned in this logbook as per the guidelines prescribed by National Medical Commission.

Head of DepartmentofOrthopaedics

Signature with Date

BIODATA OF THE CANDIDATE

PHOTO

Name of the student:

Name of the course: MBBS

Date of birth:

Father's / Guardian's name:

Mother's name:

Blood group:

Permanent Address: Temporary Address:

…… ……

…….. ……..

Student's contact no:

Father's/ Guardian's contact no:

Student's Email id:

Father's/ Guardian's Email id:

Date: Candidates Signature: ……...

GENERAL INSTRUCTIONS

1) The logbook is a record of the academic / non-academic activities of the student. Each Medical student is responsible for maintaining their logbook.

2) This logbook is prepared as per the guidelines of NMC for implementation of Competency Based Curriculum for 4THProfessional MBBS students in the subject of Orthopaedics.

3) Students are instructed to keep their logbook entries up to date. It is the responsibility of the student to enter their activity in respective pages & get them duly signed by the supervising faculty.

4) Entries in the logbook will be in accordance with activities done in the department & have to be scrutinized by the Head of the department.

5) The logbook assessment will be based on multiple factors like
   - Overall presentation
   - Active participation in the sessions
   - Quality of write up of reflections.
   - Timely completions

- Attendance

6) The logbook shall be kept as record work of the candidate for the department & be submitted to department as a bonafide record of the candidate before appearing for the University examination.

NOTE:

1. A **clear record** of all components that add to the internal assessment marks needs to be maintained by the institution and retained by them for at least **2 years** after passing of the examination. Institutions may be asked to provide these details by the University as and when required.

The contents in the logbook are suggested guidelines. The institutions can make **necessary changes as per the needs.**

ATTENDANCE

Every candidate should have attendance not less than 75% of the total classes conducted in theory, practical and clinical jointly in each calendar year calculated from the date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed to be eligible to appear for the university examinations.

For appearing at the University Examination, student should have minimum 75% attendance in each subject.

A candidate lacking in the prescribed attendance in any subject(s) should not be permitted to appear for the examination in that subject(s)

Students cannot appear in part or separately in individual subjects during the first appearance at the Professional examination.

The Principal should notify the attendance details at the end of each professional phase without fail under intimation to this University.

Self-Directed Learning, Seminars, Tutorials, Projects, Quizzes, extracurricular activities

Sr. No.	Self- directed learning (Seminars, Tutorials, Projects, Quizzes, Extracurricular activities)	Date	Phase III/I	Phase III/II	Signature of Teacher

Reflection (minimum 200 words) – 1
Date :

TOPIC:

Reflection (minimum 200 words) – 2
Date :

TOPIC:

LOGBOOK CLINICAL SKILLS : LIST OF COMPETENCIES

Clinical skills can be assessed by case presentation, case-based discussion, objective structured clinical assessment the checklist, MiniCex, as per the institutional preference.

Competency # addressed	Name of Activity
OR1.1	Describe and discuss the Principles of pre-hospital care and Casuality management of a trauma victim including principles of triage
OR1.2	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of shock
OR1.3	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of soft tissue injuries
OR1.4	Describe and discuss the Principles of management of soft tissue injuries
OR1.5	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of dislocation of major joints, shoulder, knee, hip
OR2.6	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of fractures of distal radius
OR2.7	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of pelvic injuries with emphasis on hemodynamic instability
OR2.8	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of spine injuries with emphasis on mobilisation of the patient
OR2.11	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of (a) Fracture patella (b) Fracture distal femur (c) Fracture proximal tibia with special focus on neurovascular injury and compartment syndrome
OR2.12	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Fracture shaft of femur in all age groups and the recognition and management of fat embolism as a complication
OR2.16	Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of open fractures with focus on secondary infection prevention and management
OR3.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Bone and Joint infections a) Acute Osteomyelitis b) Subacute osteomyelitis c) Acute Suppurative arthritis d) Septic arthritis & HIV infection
OR4.1	Describe and discuss the clinical features, Investigation and principles of management of Tuberculosis affecting major joints (Hip, Knee) including cold abcess and caries spine
OR7.1	Describe and discuss the aetiopathogenesis, clinical features, investigation and principles of management of metabolic bone disorders in particular osteoporosis, osteomalacia, rickets, Paget's disease
OR8.1	Describe and discuss the aetiopathogenesis, clinical features, assessment and principles of management a patient with Post Polio Residual Paralysis

OR10.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of benign and malignant bone tumours and pathological fractures

Integration	
Anatomy	
AN10.12	Describe and demonstrate Shoulder joint for– type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy
AN18.6	Describe knee joint injuries with its applied anatomy
Pathology	
PA33.1	Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of osteomyelitis
PA33.2	Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of metastases of bone tumors
Microbiology	
MI4.2	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of bone & joint infections.

LOGBOOK PSYCHOMOTOR / PERFORMANCE SKILLS:

Skills can be assessed by objective structured clinical assessment with checklist, Global Rating Scale, Simulated patients as per the institutional preference.

Colleges are instructed prepare modules for skill training as per NMC guidelines.

Module 5 Skill Training.

LIST OF COMPETENCIES

Competency # addressed	Name of Activity
OR1.6	Participate as a member in the team for closed reduction of shoulder dislocation / hip dislocation / knee dislocation
OR3.2	Participate as a member in team for aspiration of joints under supervision.
OR3.3	Participate as a member in team for procedures like drainage of abscess, sequestrectomy/ saucerisation and arthrotomy
OR13.1	Participate in a team for procedures in patients and demonstrating the ability to perform on mannequins / simulated patients in the following: i. Above elbow plaster ii. Below knee plaster iii. Above knee plaster iv. Thomas splint v. splinting for long bone fractures vi. Strapping for shoulder and clavicle trauma
OR13.2	Participate as a member in team for Resuscitation of Polytrauma victim by doing all of the following : (a) I.V. access central - peripheral (b) Bladder catheterization (c) Endotracheal intubation (d) Splintage

LOGBOOK FOR AETCOM SKILLS

Counselling for Investigation, Treatment, Prognosis, Blood donation, Organ Donation, Breaking Bad news. All types of consent. Medicolegal aspects and Ethics, Empathy and professionalism as per the Phase of the MBBS. Include cases of Allied branches also.

Competency to be assessed during Clinical postings and /or small group discussions.

LIST OF COMPETENCIES FOR AETCOM

Competency addressed	**Name of Activity**
OR14.1	Demonstrate the ability to counsel patients regarding prognosis in patients with various orthopedic illnesses like a. fractures with disabilities b. fractures that require prolonged bed stay c. bone tumours d. congenital disabilities
OR14.2	Demonstrate the ability to counsel patients to obtain consent for various orthopedic procedures like limp amputation, permanent fixations etc..
OR14.3	Demonstrate the ability to convince the patient for referral to a higher centre in various orthopedic illnesses, based on the detection of warning signals and need for sophisticated management.

PHASE II-clinical (minimum three assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd, casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B)expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE II-Psychomotor

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty ,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B)expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty ,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
6.										
7.										
8.										
9.										
10.										
11.										
12.										

PHASE II- AetCom(Minimum three assessments)

Sr. No	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty ,	Date com plete d	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Complete d (C) Repeat (R) Remedial (Re)	Initial of facult y	Feedbac k received Initial of Learner	Method of assessmen t and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part I -clinical (Minimum three assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part I-Psychomotor skill

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd, casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd, casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B)expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
6.										
7.										
8.										
9.										
10.										
11.										
12.										

PHASE III Part I - AetCom (Minimum three assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty ,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part II -clinical (minimum three assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B)expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										

PHASE III Part II -Psychomotor skill

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
Sr. No.	**Competency # addressed**	**Name of Activity**	**Site Ward, skill lab, opd , casualty,**	**Date completed**	**Attempt at activity First (F) Repeat (R) Remedial (Re)**	**Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score**	**Decision of faculty Completed (C) Repeat (R) Remedial (Re)**	**Initial of faculty**	**Feedback received Initial of Learner**	**Method of assessment and Score**
6.										
7.										
8.										
9.										
10.										
11.										
12.										

PHASE III Part II - AetCom (Minimum three assessments)

Sr. No.	Competency # addressed	Name of Activity	Site Ward, skill lab, opd , casualty ,	Date completed	Attempt at activity First (F) Repeat (R) Remedial (Re)	Rating Below (B) expectations Meets (M)expectations Exceeds (E) expectations OR Numerical Score	Decision of faculty Completed (C) Repeat (R) Remedial (Re)	Initial of faculty	Feedback received Initial of Learner	Method of assessment and Score
1.										
2.										
3.										
4.										
5.										
6.										
7.										

REFLECTION ON AETCOM MODULE For PHASE III/II

Module 4.5 - Case studies in ethics: The doctor- industry relationship

Competency addressed	*Level*
Identify and discuss amd defend medico-legal, socio-cultural, professional and ethical issues in physician- industry relationship	*KH*

Reflection (minimum 200 words) -1
Date:

Signature of Teacher-in-charge

ANNEXURE 2:

AETCOM skills can be assessed by use of Kalamazoo consensus.

Criteria
Builds relationship
Opens the discussion
Gathers information
Understands the patient's perspective
Shares information
Manages flow
Overall rating
Signature of teacher

Rating 1-3 - Poor, 4 -6 Satisfactory, 6 -10 Superior

Communication skills rating scale adapted from Kalamazoo consensus statement.

Paper wise distribution of topics for Prelim & MUHS Annual Examination

Year: III-II MBBS Subject: Orthopaedics

Paper	Section	Topics
II (General Surgery)	A	MCQs on all topics of the paper II of general surgery will include **orthopaedics**
	C	Skeletal Trauma, Poly trauma
		Fractures
		MusculoskeletalInfection
		SkeletalTuberculosis
		Rheumatoid Arthritis and associated inflammatory disorders
		Degenerative disorders
		Metabolicbonedisorders
		Poliomyelitis
		CerebralPalsy
		BoneTumors
		Peripheralnerveinjuries
		Congenitallesions

Competency Based Medical Education

Year: Second/ III-I/ III-II MBBS

Subject: Orthopaedics

Learning Resource Material

Sr.no.	Author	Title of book/ Material	Publisher
		TEXTBOOK	
1.	Maheshwari &Mhaskar	Essential Orthopaedics	JayPee Brothers Medical Publishers
2.	Anil Jain	Turek'sOrthopaedics Principles & their Applications	Wolters Kluwer
3.	Anand Thakur	The Elements of Fracture Fixation	Elsevier
4.	John Ebnezar	Textbook of Orthopedics	JayPee Brothers Medical Publishers
5.	Ashley Blom, David Warwick, Michael Whitehouse	Apley& Solomon's System of Orthopaedics& Trauma	Productivity Press
6.	Kenneth Egol, Kenneth Koval, Joseph Zuckerman	Handbook of Fractures	Wolters Kluwer
		CLINICAL ORTHOPAEDICS	
1.	S Das	A Manual on Clinical Surgery 9th Edition 2019	DAS Publications
2.	Vivek Pandey, Hitesh Shah	Musculoskeletal Examination	JayPee Brothers Medical Publishers
		REFERENCES	
1.	Frederick Azar, James Beaty	Campbell's Operative Orthopaedics	Elsevier
2.	Charles Court-Brown, James Heckman, Margaret McQueen, William Ricci, Paul Tornetta III	Rockwood & Green's Fractures in Adults and Children	Lippincott Williams and Wilkins
3.	Shrikant Gore	Orthopaedics for Undergraduates as per M.C. I's. Competency based curriculum	Maharudra Mangnale Muktrang Prakashan ,

	AS3.4	Choose and interpret appropriate testing for patients undergoing Surgery	Bedside Cliinc			General Surgery
	AS3.5	Determine the readiness for General Surgery in a patient based on the preoperative evaluation	Bedside Cliinc			General Surgery
	AS3.6	Choose and write a prescription for appropriate premedications for patients undergoing surgery	Bedside Cliinc		Pharmacology	
2	**General Anaesthesia**					
	AS4.3	Observe and describe the principles and the practical aspects of induction and maintenance of anesthesia	Bedside Cliinc		Pharmacology	
	AS4.4	Observe and describe the principles and the steps/ techniques in maintenance of vital organ functions in patients undergoing surgical procedures	Bedside Cliinc			
	AS4.5	Observe and describe the principles and the steps/ techniques in monitoring patients during anaesthesia	Bedside Cliinc			
3	**Regional Anaesthesia**					
	AS5.1	Enumerate the indications for and describe the principles of regional anaesthesia (including spinal, epidural and combined)	Bedside Cliinc			

4	**Regional Anaesthesia**					
	AS5.6	Observe and describe the principles and steps/ techniques involved in common blocks used in surgery (including brachial plexus blocks)	Bedside Cliinc			General Surgery
5	**Post-anaesthesia Recovery**					
	AS6.1	Describe the principles of monitoring and resuscitation in the recovery room	Bedside Cliinc			

	AS6.2	Observe and enumerate the contents of the crash cart and describe the equipment used in the recovery room	Bedside Cliinc			
6	**Intensive Care Management**					
	AS7.3	Observe and describe the management of an unconscious patient	Bedside Cliinc		Physiology	General Medicine
	AS7.5	Observe and describe the principles of monitoring in an ICU	Bedside Cliinc			General Medicine
7	**Fluids**					
	AS9.3	Describe the principles of fluid therapy in the preoperative period	Bedside Cliinc			General Surgery
	AS9.4	Enumerate blood products and describe the use of blood products in the preoperative period	Bedside Cliinc		Pathology	General Surgery
8	**Patient Safety**					
	AS10.3	Describe the role of communication in patient safety	Bedside Cliinc		AETCOM	General Surgery
	AS10.4	Define and describe common medical and medication errors in anaesthesia	Bedside Cliinc		Pharmacology	General Medicine
9	**Cardiopulmonary Resuscitation**					
	AS2.1	Enumerate the indications, describe the steps and demonstrate in a simulated environment, Basic Life Support in adults, children and neonates	DOAP Session			General Medicine, Pediatrics
	AS2.2	Enumerate the indications, describe the steps and demonstrate in a simulated environment, Advanced Life Support in adults and children	DOAP Session			General Medicine

D. UG curriculum for small group teaching total no. of classes (hours): 10 – (30 Competencies)

Sr. No.	Number of Competencies	Competencies	Suggested Teaching learning method	Hour	Vertical integration	Horizontal integration
1	**Cardiopulmonary Resuscitation**		Small Group Discussion, DOAP Session	1		General Medicine, Paediatrics
	AS2.1	Enumerate the indications, describe the steps and demonstrate in a simulated environment, Basic Life Support in adults, children and neonates				
	AS2.2	Enumerate the indications, describe the steps and demonstrate in a simulated environment, Advanced Life Support in adults and children	Small Group Discussion, DOAP Session			General Medicine, Paediatrics
2	**Preoperative evaluation and medication**		DOAP Session	1		General Surgery, General Medicine
	AS3.2	Elicit, present and document an appropriate history including medication history in a patient undergoing Surgery as it pertains to a preoperative anaesthetic evaluation				
	AS3.3	Demonstrate and document an appropriate clinical examination in a patient undergoing General Surgery	DOAP Session			General Surgery
	AS3.4	Choose and interpret appropriate testing for patients undergoing Surgery	Small Group Discussion			General Surgery
	AS3.5	Determine the readiness for General Surgery in a patient based on the preoperative evaluation	Small Group Discussion			General Surgery
	AS3.6	Choose and write a prescription for appropriate premedications for patients undergoing surgery	Small Group Discussion		Pharmacology	
3	**General Anaesthesia**		Small Group Discussion	1	Pharmacology	
	AS4.3	Observe and describe the principles and the practical aspects of induction and maintenance of anesthesia				

	AS4.4	Observe and describe the principles and the steps/	Small Group			

		techniques in maintenance of vital organ functions in patients undergoing surgical procedures	Discussion			
	AS4.5	Observe and describe the principles and the steps/ techniques in monitoring patients during anaesthesia	Small Group Discussion			
	AS4.6	Observe and describe the principles and the steps/ techniques involved in day care anesthesia	Small Group Discussion			
	AS4.7	Observe and describe the principles and the steps/ techniques involved in anaesthesia outside the operating room	Small Group Discussion			
4	**Regional Anaesthesia**		Small Group Discussion, DOAP Session	1	Human Anatomy	
	AS5.3	Observe and describe the principles and steps/ techniques involved in peripheral nerve blocks				
	AS5.4	Observe and describe the pharmacology and correct use of commonly used drugs and adjuvant agents in regional anesthesia	Small Group Discussion		Pharmacology	
	AS5.5	Observe and describe the principles and steps/ techniques involved in caudal epidural in adults and children	Small Group Discussion, DOAP Session			
	AS5.6	Observe and describe the principles and steps/ techniques involved in common blocks used in surgery (including brachial plexus blocks)	Small Group Discussion, DOAP Session			General Surgery
5	**Post-anaesthesia Recovery**		Small Group Discussion	1		
	AS6.1	Describe the principles of monitoring and resuscitation in the recovery room				
	AS6.2	Observe and enumerate the contents of the crash cart and describe the equipment used in the recovery room	Small Group Discussion			

6	**Intensive Care Management**		Small Group Discussion	1		
	AS7.1	Visit, enumerate and describe the functions of an Intensive Care Unit				
	AS7.2	Enumerate and describe the criteria for admission and discharge of a patient to an ICU	Small Group Discussion			General Medicine
	AS7.3	Observe and describe the management of an unconscious patient	Small Group Discussion		Physiology	General Medicine
7	**Intensive Care Management**		Small Group Discussion	1	Physiology	General Medicine
	AS7.4	Observe and describe the basic setup process of a ventilator				
	AS7.5	Observe and describe the principles of monitoring in an ICU	Small Group Discussion			General Medicine
8	**Pain and its management**		Small Group Discussion, DOAP Session	1	Physiology	
	AS8.2	Elicit and determine the level, quality and quantity of pain and its tolerance in patient or surrogate				
9	**Fluids**		Small Group Discussion, DOAP Session	1		
	AS9.1	Establish intravenous access in a simulated environment				
	AS9.2	Establish central venous access in a simulated environment	Small Group Discussion, DOAP Session			
10	**Patient Safety**		Small Group Discussion			
	AS10.1	Enumerate the hazards of incorrect patient positioning				
	AS10.2	Enumerate the hazards encountered in the perioperative period and steps/techniques taken to prevent them	Small Group Discussion			
	AS10.3	Describe the role of communication in patient safety	Small Group Discussion		AETCOM	General Surgery

	AS10.4	Define and describe common medical and medication errors in anaesthesia	Small Group Discussion		Pharmacology	General Medicine

Dividing Competencies into
Lectures and Small Group Discussion/Bedside Clinics/DOAP Session

Sr. No.	Competency No.	Total	Dividing Competencies into			
			Lectures	Total	Small Group Discussion/Bedside Clinics/DOAP Session	Total
1	AS1.1, AS1.2, AS1.3, AS1.4	4	AS1.1, AS1.2, AS1.3, AS1.4	4		
2	AS2.1, AS2.2	2			AS2.1, AS2.2	2
3	AS3.1, AS3.2, AS3.3, AS3.4, AS3.5, AS3.6	6	AS3.1	1	AS3.2, AS3.3, AS3.4, AS3.5, AS3.6	5
4	AS4.1, AS4.2, AS4.3, AS4.4, AS4.5, AS4.6, AS4.7	7	AS4.1, AS4.2	2	AS4.3, AS4.4, AS4.5, AS4.6, AS4.7	5
5	AS5.1, AS5.2, AS5.3, AS5.4, AS5.5, AS5.6	6	AS5.1, AS5.2	2	AS5.3, AS5.4, AS5.5, AS5.6	4
6	AS6.1, AS6.2, AS6.3	3	AS6.3	1	AS6.1, AS6.2	2
7	AS7.1, AS7.2, AS7.3, AS7.4, AS7.5	5			AS7.1, AS7.2, AS7.3	3
					AS7.4, AS7.5	2
8	AS8.1, AS8.2, AS8.3,AS8.4, AS8.5	5	AS8.1, AS8.3	2	AS8.2	1
			AS8.4, AS8.5	2		
9	AS9.1, AS9.2, AS9.3, AS9.4	4	AS9.3, AS9..4	2	AS9.1, AS9.2	2
10	AS10.1, AS10.2, AS10.3, AS10.4	4			AS10.1, AS10.2, AS10.3, AS10.4	4
		46		16		30

Competency Based Medical Education

Year: III-I MBBS

Subject: **Anaesthesiology**

LEARNING RESOURCE MATERIAL

Sr. No.	Author	Title of book/ Material	Publisher
1.	John F. Butterworth, John D. Wasnick, David C. Mackey	Morgan & Mikhail's Clinical Anesthesiology	Lange
2.	R. S. Atkinson	Lee's Synopsis of Anaesthesia	Elsevier
3.	Ajay Yadav	Short Textbook of Anesthesia	Jaypee, The Health Sciences Publisher - London, New Delhi, Panama
4.	Ronald D. Miller	Miller's Anesthesia	

INTERNAL ASSESSMENT EXAM IN ANASTHESIOLOGY

End of the posting examto be conducted for 25 marks and to be submitted to department of General Surgery during respective phase of teaching. Refer to surgery Syllabus for details.

Dentistry

For theory Competencies included in Surgery Syllabus

Clinical Postings-3 days

Day	Competency no.	Topic	Hours
1	DE1.3, DE1.5, DE2.3, DE2.5, DE3.3, DE3.4	Identify dental caries, malocclusion, complete compliment of teeth and identify missing teeth, counsel the patients with respect to correction of malocclusion and the role it might have on oral health specifically on the TMJ, counsel the patients with respect to oral hygiene, diet and the direct bearing on systemic health and vice versa, Counsel the patients on the importance of restoring missing teeth with respect to benefits on oral and systemic hygiene.	3 hrs
2	DE4.3, DE4.4	Identify potential precancerous/cancerous lesions, Counsel patients about oral cancers with respect to tobacco smoking, alcohol and other causative factors.	3 hrs
3	DE5.3, DE5.4, DE5.5	Identify periodontal disease, discuss the role of periodontal disease as a focus of sepsis, counsel the patients with respect to oral hygiene, diet and the direct bearing on systemic health and vice versa	3 hrs

RADIODIAGNOSIS

Course Content

Second / III-I/ III-II MBBS

Subject : Radio Diagnosis Theory / Practical

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 2 / 3; page nos. 161 to166)

1. Total Teaching hours :20

A. Lectures (hours): 10 B. Self directed learning (hours) : 2

C. Small group teachings/tutorials/Integrated teaching/Practicals (hours)**: 8** hours

D. Clinical Postings (hours): 2 weeks (3hours /day x 12 days Monday to Saturday

Term I/II

A. Lectures/ Large Group Teachings Total Number of Competencies: 13
In institutes where radiotherapy facility is available 2 hours will be allotted to Radiotherapy department. Time Table in these institutes will be prepared by Radio Diagnosis and Radiotherapy department in joint collaboration

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
LEC 1	RD1.1	Define radiation and the interaction of radiation and importance of radiation protection	Lecture, Demonstration	1		
	RD1.2	Describe the evolution of Radiodiagnosis. Identify various radiological equipmentsIn the current era				
LEC 2	RD1.3	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and	Lecture, Demonstration	1		ENT

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		interpret findings in common conditions pertaining to disorder of ENT				
LEC 3	RD1.4	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorder in Ob &Gy	Lecture, Demonstration	1		Obstetrics &Gynaecology
	RD1.12	Describe the effects of radiation in pregnancy and the methods of prevention/ minimization of radiation exposure				
	RD1.13	Describe the components of the PC & PNDT Act and its medicolegal implications				
LEC 4	RD1.5	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to disorder in internal medicine				Medicine
LEC 5	RD1.6	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to				Surgery

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		disorderls in surgery				
LEC 6	RD1.7	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to disorder in Pediatrics				Pediatrics
LEC 7	RD1.8	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to common malignancies				All clinical departments
LEC 8	RD1.9	Describe the role of Interventional Radiology in common clinical conditions				All clinical departments
LEC 9	RD1.10	Describe the role of Emergency Radiology, miscellaneous & applied aspects, interaction with clinical departments				All clinical departments
LEC 10	RD1.11	Describe preparation of patient for common imaging procedures	Lecture, Demonstration			All clinical departments
B – Self Directed Learning 2 hours						

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
Serial No.	**Competency No.**	**Topics & Sub Topics**	**Suggested Teaching Method**	**Hours**	**Vertical Integration**	**Horizontal Integration**
SDL 1	RD1.5	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to disorder in internal medicine	Small group discussion, Quiz, etc	1		All clinical departments
	RD1.10	Describe the role of Emergency Radiology, miscellaneous & applied aspects, interaction with clinical departments	Small group discussion, Quiz, etc			
SDL 2	RD1.4	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorder in Ob &Gy	Small group discussion, Quiz, etc	1		Obstetrics &Gynaecology
	RD1.13	Describe the components of the PC & PNDT Act and its medicolegal implications				
	RD1.1	Define radiation and the interaction of radiation and importance of radiation protection				
C	C. **Small group teachings/tutorials/Integrated teaching/Practicals(hours): 8 hours**					
Serial No.	**Competency No.**	**Topics & Sub**	**Suggested**	**Hours**	**Vertical**	**Horizontal**

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		Topics	**Teaching Method**		**Integration**	**Integration**
SGT 1	AN20.6, AN25.7, AN43.7, AN43.9, AN51.1, AN51.2, IM7.18	Identify anatomical parts on radiographic images	Lecture/ Small group discussion	**3**		**Anatomy & All Clinical Departments**
SGT 2	AN25.8, AN54.2	Role of Barium Studies in gastro Intestinal Tract Evaluation	Lecture/ Small group discussion	3		Medicine, Surgery
SGT 3	FM1.9	Medicolegal aspects in Radiology	Lecture/ Small group discussion	1		Forensic Medicine
SGT 4	IM1.19, IM3.7, IM3.11, M13.12, PE34.8, PE23.13	Role of Radiology in Chest Diseases	Lecture/ Small group discussion	1		Medicine, Pediatrics
SGT 5	SU25.3	Role of Radiology in Breast Diseases	Lecture/ Small group discussion	1		Surgery
SGT 6	PE28.17	Role of Radiology in Ear Nose Throat and Eye Diseases	Lecture/ Small group discussion	1		ENT &Opthalmology
SGT 7	IM10.19, PE21.12, IM10.19, AN54.2	Role of Radiology in Diseases of the Genito Urinary System	Lecture/ Small group discussion	1		Medicine
SGT 8	IM19.7, PE30.23, IM6.12, AN43.7, AN43.8, AN43.9	Role of Radiology in Central Nervous System	Lecture/ Small group discussion	1		Medicine, Surgery, Pediatrics,

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		Diseases				
D	**D.** Clinical Postings(hours): 2 weeks (3hours /day x 12 days Monday to Saturday. **In institutes where radiotherapy facility is available 6 hours will be allotted to Radiotherapy department. Time Table in these institutes will be prepared by Radio Diagnosis and Radiotherapy department in joint collaboration**					
CP 1	RD1.1 RD1.2	Introduction to All modalities under Radiodiagnosis and Radiation Protection.	Lecture, Demonstration, Small group teaching	**1**		
CP 2	RD1.5	Role of Radiology in Chest Conditions lungs and heart	Lecture, Demonstration, Small group teaching			Medicine and Pediatrics
CP 3	RD1.6	Role of Radiology in Abdominal Conditions hepatobilary system and Gastrointestinal System	Lecture, Demonstration, Small group teaching	3		Surgery
CP 4	RD1.6	Role of Radiology in Abdominal Conditions - Genitourinary system	Lecture, Demonstration, Small group teaching	3		Surgery
CP 5	RD1.4 & RD 1.5	Role of Radiology in Obstetrics and Gynaecolgy	Demonstration, Small group teaching	3		Obstetrics & Gynecology
CP 6	RD1.6	Role of	Demonstration,	3		Orthopedics

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		Radiology in Musculoskeletal system	Small group teaching			
CP 7	RD1.6	Role of Radiology in Diseases of Central Nervous System	Demonstration, Small group teaching	3		All clinical Branches
CP 8	RD1.2	Basic Principles of Computed Tomography	Demonstration, Small group teaching	**3**		
CP 9	RD1.2	Basic Principles of Magnetic Resonance Imaging	Demonstration, Small group teaching	**3**		
CP 10	RD1.1	Radiation Hazards and Radiation Protection	Demonstration, Small group teaching	3		
CP 11	RT	Radiotherapy related topics	Radiotherapy related topics	3		
CP 12	RT	Radiotherapy related topics	Radiotherapy related topics	3		

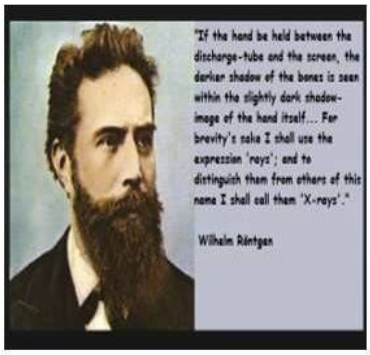
Learning Resource Material

Sr.no.	Author	Title of book/ Material	Publisher
1	David Sutton	Text Book of Radiology and Medical Imaging for Medical Students Seventh Edition	Elseivier
2	David Sutton	Text Book of Radiology & Imaging Students Seventh Edition	Elseivier
3	Grainger Allison	Diagnostic Radiology	Elseivier

Name of the Institute

LOG BOOK

DEPARTMENT OF RADIODIAGNOSIS



CONTENTS

Sr. No.	Subject	Page No.
1	LOGBOOK CERTIFICATE	04
2	RECORD OF INTERNAL ASSESSMENT EXAMINATIONS	05
3	SELF DIRECTED LEARNING / TUTORIALS / SEMINARS / EXTRA CURRICULAR ACTIVITIES	06
4	LIST OF COMPETENCIES	08
5	PHASE III/I	10

RADIODIAGNOSIS LOGBOOK CERTIFICATE

This is to certify that this logbook is the bonafide record of Mr. / Ms..... Roll No…….. Admission Year …….……, of the Department of RadioDiagnosis at …….…… …….……. Medical College.

The logbook is as per the guidelines of Competency Based Undergraduate Medical Education Curriculum, Graduate Medical Regulation 2019.

He / She has satisfactorily attended/ completed all assignments mentioned in this logbook as per the guidelines prescribed by National Medical Commission.

Head of Department
Department of Radio Diagnosis
Signature with Date

INTERNAL ASSESSMENT EXAMINATION IN RADIODIAGNOSIS

End of the posting exam to be conducted for 25 marks and to be submitted to department of General Surgery during respective phase of teaching. Refer to Surgery Syllabus for details.

Self-Directed Learning: Seminars, Tutorials, Projects, Quizzes,

Extra-curricular activities

Sr. No.	Self- directed learning (Seminars, Tutorials, Projects, Quizzes, Extracurricular activities)	Date	Phase III/I	Signature of Teacher
1				
2				

Reflection (minimum 200 words) 1
Date:

TOPIC:

LOGBOOK CLINICAL SKILLS : LIST OF COMPETENCIES

Clinical skills can be assessed by case presentation, case-based discussion, objective structured clinical assessment the checklist, MiniCex, as per the institutional preference.

Sr. No	Competencies Addressed	Name of the Activity
1	PE21.12	How will you interpret a KUB Report?
2	PE23.13	How will you report a Chest radiograph and rule out cardiomegaly?
3	PE23.16	How will you use the ECHO reports in management of case of Cardiac disease ?
4	PE30.23	How will you interpret CT scan and MRI Report?

Radiotherapy

For theory Competencies to be included in Surgery & Radiology Syllabus

Clinical Postings-3 days where ever department exists

BOOKS RECOMMENDED:

REFERENCE BOOKS:

1) Hardikar's Orthopaedics Operations Text and Atlas by- Shrinivas S. Shintre, Sharad M. Hardikar, Vijay M. Panchandikar

RADIODIAGNOSIS

Course Content

Second / III-I/ III-II MBBS

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Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
LEC 1	RD1.1	Define radiation and the interaction of radiation and importance of radiation protection	Lecture, Demonstration	1		
	RD1.2	Describe the evolution of Radiodiagnosis. Identify various radiological equipmentsIn the current era				
LEC 2	RD1.3	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and	Lecture, Demonstration	1		ENT

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		interpret findings in common conditions pertaining to disorder of ENT				
LEC 3	RD1.4	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorder in Ob &Gy	Lecture, Demonstration	1		Obstetrics &Gynaecology
	RD1.12	Describe the effects of radiation in pregnancy and the methods of prevention/ minimization of radiation exposure				
	RD1.13	Describe the components of the PC & PNDT Act and its medicolegal implications				
LEC 4	RD1.5	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to disorder in internal medicine				Medicine
LEC 5	RD1.6	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to				Surgery

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		disorderls in surgery				
LEC 6	RD1.7	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to disorder in Pediatrics				Pediatrics
LEC 7	RD1.8	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to common malignancies				All clinical departments
LEC 8	RD1.9	Describe the role of Interventional Radiology in common clinical conditions				All clinical departments
LEC 9	RD1.10	Describe the role of Emergency Radiology, miscellaneous & applied aspects, interaction with clinical departments				All clinical departments
LEC 10	RD1.11	Describe preparation of patient for common imaging procedures	Lecture, Demonstration			All clinical departments
B – Self Directed Learning 2 hours						

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
Serial No.	**Competency No.**	**Topics & Sub Topics**	**Suggested Teaching Method**	**Hours**	**Vertical Integration**	**Horizontal Integration**
SDL 1	RD1.5	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining to disorder in internal medicine	Small group discussion, Quiz, etc	1		All clinical departments
	RD1.10	Describe the role of Emergency Radiology, miscellaneous & applied aspects, interaction with clinical departments	Small group discussion, Quiz, etc			
SDL 2	RD1.4	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorder in Ob &Gy	Small group discussion, Quiz, etc	1		Obstetrics &Gynaecology
	RD1.13	Describe the components of the PC & PNDT Act and its medicolegal implications				
	RD1.1	Define radiation and the interaction of radiation and importance of radiation protection				
C	C. **Small group teachings/tutorials/Integrated teaching/Practicals(hours): 8 hours**					
Serial No.	**Competency No.**	**Topics & Sub**	**Suggested**	**Hours**	**Vertical**	**Horizontal**

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		Topics	**Teaching Method**		**Integration**	**Integration**
SGT 1	AN20.6, AN25.7, AN43.7, AN43.9, AN51.1, AN51.2, IM7.18	Identify anatomical parts on radiographic images	Lecture/ Small group discussion	**3**		**Anatomy & All Clinical Departments**
SGT 2	AN25.8, AN54.2	Role of Barium Studies in gastro Intestinal Tract Evaluation	Lecture/ Small group discussion	3		Medicine, Surgery
SGT 3	FM1.9	Medicolegal aspects in Radiology	Lecture/ Small group discussion	1		Forensic Medicine
SGT 4	IM1.19, IM3.7, IM3.11, M13.12, PE34.8, PE23.13	Role of Radiology in Chest Diseases	Lecture/ Small group discussion	1		Medicine, Pediatrics
SGT 5	SU25.3	Role of Radiology in Breast Diseases	Lecture/ Small group discussion	1		Surgery
SGT 6	PE28.17	Role of Radiology in Ear Nose Throat and Eye Diseases	Lecture/ Small group discussion	1		ENT &Opthalmology
SGT 7	IM10.19, PE21.12, IM10.19, AN54.2	Role of Radiology in Diseases of the Genito Urinary System	Lecture/ Small group discussion	1		Medicine
SGT 8	IM19.7, PE30.23, IM6.12, AN43.7, AN43.8, AN43.9	Role of Radiology in Central Nervous System	Lecture/ Small group discussion	1		Medicine, Surgery, Pediatrics,

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		Diseases				
D	**D.** Clinical Postings(hours): 2 weeks (3hours /day x 12 days Monday to Saturday. **In institutes where radiotherapy facility is available 6 hours will be allotted to Radiotherapy department. Time Table in these institutes will be prepared by Radio Diagnosis and Radiotherapy department in joint collaboration**					
CP 1	RD1.1 RD1.2	Introduction to All modalities under Radiodiagnosis and Radiation Protection.	Lecture, Demonstration, Small group teaching	**1**		
CP 2	RD1.5	Role of Radiology in Chest Conditions lungs and heart	Lecture, Demonstration, Small group teaching			Medicine and Pediatrics
CP 3	RD1.6	Role of Radiology in Abdominal Conditions hepatobilary system and Gastrointestinal System	Lecture, Demonstration, Small group teaching	3		Surgery
CP 4	RD1.6	Role of Radiology in Abdominal Conditions - Genitourinary system	Lecture, Demonstration, Small group teaching	3		Surgery
CP 5	RD1.4 & RD 1.5	Role of Radiology in Obstetrics and Gynaecolgy	Demonstration, Small group teaching	3		Obstetrics & Gynecology
CP 6	RD1.6	Role of	Demonstration,	3		Orthopedics

Serial No.	Competency Nos.	Topics & Subtopics	Suggested Teaching Method	Hours	Vertical Integration	Horizontal Integration
		Radiology in Musculoskeletal system	Small group teaching			
CP 7	RD1.6	Role of Radiology in Diseases of Central Nervous System	Demonstration, Small group teaching	3		All clinical Branches
CP 8	RD1.2	Basic Principles of Computed Tomography	Demonstration, Small group teaching	**3**		
CP 9	RD1.2	Basic Principles of Magnetic Resonance Imaging	Demonstration, Small group teaching	**3**		
CP 10	RD1.1	Radiation Hazards and Radiation Protection	Demonstration, Small group teaching	3		
CP 11	RT	Radiotherapy related topics	Radiotherapy related topics	3		
CP 12	RT	Radiotherapy related topics	Radiotherapy related topics	3		

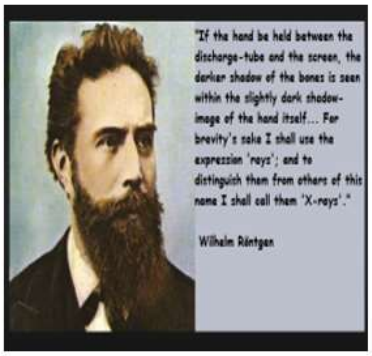
Learning Resource Material

Sr.no.	Author	Title of book/ Material	Publisher
1	David Sutton	Text Book of Radiology and Medical Imaging for Medical Students Seventh Edition	Elseivier
2	David Sutton	Text Book of Radiology & Imaging Students Seventh Edition	Elseivier
3	Grainger Allison	Diagnostic Radiology	Elseivier

Name of the Institute

LOG BOOK

DEPARTMENT OF RADIODIAGNOSIS



CONTENTS

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3	SELF DIRECTED LEARNING / TUTORIALS / SEMINARS / EXTRA CURRICULAR ACTIVITIES	06
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5	PHASE III/I	10

RADIODIAGNOSIS LOGBOOK CERTIFICATE

This is to certify that this logbook is the bonafide record of Mr. / Ms..... Roll No…….. Admission Year ……., of the Department of RadioDiagnosis at …… ……. Medical College.

The logbook is as per the guidelines of Competency Based Undergraduate Medical Education Curriculum, Graduate Medical Regulation 2019.

He / She has satisfactorily attended/ completed all assignments mentioned in this logbook as per the guidelines prescribed by National Medical Commission.

Head of Department
Department of Radio Diagnosis
Signature with Date

INTERNAL ASSESSMENT EXAMINATION IN RADIODIAGNOSIS

Please refer General Surgery Syllabus (available on https://www.muhs.ac.in/upload/syllabus/Third%20MBBS%20General%20Surgery%20Syllabus%20030621.pdf) for details internal assessment in radio diagnosis.

Format / Skeleton of question paper for University

Please refer General Surgery Syllabus (available on https://www.muhs.ac.in/upload/syllabus/Third%20MBBS%20General%20Surgery%20Syllabus%20030621.pdf) for details question paper for university in radio diagnosis.

Self-Directed Learning: Seminars, Tutorials, Projects, Quizzes,

Extra-curricular activities

Sr. No.	Self- directed learning (Seminars, Tutorials, Projects, Quizzes, Extracurricular activities)	Date	Phase III/I	Signature of Teacher
1				
2				

Reflection (minimum 200 words) –1
Date:

TOPIC:

LOGBOOK CLINICAL SKILLS : LIST OF COMPETENCIES

Clinical skills can be assessed by case presentation, case-based discussion, objective structured clinical assessment the checklist, MiniCex, as per the institutional preference.

Sr. No	Competencies Addressed	Name of the Activity
1	PE21.12	How will you interpret a KUB Report?
2	PE23.13	How will you report a Chest radiograph and rule out cardiomegaly?
3	PE23.16	How will you use the ECHO reports in management of case of Cardiac disease ?
4	PE30.23	How will you interpret CT scan and MRI Report?

Radiotherapy

For theory Competencies to be included in Surgery & Radiology Syllabus

Clinical Postings-3 days where ever department exists

Draft Syllabus Prepared by Sub Committee on 06/01/2014 as per meeting of BOS on 07/10/2013 & Faculty of Medicine 08/10/2013. To be Submitted to BOS on 20/03/2014 & Faculty on 21/03/2014

Final Syllabus passed by Academic Council on 21/05/2014 Item No. 28 /2014. Subject to Uniformity in the University Examination System.

FACULTY OF MEDICINE

SYLLABUS

FOR

M.D. & DDVL IN DERMATOLOGY, VENEREOLOGY AND LEPROSY

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

NASHIK

DERMATOLOGY , VENEREOLOGY AND LEPROSY — M D & DDVL

Dermatology including Venereology (STD) and Leprology is one of the important basic clinical speciality. Considerable advances have taken place in the understanding of dermatological disorders and their treatment. Leprosy is still a public health problem of considerable magnitude in the country. The STDs are showing worldwide increase in incidence with new dimensions added to it.
There is a dearth of trained personnel in the speciality. Very few medical college in the country impart sufficient knowledge about these diseases at Undergraduate level and Postgraduate courses are not available in all medical colleges.
The curriculum of MD Dermatology has been made designed matching the other clinical specialities at the Institute. An attempt has been made to give a comprehensive training to the postgraduates including basic subjects and recent advances.

OBJECTIVES

At the end of this training a candidate should be able to
1. Diagnose and manage independently common skin diseases, sexually transmitted diseases and leprosy.
2. Manage independently and efficiently all medical emergencies related with skin, leprosy and venereal disease.
3. Adopt preventive measures at individual and community levels against communicable skin, venereal diseases and leprosy.
4. Teach requisite knowledge and laboratory skills to other medical/paramedical team members.
5. Adopt a compassionate attitude toward towards the patients (and their families) under his/ her charge.
6. Critically evaluate and initiate investigation for solving problems relating to skin, venereal diseases and leprosy.

SKILLS TO BE LEARNT

1. History taking for dermatology, venereology and leprosy
2. Describe cutaneous findings in dermatological terms in a systematic way.
3. Evaluate and manage the common diseases in dermatology and have a broad idea how to approach an uncommon diseases.
4. Evaluate and manage STD cases
5. Evaluate and manage HIV positive cases
6. Systemic examination relevant for dermatologic condition
7. Maintain basic skills like pulse, blood pressure chest and cardiac auscultation learnt in MBBS
8. Care of dermatologic emergencies like TEN, Pemphigus, necrotic ENL, angioedema, drug reactions etc.
9. Management of pediatric cases with skin diseases
10. To achieve adequate skills for tests done in side laboratory in day-to-day practice and be familiar with other sophisticated investigations.

Fundamentals of Cutaneous Diagnosis-

Basic skin lesions, history taking, examination of the patient including relevant diagnostic, clinical tests and aids.

Duration of Course –

Full Time: 3 Academic Years for PG Degree Course and Full Time 02 Academic Years for Diploma course.

SYLLABUS

Topics Related to Allied Basic Sciences

The structure, function and development of human skin. Skin as a barrier
Ultra structural aspects of epidermis, epidermal appendages, dermoepidermal junction, dermis, and sub-cutis
Immunology, Molecular biology and genetics in relation to the skin.
Epidermal cell kinetics and Keratinization
Lipids of epidermis and sebaceous glands
Percutaneous absorption
Biology of eccrine and apocrine sweat glands
Biology of hair follicles, sebaceous glands and nails
Biology of melanocytes and melanin formation
Disorders of keratinisation
Epidermal proteins
Dermal connective tissue : collagen, elastin, reticulin, basement membrane and ground substance
Metabolism of carbohydrates, proteins, fats and steroids by the skin
Cutaneous vasculature and vascular responses
Mechanism of cutaneous wound healing
Cellular and molecular biology of cutaneous inflammation
Immunoligic aspects of skin
HLA system, Immunoglobulins, cyto kines
Complement system
Hyper-sensitivity and allergy
Cutaneous carcinogenesis
Basic of cutaneous bacteriology, mycology, virology, parasitology and defence mechanism.
Common laboratory procedures, stains culture media and related serological tests
Basic pathologic reaction pattern in skin
Common and special histopathological stains and procedures used in the diagnosis of skin diseases and Special techniques such as immunofluorescence, immunoperoxidase and other related techniques.

Clinical Dermatology

Epidemiology of cutaneous diseases
Pyschologic aspects of skin disease and psycho-cutaneous disorders
Pathophysiology and clinical aspects of pruritus.

Papulo-squamous Diseases

Psoriasis, Pityriasis rubra pilaris, pityriasis rosea Licen Planus, lichenoid eruptions
Parapsoriasis, Palmoplantar Keratodermas.
Darier.s disease. Prorokeratosis
Ichthyoses and ichthyosiform dermatoses, Keratodermas

Vesiculo-bullous Disorders

Pemphigus group of disorders
Bullous pemphigiod

Chronic bullous disease of childhood
Familial benign pemphigus
Herpes gestationis
Mechanobullous (hereditary and acquired)
Epidermolysis bullosa acquisita
Dermatitis herpetiformis
Erythema Multiforme
Subcorneal pustular dermatoses

Disorders of Epidermal Appendages

Disorders of hair and nails
Disorders of sebaceous glands : Acne
Rosacea, Perioral dermatitis,
Disorders of eccrine and apocrine sweat glands

Tumours

Naevi and hamartomas
Precancerous Skin lesions, Squamous cell carcinoma and Basal cell carcinoma, malignant melanoma.
Pagets disease, Keratoacanthoma.
Benign epithelial tumours, appendageal tumours

Disorders of pigmentation

Vitiligo Albinism, Benign neoplasia and hyperplasias of melanocytes, Dyplastic melanocytic nevi, hyperpigmentation

Inflammatory Disorders of the Dermis

Acute Febrile Neutrophilic dermatosis
Erythema elevatum diutinum
Cutaneous eosinophilic diseases
Granuloma faciale
Pyoderma grangrenosum
Erythema annulare centrifugum and other Figurate Erythemas
Granuloma annulare
Malignant atrophic papulosis
Neoplasms, Pseudo neoplasms and Hyperplasias of the Dermis
Vascular Anomalies, Kaposi.s Sarcoma
Anetoderma and other Atrophic Disorders of the skin
Neoplasias and hyperplasias of Neural and Muscular origin
Elastosis Perforans Serpiginosa, Reactive Perforating Collagenosis, Kyrle.s disease

Lymphomas, Pseudolymphomas and Related Conditions

Disorders of Subcutaneous Tissue

Panniculitis
Lipodystrophy
Neoplasms of the subcutaneous Fat

Disorders of the Mucocutaneous Integument.
Biology and disorders of oral mucosa
Disorders of anogenitalia of males and females

Cutaneous changes in disorders of altered reactivity

Genetic Immunodeficiency Disease
Urticaria and Angioedema
Disorders associated with complement abnormalities
Graft-versus-Host Disease
Muco-cutaneous manifestations in immunosuppressed host other that HIV-infection
Contact Dermatitis
Auto sensitization dermatitis
Atopic dermatitis (Atopic Eczema)
Nummular eczematous dermatitis
Seborrhoeic dermatitis
Vesicular plamoplantar eczema
Erythrodermas

Skin Changes Due to Mechanical and Physical Factors

Occupational skin disease
Radiobiology of the skin.
Skin problems in amputee.
Sports Dermatology.
Skin problems in war field.
Decubituls ulcers.
Radiation to the skin
Skin diseases due to cold, heat

Photobiology of skin

Normal reaction to ultra violet rays and sun exposure

Disorders Due to Drugs and Chemical Agents

Erythema multiformae, Stevens-Jhonson syndrome, toxic epidermal necrolysis and
Cutaneous reactions and mucocutaneous reactions to chemicals and drugs
Pathological response to UVR and sun exposure
Cutaneous manifestations of drug Abuse

Abnormal vascular response

Erythemas including annular erythemas
Urticaria
Vasculitis

Dermatology and age of man

Ageing of skin
Neonatal dermatological problems
Pediatric and adolescent problems
Geriatric dermatological problems

Skin Lesions in nutritional, heritable and metabolic disorders

Cutaneous Changes in nutritional disorders.
Acrodermatitis enteropathica and zinc deficiency disorders.
Cutaneous Changes in errors of amino acid metabolism

Porphyrias
Xanthomas
Disorders of lipid metabolism and storage
Mucinosis
Amyloidosis
Angiokeratoma corpris diffusum
Lipid proteinosis
Malabsorbtion
Vitamin and mineral deficiency and excess

Skin Manifestations of systemic disorders

Skin and disorders of the alimentary tract
Hepatobiliary system and the skin
Cutaneous changes in renal disorders, cardiovascular, pulmonary
disorders and endocrinal disorders
Skin changes in pregnancy
Cutaneous changes in haematological disease (Langerhans Cells and other cutaneous histiocytosis, Mastocytoses Syndrome)
Cutaneous changes in endocrine disorder
Flushing and carcinoid syndrome.

Genodermatosis

Phacomatosis
Tubero sclerosis
Incontinentia pigmentation
Ectodermal dysplasia
Xeroderma pigmentosis

Connective tissue disorder and Skin manifestations of rheumatological diseases

- Reiter's syndrome.
- Arteritis and venulitis.
- Lupus erythematosus
- Dermatomyositis
- Scleroderma
- MCTD (Mixed connective Tissue Disorders)
- Relapsing polychondritis
- Rheumatoid arthritis, rheumatic fever and gout
- Sjogren.s syndrome
- Raynaud.s phenomenon
- Multicentric reticulohistiocytosis

Cutaneous Manifestations of Disease in Other Organ Systems

Sarcoidosis of the skin
Cutaneous Manifestations of Internal Malignancy
Acanthosis Nigricans
Papular Mucinosis
Neurocutaneous Disease
Tuberous Sclerosis Complex
Neurofibromatosis
Ataxia Telangiectasia
Behect.s Disease

Bacterial infections

Pyodermas : Staphylococcus aureus, Streptococcus, and others
Staphylococcal scalded-skin syndrome
Soft tissue infections : Erysipelas, Cellulitis
Systemic bacterial infections with cutaneous manifestations
Cutaneous tuberculosis and atypical mycobacterial infections
Actinomycetoma

Fungal infections

Superficial fungal infection : (dermatophytosis, yeast, others)
Deep fungal infections

Viral and rickettsial infections

Herpes simplex virus infections
Varicella . zoster infection
Human papilloma virus
Molluscum contagiosum
Hepatitis B, C
Rubella
Measles

Parasitic and protozoal infestations

Scalries
Pediculosis.
Arthropods and skin.

THERAPEUTICS

Topical Therapy

Pharmacokinetics and topical applications of drugs
Principles of topical therapy, topical formulations

Topical Agents
Glucocorticoids, analgesics, anesthetics, antinflammatory, anti microbial, anti parasitic, antiperspirants, antipruritic, antiviral, astringents, bleaching agents, keratolytics and keratoplastic agents.
Therapies, antiviral, topical antibiotics, topical antifungal agents, sunscreens, cytotoxic agents, retinoids, Vit D3 analogues, cosmetics and skin care in practice, emollients and moisturizer.

Systemic Therapy
Systemic glucocorticoids, antibiotics, antileprosy and antituberculous agenst, sulfones, aminoquinolines, cytotoxic and antimetabolic agents, oral retinoids, antihistamines, antiviral drugs, oral antifungal agents, immunosuppressive and immunomodulatory drugs, thalidomide. Antiparasitic drugs, antiandrogens, interferons, biologics, intravenous immunoglobulins, antiplatelet agents, psychotropic agents. other misc. systemic drugs

Dermatosurgery including Cosmetic dermatology
Local aneasthesia and nerve blocks, electrosurgery/ cautery, vitiligo surgeries, cryotherapy, electrolysis, tattooing, intra-lesional injections, iontophoresis, dermabrasion, biopsy techniques, hair and nail minor surgeries, excision surgeries.
Lasers in dermatology - for vascular, hair and pigmented disorders.

Skin resurfacing : chemical peels
Skin resurfacing : dermabrasion
Skin resurfacing : Laser
Skin punch grafting
Wound dressings
Sclerotherapy for varicose and telangiectatic veins
Botulinum injections.
Tumescent liposuction
Substances for soft tissue augmentation
Hair transplantation and alopecia reduction
Cryosurgery
Mohs micrographic surgery
Nail surgery

Photochemotherapy and Photo therapy including principles and use of Narrow band UVB, PUVA, UVB in Skin diseases.

STD
Clinical approach to the patient with STD
Anatomy of male and female genitalia
Epidemiology of STD's
Human Sexuality.
Viral STD.s including HIV, HSV, HPV, Molluscum contagiosum, EBV etc.
Bacterial STD.s : Syphilis, gonorrhoea, chancroid, donovanosis, bacterial vaginosis
Chlamydial and mycoplsma infections : Lymphogranuloma venereum, urethritis, cervicits, NGU
Fungal : Candidiasis
Protozoal : Trichomoniasis
Ectoparasitic : scabies, pediculosis infestations.
Syndromic management of STD.s
STD.s in reproduction health and paediatrics
STD.s and HIV
Post exposure prophylaxis
Prevention, counseling and education of different STD.s including HIV
National control programmes of STDs and HIV infection
Medicolegal, social aspects of STD.s including psychological and behavioural abnormalities in STD patients.

Management of Antiretroviral Therapy of Adults and Adolescents.
- Diagnosis of HIV Infection in Adults and Adolescents.
- Assessment of Adults and Adolescents with HIV Infection and pre- ART Care and Follow-up.
- Prophylaxis of Opportunistic Infections.
- ART in Adults and Adolescents.
- Routine Monitoring of Patients on ART.
- ART in pregnant Women, PPTCT and Previous Exposure to NVP.
- Considerations for Co-infection with HIV.
- Antiretroviral Drug Toxicity.
- ART Treatment Failure and When to Switch.
- Choice of ARV Regimens in the Event of Failure of First-line Regimens.
- Nutritional Aspects of HIV.
- Palliative Care in HIV.
- NACO Standardized Reporting and Recording System.

Management of Occupational Exposure including Post-exposure Prophylaxis.
Cutaneous Manifestation and Lab-diagonasis of HIV.
Prevention aspect of STD's (Condoms, Vaccines etc).
Prevention, counseling and education of different STD.s including HIV
National control programmes of STDs and HIV infection

Medicolegal, social aspects of STD.s including psychological and behavioural abnormalities in STD patients

LEPROSY

Approach to the patient with leprosy
Epidemiological aspects
Structure, biochemistry, microbiology of Mycobacterium leprae
Animal models
Pathogenesis
Classification
Immunology and molecular biological aspects
Histopathology and diagnosis including laboratory aids
Clinical features
Reactions
Systemic involvement (ocular, bone, mucosa, testes and endocrine etc.)
Pregnancy and leprosy
HIV infection and leprosy
Therapeutic aspects including newer drugs
Immunotherapy,
Disabilities, deformities and rehabilitation
Prevention, education and counseling
National leprosy control and elimination programme

DIPLOMA IN VENEREOLOGY AND DERMATOLOGY PRACTICAL/ CLINICAL EXAMINATION :-

Sr. No.	Heads	Marks
1	One Long Case	80
2	Two Short Cases	30×2=60
3	Viva	80
4	Spotters Ten	5×10=50
5	Histopath Slides	3×10=30
Total Marks	**300 Marks**	

Subheads to be added to Draft Syllabus for MD and DDVL

Basics of Dermoscopy and Trichoscopy

Cosmetic Dermatology
Chemical Peels,
Lasers,
Botox and fillers,
Facial rejuvenation

Continuing Medical Education:

1) University should sponsor CMEs to be held by rotation in each of the medical colleges affiliated to the university on the subjects of (or related subjects)
    a. Dermatopathology
    b. Dermoscopy
    c. Skin in internal medicine
    d. Genodermatoses
    e. Autoimmune diseases
    f. Contact Dermatitis
    g. Ultraviolet therapy
    h. Vitiligo
    i. Pigmentary diseases
    j. Leprosy

2) Faculty development:

    a. Faculty training: Each of the medical college departments may be identified as a training centre for one or two subspecialties mentioned above. Faculty from other medical colleges interested in getting trained in that department for that subject should be given the opportunity to attend the training for one to two weeks on deputation from their department under a university program. Faculty may also be encouraged to acquire experience in related fields by attending part time at an allied department in the same hospital.

    b. Foreign Conferences - leave and support: Each senior faculty (Professor and Associate Professor), should be given 5 days leave once a year to attend a conference or training abroad. Financial assistance for such travel may be given if the faculty is invited to present a paper at the conference.

3) Books and journals: Currently students and teachers are unaware of the availability of digital resources provided by MUHS. Awareness drive should be held to improve visibility of this vital resource. Students should be given a handout of the facilities at the time of registration.

    a. The number of books and journals provided in the MUHS digital library should be increased. I recommend the following additional journals:
        Indian Journal of Dermatology
        International Journal of Dermatology
        Indian Journal of Sexually Transmitted Infections and AIDS
        Journal of American Academy of Dermatology
        Journal of European Academy of Dermatology and Venereology

INTRODUCTION

EM specialist is the first Doctor whom the patient meets on entering the hospital. The kind of care patient receives in the ER becomes the mirror of the quality of the service for the patient in the rest of the hospital. The EM specialist has to appreciate the importance of the Platinum minutes and Golden Hour to minimize morbidity and mortality.

The EM specialist has to tackle

1. **Acute problems**
2. **Mass Casualties**
3. **Agonized patients and relatives**
4. **Medico- legal issues**

The patient spends first few minutes or hours only in the ER. The aim of this course is to train the Medical Graduate in the field of Emergency Medicine. Knowledge & practical skills shall be acquired by the candidates in various specialties so that the candidate will be competent & confident to manage all types of cases attending the Emergency room. He will be given special training of soft skills like

1. **Communication skill**
2. **Crowd management**
3. **Breaking a bad news**
4. **Stress management for self & the patient's relatives**
5. **Management of Stressful situation**
6. **Social Problems**

They should be well versed with all types of EM equipments. They will be trained in emergency ultrasound. They will be trained in basic research methodology so as to enable them to conduct fundamental & applied research. They will be trained in teaching methods so that they can take teaching assignments.

GOALS

To transform the medical graduate into an all rounder who can handle all kinds of emergencies effectively.

Educational Objectives

To empower the EM student with knowledge, skill and tools required to handle the ER.

This will require

- **Medical skills as well as**
- **Soft skills and**
- **Equipment handling**

Soft Skills

- **Cognitive and psychomotor skills**
- **Empathy**
- **Stress management for self as well as patient's relatives.**
- **Management of stressful situations**
- **Communication skills (e.g. Breaking bad news)**
- **Medico-Legal knowledge and skills**
- **Social skills**

CURRICULUM

The curriculum is based on the primary text book of emergency medicine: A Comprehensive Study Guide 9th edition edited by J .E. Tintinalli. In addition, Rosen's Emergency Medicine Concepts and Clinical Practice. Clinical Procedures in emergency medicine by J.R.Roberts & Jerris Hedges will be used to teach the procedures in EM .

The core curriculum for 3-year postgraduate training program in Emergency Medicine

Cardiovascular Diseases
Cardiopulmonary resuscitation
Basic life support (one and two-rescuer CPR)
Advanced life support
Recognition of cardiac rhythms during cardiac arrest
Use of drugs
Defibrillation
Pacing
Leadership during CPR
Choking victim
Neonatal/pediatric CPR
CPR during pregnancy
Chest pain
Stable angina
Acute coronary syndromes (unstable angina, ST-elevation and Non-STelevation myocardial infarction)
Use of thrombolytics
Use of glycoprotein inhibitors in ED
Angioplasty vs. thrombolytics
Pulmonary embolism
Aortic dissection
Congestive heart failure and pulmonary edema
Palpitations
Cardiac arrhythmias
Tachyarrhythmias
Narrow complex vs. broad complex
Electric cardioversion
Anti-arrhythmic drugs
Bradyarrhythmias
Hypertensive urgencies and emergencies
Temporary and permanent cardiac pacemaker
Shock
Hemorrhagic shock
Cardiogenic shock
Neurogenic shock
Septic shock
Anaphylactic shock
Blood/blood products
Cardiovascular drugs
Fluids
Vasopressors
Deep vein thrombosis
Valvular heart diseases
Stuck artificial cardiac valve
Infective endocarditis
Acute pericarditis and cardiac tamponade
Acute myocarditis
Acute rheumatic fever
Vascular access
Peripheral vascular disease
Sudden cardiac death
Cardiac transplant patient
Airways management and Anesthesia
Principle of airway management
including difficult airway management
Rapid sequence intubation
Pain management
Procedural sedation
Regional, local and general anesthesia
Ventilator management
Trauma
Trauma resuscitation
Primary survey
Secondary survey
Advanced trauma life support
Transfer arrangements
Wound management:
Lacerations
Abrasions
Contusion
Puncture wounds
Principles of management
Control of local bleeding
Suturing
General
Specific sites
Local anesthesia
Head and facial trauma
Head injury
Fractures of bones of face
Facial injuries
Dental injuries
Nasal injuries
Ear injuries
Oral cavity injuries
Temporomandibular joint dislocation
Spinal trauma
Immobilization
Examination
Cervical
Dorsal
Lumbar
Chest trauma
Blunt/penetrating
Tension pneumothorax
Cardiac tamponade

Massive hemothorax
Open chest wound
Ruptured aorta
Flail chest
Contusion lung
Emphysema
Abdominal trauma
Blunt/penetrating trauma
FAST
Diagnostic peritoneal lavage
Ultrasound and CT
Pelvic trauma
Genitourinary trauma
Pelvic fracture
Extremity trauma
Skeletal trauma (fractures)
Dislocation
Vascular trauma
Soft tissue trauma (strains and
sprains)
Hand trauma
Compartment syndrome
Degloving injuries
Amputation/reimplantation
Fat embolism
Trauma in children
Trauma during pregnancy
Trauma in elderly
Blast injuries
Mass casualties and injury care
Respiratory emergencies
Dyspnea
Respiratory failure and ARDS
Hemoptysis
Acute severe asthma / COPD
Pneumothorax
Foreign body
Pneumonia and chest infections
Thermal/chemical injury to lungs
Sleep apnea syndrome
Gastrointestinal and Hepatic emergencies
Abdominal pain
Acute abdomen
Acute gastritis
Cholangitis, cholecystitis
Acute pancreatitis
Acute appendicitis
Perforation/peritonitis
Mesenteric ischemia
Renal pain
Intestinal obstruction
Paralytic ileus
Inflammatory bowel disease
Vomiting and diarrhoea
Evaluation of dehydration
Fluid therapy
Acute GI bleed
Upper GI bleed
Lower GI bleed
Foreign body ingestion
Acute volvulus
Hemorrhoids
Rectal prolapse
Perirectal abscess
Hernias
Ascites
Acute liver failure
Cirrhosis and its complications
Liver abscess
Jaundice
Liver transplant patient
Onco-haematological emergencies
Acute bleeding (including hemophilia)
Disseminated intravascular coagulation
Use of antithrombotic and antiplatelet agents
Febrile neutropenia
Thrombocytopenia
Severe anemia
Acute hemolysis
Superior vena cava syndrome
Tumour lysis syndrome
Cord compression
Metastatic emergencies
Blood/blood products and transfusion
Stem cell and bone marrow transplantation
Non-traumatic orthopedic emergencies
Orthopedic and neurovascular examination of extremities
Acute osteomyelitis
Acute arthritis
Acute gout
Prosthesis-related emergencies
Acute back pain
Acute neck pain
Acute shoulder pain
Hand and foot infections
Joint infections and inflammations
Muscle and tendon infections and inflammation
Genitourinary emergencies
Nephrolithiasis
Acute renal failure
Acute retention of urine
Sexual assault
Complications of chronic kidney disease
Hematuria
Torsion of testis
Sexually transmitted diseases
Epididymitis/orchitis/prostatitis
Obstructive uropathy
Acute pyelonephritis and perinephric abscess
Phimosis and paraphimosis
Foreign body insertion
Kidney transplant patient
Rheumatological emergencies
Acute vasculitis
Anti-phospholipid antibody syndrome
Rheumatologic disorders involving vital organs
Kawasaki’s syndrome
Ocular emergencies
Red eye

Conjunctivitis
Acute glaucoma
Uveitis
Ocular emergencies (cont.)
Trauma
Foreign body
Corneal abrasión
Hyphema
Blow-out fracture
Chemical burns
Visual loss/impairment
Orbital cellulitis
CNS emergencies
Headache
Approach
Specific disorders (including migraine)
Syncope, vertigo and dizziness
Seizures
Epileptic seizures
Pseudoseizures
Status epilepticus
Coma and neurological impairment
Metabolic coma
Hypoglycemia
Ketoacidosis
Hyperosmolar coma
Hepatic encephalopathy
Neurological coma
Meningitis and encephalitis
Acute stroke
Ischemic
Hemorrhagic
Transient ischemic attack
Subarachnoid hemorrhage
Cavernous sinus thrombosis
Compressive and non-compressive myelopathies
Peripheral neuropathy (including LGB syndrome)
Myasthenic crisis
Cranial nerve palsies
Infections
HIV in emergency department
Malaria (complicated and uncomplicated)
Leptospirosis
Enteric fever
Chicken pox and herpes zoster
Measles/mumps
Dengue and other hemorrhagic fevers
Chikungunya
Evaluation of fever in Emergency Department
Acute hepatitis
Disseminated tuberculosis
Management of needlestick injury
Tetanus
Infections (cont.)
Rabies
Diphtheria/Pertussis
Cholera
Food poisoning
Polio
Plague
Toxic shock syndrome
Gas gangrene and other anerobic infections
Sexually transmitted diseases
Influenza
Fever
Immunization
ENT emergencies
Upper airway obstruction and stridor
Epistaxis
Acute tonsillitis/sore throat/acute laryngitis
Foreign bodies
Acute suppurative otitis media and externa
Acute sinusitis
Other infections
Dermatological emergencies
Exfoliative dermatitis
Steven Johnson syndrome
Toxic epidermal necrolysis
Skin infections, inflammation and allergies
Gynecology and Obstetrics emergencies
Ectopic pregnancy
Lower abdominal pain
Vaginal bleeding
Abortion
Pre-eclampsia/Eclampsia
Conduct of delivery
Emergency contraception
Rape victim
Amniotic fluid embolism
Pediatric emergencies
Advanced pediatric life support
Neonatal advanced life support
Care of newborn
Croup/epiglottitis
Asthma
Fever (neonate, young infant, older infant, child)
Septicemia
Meningitis
Seizures
Congenital heart diseases
Non-cardiac congenital diseases
Pediatric emergencies (cont.)
Pain relief
Dehydration
Care of pre-term baby
Drug therapy in newborns, infants and children
Child abuse
Drugs in pediatric emergencies
Metabolic and Endocrine emergencies
Diabetic emergencies:

Hypoglycemia
Hyperosmolar hyperglycemic state
Keoacidosis
Fluid and electrolyte abnormalities
Normal physiology
Hypovolemia
Hyper/Hyponatremia
Hyper/hypokalemia
Hyper/hypocalcemia
Acid-base disturbances
Hypopituitarism/Hypoadrenalism
Thyrotoxic crisis and myxedema coma
Acute toxicology
Initial management
Recognition of toxidromes
Antidotes
Insecticides and pesticides
Drug overdose
Snake bites, and scorpion and insect
stings
Plant poisoning
Kerosene oil poisoning
Ethyl alcohol poisoning and withdrawal
Other alcohols (methyl alcohol,
ethylene glycol)
Methemoglobinemia
Hyperthermias
Substance abuse
Hazardous chemicals
Metal poisoning
CBRN disasters
Poison control centers
Environmental emergencies
Burns
Smoke inhalation
Lightening
Electric burns
High altitude illnesses
Diving emergencies
Cold-induced illnesses
Heat-induced illnesses
Near-drowning
Animal and human bites
Geriatric emergencies
Psycho-social assessment
Mobility assessment
Drug pharmacology
Geriatric abuse
Psychiatric emergencies
Thought and mood disorders
Anxiety and somatiform disorders
Self-harm
Delirium, dementia and psychosis
Suicide and homicide
Alcohol and substance abuse
IV drug abuse
Sexual assault and child abuse
Domestic violence and elder abuse
Violence in the ED
Disaster medicine
Definitions
Disaster planning
Medical response to terrorist incidents
Miscellaneous
Pre-hospital care
Forensic aspects
Medico-legal examination
Examination of rape accused
Wound examination
Bullet wounds
Types of injuries (simple, grievous,
dangerous)
Signs of death
Biostatistics
Research methodology
Imaging techniques:
Plain x-rays
Ultrasound and echocardiography
CT
MRI
Angiography
Interventional techniques
Nuclear medicine in emergencies
Ethical issues

PROCEDURAL SKILLS

Airway management and cervical spine control
Wound management
Wound preparation
Wound closure techniques
Debridement
Dressing techniques
Removal of foreign bodies
Tendon repair
Orthopedic emergency procedures
Splinting/immobilization
Spinal immobilization
Limb splinting
Logrolling
Helmet removal
Fasciotomy
Reduction of dislocations
Traction splints
Plaster techniques for various fractures
Joint aspiration
Cervical collar application
Pelvic stabilization techniques
Local and regional anesthesia
Conscious sedation and analgesia
Ear, nose and throat procedures
Indirect larngoscopy
Nasal packing
Removal of foreign bodies
Maxillo-facial techniques
Dental anesthesia
Dental socket suture
Ocular techniques
Slit lamp
Foreign body removal
Gynaecological and Obstetrics:
Delivery
Speculum examination

Others
Reducing paraphimosis
Nasogastric tube insertion
Incision and drainage of abscess
Nerve blocks
Detorsion of torsion of testis
Transportation of patients
Intra-hospital
Inter-hospital
Communication skills
Patients and relatives
Colleagues and other personnel
Bereavement
Ultrasonography and echoardiography (both diagnostic and therapeutic)
Designing a research study
Interpretation of laboratory investigations/plain X-rays/CT/MRI
Major incident planning
Basic airway management (opening airway by various methods)
Bag mask ventilation
Advanced airway management
Tracheal intubation
Alternative procedures (non-surgical and surgical)
Pediatric airway management
Neonatal airway management
Cardiopulmonary resuscitation
Basic
Advanced
Electric therapy
Cardioversion/defibrillation
Cardiac pacing

ECG interpretation
Ventilator management
Basic trauma management and Advanced Trauma Life Support (non-Orthopedics)
Intercostal chest tube
Needle thoracentesis
Surgical and needle cricothyroidotomy
Suprapubic catheterization
Central venous access
Suture technique
Arterial puncture
Nasal packing
Foreign body removal
Foley's catheterization
Needle and tube thoracotomy (in penetrating chest injuries) and aortic clamping
Pulmonary procedures
Invasive ventilation principles
Thoracentesis
Needle/tube thoracostomy
Cardiovascular procedures
Cardiac compression
Central venous access
Subclavian vein
Jugular vein
Femoral vein
Arterial access
Cut down techniques
Intra-osseous access
CVP monitoring
Pericardiocentesis
Monitoring
Decontamination procedures
Gastric lavage
Skin/eye decontamination
Paracentesis
Neurological
Lumbar puncture
Burr hole

LIST OF PROCEDURES ALONG WITH MINIMUM NUMBER TO BE PERFORMED INDEPENDENTLY

Procedure	Numbers to be performed independently.
Airway management (opening airway by various methods)	100
Bag mask ventilation	100
Tracheal intubation	100
Alternative airway management methods (non-surgical andsurgical)	25
Pediatric and neonatal airway management	35
Cardiopulmonary resuscitation	50
Cardioversion/defibrillation	40
Cardiac pacing	10
Ventilator management	50
Intercostal chest tube	10
Needle thoracentesis	10
Suprapubic catheterization	05
Central venous access	50
Suturing (various techniques)	100
Arterial puncture	100
Cut down	10
Intraosseous access	10
CVP monitoring	10
Ultrasound and echocardiogram	40 normal and 60 abnormal with various emergency conditions equally represented
Nasal packing	10
Foley's catheterization	50
Paracentesis	10
Pericardiocentesis	10
Wound care	100
Splint application for various fractures	100
Spinal immobilization	10
Reduction of dislocations	20
Plaster techniques for various fractures	50

Cervical collar application	10
Pelvic stabilization	05
Local and regional anesthesia	50
Conscious sedation and analgesia	10
Nerve blocks	10
Slit lamp examination	20
Delivery	10
Lumbar puncture	10
Burr hole	05
Reducing paraphimosis	05
Nasogastric tube insertion	50
Incision and drainage of abscess	50
Analysis of plain X-ray films	200
Analysis of CT scans	20

LECTURES

Lecture 1: Pre-Hospital care

Lecture 2 & 3: Disaster Management

Lecture 4-8: Resuscitation

Lecture 9-12: Resuscitative Procedures

Lecture 13: Analgesia Anesthesia Procedural Sedation

Lecture 14-15: Wound management

Lecture 16-19: Cardiovascular (Add a EKG Lecture : One hour More)

Lecture 20-23: Gastrointestinal

Lecture 24-25: Renal & Genitourinary

Lecture 26-28: Obstetrics & gynecology

Lecture 29-34: Pediatrics

Lecture 35-36: Infectious Diseases

Lecture 37-40: Central Nervous System

Lecture 41-48: Toxicology

Lecture 49-53: Environment

Lecture 54-55: Endocrine

Lecture 56-58: Hemato-oncology

Lecture 59-61: ENT

Lecture 62-63: Dermatology (Add Skin Pictures lecture: One Hour More)

Lecture 64-68: Trauma (Add CT/MRI Lecture one Hour More)

Lecture 69-73: Orthopedics (Add X-ray Lecture: One Hour More)

Lecture 74-76: Musculoskeletal

Lecture 77-78: Psychiatry

Lecture 79-80: Abuse Assault Special Situations

Total lectures 84/year

Minimum 2 per lectures/ week based on the above schedule. And at end of lectures 10 MCQ will be submitted by Residents to Faculty to be put in bank. Once a month test from Monthly lectures. 10 Short answer questions in each test.

INTERDICIPLINARY LECTURES FROM OTHER DEPARTMENT FACULTY

32 Exam Interdisciplinary Topics so that Standard Orders and Protocols can be built with other departments.

1. ARDS: ICU

2. Pediatric Sepsis: PICU

3. Ventilation Strategies: Anesthesia

4. Abdominal Compartment Syndrome: ICU

5. Complex Metabolic Management: Anesthesia

6. Complex ABG Management: Anesthesia

7. Intracerebral Hemorrhage Traumatic V/S Non Traumatic: Neurosurgery

8. Complex Management of Seizures in Pediatric and Adults: Neurology

9. Eclampsia in Pregnancy: Obstetrics & gynecology

10. Aortic TAA/ TAD/ AAA Emergencies: CVTS

11. Thrombolytic and Anticoagulation in Emergency Situations

12. Priapism: Urology

13. Exchange Transfusions in Pediatrics and Adults: Hematology

14. Management of Acute on Chronic Renal Failure in EM: Nephrology

15. Hemorrhagic Fevers: Internal Medicine

16. Fever in Immunocompromised subjects: Internal Medicine

17. Right Ventricular Infarction: Cardiology

18. Learning about Pacemaker and its emergencies: Cardiology

19. Meningitis and its recognition and interpretation of LP :Traumatic v/s non

traumatic in adults

20. Meningitis and its recognition and interpretation of LP :Traumatic v/s non

traumatic in adults

21. Fractures which needs to go to OR Stat: Orthopedics

22. Advances in Stroke: Neurology

23. Rationale use of Antibiotics: Microbiology

24. Bleeds in Hemophiliacs in Pediatrics and Adults

25. Vascular Trauma; Dissections (Other than aorta): CVTS

26. Which Radiology Test what indication: Radiology

27. Standard Orders in DKA NKHHC: Endocrinology

28. Treating K/Ca/Na/Mg Disorders: Standard Orders

29. Status Epilepticus: Neurology

30. Status Asthamaticus: Chest & T.B.

31. Documentation Pearls to avoid litigation

32. High Risk EM REVIEW

PGP

The schedule for Post Graduate Program includes

1. Once a week Seminar
2. Once a week Journal class
3. Once a week Clinico-pathological correlation
4. Once a week Case presentation
5. Twice weekly lectures by faculty
6. Once a month Death Audit
7. Grand round daily
8. Integrated teaching once in 3 months
9. Statistical Meeting once a month

ROTATION

Year I

Emergency Department: 7 months
Orthopedic & wound care: 2wks
PSM – 2 weeks
SICU - 1 month
MICU-1 month
Ophthalmology/ENT- 2wks/2wks
Anaesthesia-1 month

Year II

Emergency Department: 7 months
OBG – 1 month
Pediatric ward – 2 weeks
Psychiatry – 2 wks
PICU- 1 month
Neurology/Nephrology- 2 weeks each
Pediatric EM: 1 month
Neurosurgery – 2 weeks

Year III

Emergency Department: 7 months
Trauma - 1 month
Dermatology – 1 month
FMT – 2 weeks
Radiology & Ultrasound- 2 wks
Administration (EM Services)-1 month
Elective- 1 month

GOALS OF ROTATION

Anesthesia

- Develop airway management skills
- Develop familiarity with pharmacological agents used in anesthesia
- Learn standard monitoring techniques
- Learn ventilator management
- Learn relevant pre-operative historical and physical exam considerations
- Learn principles of pain management.

Emergency Medicine

Develop the ability to rapidly evaluate, diagnose, stabilize, and disposition of critically ill patients.

- Learn respiratory, cardiovascular, renal and neurologic physiology and the pathophysiology of trauma, toxins, shock, sepsis, cardiac failure, and respiratory failure that affect critically ill patients.
- Learn the principles of medical instrumentation and hemodynamic monitoring and be able to utilize them in the care of critically ill patients.
- Learn the indications and develop the technical skills needed to perform diagnostic and therapeutic interventions in critically ill patients.
- Learn the rational use of laboratory, radiographic and other diagnostic tests in the management of critically ill patients.
- Understand the etiologies and pathophysiology of cardiac arrest.
- Learn to recognize the dysrhythmias associated with cardiac arrest and their treatment.
- Learn the American Heart Association (AHA) recommendations and develop skill in the performance of standard resuscitative procedures.
- Learn the principles of pharmacotherapy and the routes and dosages of drugs recommended during cardiac arrest and following resuscitation.
- Learn the indications for withholding and terminating resuscitation.
- Learn common organizational structures of emergency medical services.
- Learn the pathophysiology, patient evaluation and management of thermal and chemical burns.
- Learn the pathophysiology, patient evaluation and management of electrical injury, including lightning injury.
- Learn the pathophysiology, patient evaluation and management of radiation injuries.
- Learn the pathophysiology, patient evaluation and management of hypothermia and frostbite.
- Learn the pathophysiology, patient evaluation and management of heat illness.
- Learn the pathophysiology, patient evaluation and management of drowning and near-drowning.
- Learn the pathophysiology, patient evaluation and management of high altitude illness.
- Learn basic ethical principles relevant to emergency medicine.
- Learn basic legal principles relevant to emergency medicine.

- Learn the overall principles of managing the geriatric patient in an emergency care environment.
- Learn basic statistics and research methodologies
- Learn the presenting signs, symptoms, laboratory findings, pathophysiology and treatment of common therapeutic drug poisonings, drugs of abuse, natural toxins, and general household poisons as delineated in the core curriculum of Emergency Medicine
- Learn the common hazardous materials (HAZMAT) of the workplace and prehospital operations with regard to HAZMAT incidents.
- Learn use of the diagnostic imaging modalities available for the evaluation of orthopedic disorders.
- Develop skill in the diagnosis and treatment of inflammatory and infectious disorders of the musculoskeletal system.
- Learn principles of acute and chronic pain management in patients with musculoskeletal disorders.
- Master the understanding of the components of the immune system, and the disorders of hyper and hypofunction of the immune system.
- Know the major systemic infectious disorders, their diagnosis and treatment.
- Develop knowledge of the etiologies, manifestations, and treatment of endocrine and metabolic disorders.
- Develop familiarity with common general surgical disorders presenting to Emergency, and develop relevant history and physical exam skills.
- Develop procedural skills relevant to general surgery.
- Learn indications for consultation and surgical intervention in patients with acute abdominal pain.
- Learn the principles of trauma management including ATLS.
- Learn how CSF shunts function and learn to evaluate patients with possible shunt malfunction.

Dermatology

- Develop ability to recognize and appropriately treat disorders of the skin and mucous membranes.

Forensic Medicine

- Learn basic principles of medico-legal cases
- Learn various types of wounds
- Learn medico-legal aspects of gunshot wounds
- Learn preservation of various samples for medico-legal purpose.

General Medicine

- Assimilate general concepts of Internal Medicine, history taking and physical examination skills to develop a systematic evaluation for patients presenting to the emergency department.
- Learn the pathophysiology, presentation, and management of diseases related to the alimentary tract.

- Develop knowledge of the pathophysiology, presentation, and management of common hematologic diseases.
- Master the understanding of the components of the immune system, and the disorders of hyper- and hypofunction of the immune system.
- Know the major systemic infectious disorders, their diagnosis and treatment.
- Learn the pathophysiology, evaluation, and treatment of renal disorders.
- Develop knowledge of the etiologies, manifestations, and treatment of endocrine and metabolic disorders.
- Master the understanding of the diseases of the respiratory system, including pathophysiology, evaluation, and treatment.
- Learn management of upper and lower gastrointestinal bleed
- Learn management of acute hepatic failure
- Learn management of complications of cirrhosis
- Learn about acid-base and electrolyte disturbances
- Perform peritoneal dialysis
- Learn about complications of dialysis and renal failure
- Demonstrate the ability to stabilize patients who present in cardiopulmonary arrest.
- Develop skills in the evaluation of patients who present with chest pain.
- Demonstrate the ability to evaluate, stabilize, treat, and arrange for appropriate disposition of patients with cardiac disease processes.
- Demonstrate the ability to develop a differential diagnosis for patients presenting with cardiac symptomatology (chest pain, shortness of breath, weakness, palpitations), etc.
- Demonstrate skill in the interpretation of diagnostic modalities (ECG, chest x-ray and cardiac ultrasonography).
- Develop familiarity with cardiac pharmacologic agents.
- Demonstrate skill at cardiac related procedures: venous line and CVP pressure monitoring, pericardiocentesis, defibrillation and cardioversion, Swan Ganz catheterization, and ultrasonography.
- Demonstrate the ability to diagnose, stabilize, and apply thrombolytic therapy to patients presenting with acute myocardial infarction.
- Learn the anatomy, pathophysiology, presentation, and management of common nervous system disorders.
- Develop skill in the performance of a screening and detailed neurological evaluation.
- Develop skill in the use and performance of diagnostic procedures in the evaluation of neurological disorders

General Surgery including Trauma

- Develop familiarity with common general surgical disorders.
- Develop relevant history and physical examination skills.
- Develop procedural skills relevant to general surgery.
- Develop skill in the overall assessment of the general surgical patient.
- Learn indications for consultation and surgical intervention in patients with acute abdominal pain.
- Learn the principles of care of the preoperative patient.

- Learn the anatomy, pathophysiology, presentation, and management of common nervous system injuries.
- Develop skill in the performance of screening and detailed neurological evaluation.
- Develop skill in the use and performance of diagnostic procedures in the evaluation of neurological injuries.
- Effectively utilize radiologic studies to diagnose neurological injuries.
- Diagnose, stabilize and provide initial treatment of injuries of the brain, spinal cord, bony spine and peripheral nerves.
- Learn how CSF shunts function and learn to evaluate patients with possible shunt malfunction.
- Learn about special aspects of trauma in children
- Learn surgical emergencies in children
- Learn the relevant history and physical examination skills.
- Learn the use of diagnostic imaging modalities available for the evaluation of urologic disorders.
- Learn the diagnosis and management of urinary tract infections, including pyelonephritis and prostatitis.
- Learn the diagnosis and management of renal calculi.
- Learn the evaluation and management of renal and genitourinary trauma.
- Learn the diagnosis and management of disorders of the male genitalia.

Obstetrics/Gynecology

- Learn the principles of contraception.
- Develop expertise in the diagnosis and management of emergent complications of pregnancy.
- Develop expertise in the management of uncomplicated and complicated labor and delivery.
- Develop expertise in the management of sexual assault.
- Learn the principles of management of gynecologic and obstetrical trauma.
- Learn diagnosis and treatment of genital and pelvic infectious diseases.
- Develop expertise in the diagnosis and management of abdominal pain in females.
- Develop expertise in the diagnosis and management of vaginal bleeding.

Ophthalmology

Develop relevant history and physical examination skills

- Learn to recognize and treat emergent causes of visual loss
- Learn the principles of ocular trauma management
- Learn the evaluation and management of common ophthalmologic complaints.

Orthopedics

- Develop relevant history and physical examination skills.
- Learn use of the diagnostic imaging modalities available for the evaluation of orthopedic disorders.
- Develop skill in the evaluation and management of musculoskeletal trauma.

- Develop skill in the diagnosis and treatment of inflammatory and infectious disorders of the musculoskeletal system.
- Learn principles of acute and chronic pain management in patients with musculoskeletal disorders.
- Learn principles trauma care.
- Develop an organized approach to the assessment, resuscitation, stabilization and provision of definitive care for the trauma victim.
- Learn use of the diagnostic imaging modalities available for evaluation of the trauma victim.
- Develop procedural skills necessary in the evaluation and management of the trauma victim.
- Learn to recognize and treat immediate life and limb threatening injuries in the trauma victim.
- Learn special considerations in the evaluation and management of the pregnant trauma victim.
- Learn special considerations in the evaluation and management of the pediatric trauma victim.
- Learn special considerations in the evaluation and management of the geriatric trauma victim.
- Learn the principles of disaster management
- Learn how to manage fractures, reduce dislocations and learn the splint and plaster techniques

Otolaryngology

- Develop relevant history and physical examination skills.
- Learn the evaluation and management of common problems of the head and neck.
- Learn the evaluation and management of facial trauma.
- Develop skill in the evaluation and management of upper airway disorders.
- Learn use of the diagnostic imaging modalities available for evaluation of head and neck disorders.

Pediatrics

- Develop skill in infant/pediatric resuscitation.
- Develop skill in performance of appropriate pediatric history and physical examination, including general growth and development, assessment and knowledge of current immunization requirements.
- Learn the etiologies, significance, and treatment of fever and infection in the child.
- Learn the manifestations and significance of abdominal related complaints in the child.
- Learn the etiologies and treatment of neurologic emergencies in the child.
- Learn the physiology and management of derangements of fluid and electrolyte in children.
- Learn the indications of social and/or psychological disturbances.
- Learn the specific problems of pediatric trauma victims.
- Learn the manifestations and treatment of pediatric cardiac abnormalities.

- Learn the pathophysiology, etiologies, and treatment of respiratory disorders of children.
- Learn the pathophysiology, etiologies, and treatment of common serious endocrine and hematologic disorders of children.
- Learn the pathophysiology, etiologies, and treatment of common serious gynecologic and urologic conditions of children.
- Learn to recognize and provide appropriate treatment for orthopedic and soft tissue problems of childhood.
- Learn the common dermatologic diseases and dermatologic manifestations of systemic diseases in children.
- Learn to recognize and treat children with common and/or serious problems of the head and neck.

Psychiatry

- Develop familiarity with common psychotherapeutic agents.
- Learn relevant interviewing techniques to deal with patients with various psychiatric disorders.
- Learn principles of managing the violent patient.

Radiology

- Learn all the possible presentations of injuries and clinical conditions with theirrelated radiological findings in CT Scan, X-Ray and MRI, Ultrasound, etc.

Elective

Upgrade any area of deficient expertise

Community Medicine –

- Learn management of emergencies in the community setting

COMPETENCIES TO BE ATTAINED BY THE END OF 3 YEARS

By the end of their first year, emergency medicine residents will:

1. Demonstrate the ability to provide appropriate care to patients with non-emergent problems:
    a. Obtain an accurate and complete clinical and psychosocial history and perform a comprehensive physical examination
    b. Develop appropriate differential diagnoses
    c. Know the available investigative and therapeutic options
    d. After review, implement an appropriate investigative and therapeutic plan
    e. Develop and, after review, implement an appropriate written and verbal discharge plan
    f. Demonstrate an awareness of the available information systems to support patient care and discharge planning
    g. Demonstrate competency (including an understanding of the indications, contraindications, and techniques) in the core procedures used on nonemergent patients (e.g. laceration repair, reduction in or immobilization of extremity
    h. injury, pelvic examination, slit-lamp examination)
    i. Demonstrate an understanding of the concepts of disease prevention as it
    j. applies to emergency medicine
    k. Properly document all historical, physical examination, and diagnostic test findings
2. Demonstrate a level-appropriate knowledge of the biochemical, clinical, epidemiologic, and social-behavioural basis of diseases seen in the emergency department:
    a. Demonstrate a basic understanding of the principles of evidence-based medicine
    b. Demonstrate mastery of minor acute and nonemergent conditions
    c. Demonstrate mastery of the principles of ACLS and ATLS d. PALS and NALS (paediatric advanced life support and neonate advanced life support)
    d. Demonstrate a level-appropriate understanding of the core curriculum
3. Demonstrate the ability to appraise and assimilate scientific evidence and analyze and improve their own practice:
    a. Demonstrate the ability to critically assess their competency in managing minor acute and on emergent cases
    b. Demonstrate the ability to apply published studies to their own practice
    c. Demonstrate the ability to use available information technology appropriate to the care of their patients
4. Demonstrate effective interpersonal and communication skills with:
    a. Patients and their families
    b. Other physicians
    c. Other health care providers
5. Demonstrate the professionalism required of a physician:
    a. Accept responsibility for continuity of patient care
    b. Demonstrate respect for patients' privacy and autonomy
    c. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities
    d. Demonstrate a commitment to sound ethical principles regarding the care of patients

e. Demonstrate respect for the dignity of patients and colleagues as persons

6. Demonstrate a basic understanding of the role of the emergency department in the larger context of health care delivery:
   a. Demonstrate an understanding of the principles of a cost-benefit analysis
   b. Know the relative costs of the various tests and treatment contemplated
   c. Serve as an advocate for the patient in their dealing with the complexities of the health care system, specifically with regard to appropriate referral and followup

By the end of their second year, residents will, in addition to the objectives achieved during the first year:

1. Demonstrate the ability to provide appropriate care to patients with emergent and life threatening conditions:
   a. Obtain an appropriately focused history and perform an appropriately focused physical examination
   b. Develop comprehensive differential diagnoses
   c. Develop an investigative and therapeutic plan
   d. Develop and, after review, implement an appropriate written and verbal discharge plan
   e. Demonstrate competency (including an understanding of the indications, contraindications, and techniques) in the core procedures used on patients with emergent and life-threatening conditions (eg, endotracheal intubation, tube thoracostomy, defibrillation/cardioversion, etc.)
2. Demonstrate a level-appropriate knowledge of the biochemical, clinical, epidemiologic, and social-behavioural basis of diseases seen in the emergency department:
   a. Apply the principles of evidence-based medicine
   b. Demonstrate mastery of the emergent and life-threatening conditions that present to the emergency department
   c. Demonstrate a level-appropriate understanding of the core
3. Demonstrate the ability to appraise and assimilate scientific evidence and analyze and improve their own practice:
   a. Demonstrate the ability to critically assess their competency in managing the emergent and life-threatening conditions that present to the emergency department
   b. Use published studies to improve their own practice
   c. Use available information technology appropriate to the care of their patients
4. Demonstrate a level-appropriate understanding of the role of the emergency department in the larger context of health care delivery:
   a. Demonstrate the ability to divide his or her time and energies appropriately to provide optimal care for several patients concurrently
   b. Develop plans for evaluation and treatment that, without compromising patient care, acknowledge the patient's particular health care system

By the end of their third year, residents will, in addition to the objectives achieved during the first 2 years:

1. Demonstrate the ability to provide appropriate care to patients

a. Listen to a history and physical examination presentation from a junior resident and provide appropriate feedback and guidance
b. Perform an appropriately focused history and physical examination, taking into consideration the previous evaluation of the junior resident
c. Implement an appropriate investigative and therapeutic plan
d. Implement an appropriate written and verbal discharge plan
e. Demonstrate understanding of the indications, contraindications, and techniques in uncommonly performed but lifesaving procedures (eg, cricothyroidotomy, burr craniotomy) and mastery of all other core procedures
f. Demonstrate an understanding of documentation as it applies to billing and reimbursement requirements

2. Demonstrate a level-appropriate knowledge of the biochemical, clinical, epidemiologic, and social-behavioural basis of diseases seen in the emergency department:
   a. Demonstrate mastery of all conditions that commonly present to the emergency department
   b. Teach courses such as ACLS as a certified instructor
   c. Demonstrate an understanding of the core curriculum
3. Facilitate the learning of others
   a. Teach and appropriately supervise medical students and junior residents
4. Demonstrate an understanding of the role of the emergency department in the larger context of health care delivery
   a. Triage patients and direct the attention of junior-level residents so as to provide optimal care for all patients in the emergency department.
   b. Plan and participate in a mass-casualty disaster drill

PROGRESS REPORT FORMAT

(Affiliated to Maharashtra University of Health Sciences)

Term-wise Progress Report of
Post Graduate Residents

Department of : _____

Part – I

(Students Profile)

1. Name of P. G. Resident : _____
2. Name of the PG Course : _____
3. Year of admission : _____
4. Term : From _____to _____
5. Dissertation Topic : _____

   (for Degree Course Only) _____

   _____
6. Name of P.G. Guide : _____
7. Name of the H.O.D. : _____

8. Leave availed during the : _____

period

9. Total percentage of attendance: _____

Part – II

Assessment according to Clinical/Academic Performance

Grading	A	-	Above 80%
	B	-	60% to 80%
	C	-	50% to 59%
	D	-	Less than 50%

(1) CLINICAL PERFORMANCE (Grading):

(i) O.P.D. Work : _____

_____

(ii) Ward Work : _____

(iii) O.T. Work : _____

_____

(iv) Other : _____

_____

(2) PROGRESS OF DISSERTATION (Wherever applicable):

_____
_____
_____

(3) ACADEMIC PERFORMANCE:

(i) Written Tests:-

Date	Marks obtained

(ii) *Seminar/Symposia:-

Date	Topic	Evaluation

(iii) *Case Presentation:-

Date	Topic	Evaluation

(iv) *Journal Club:-

Date	Topic	Evaluation

(v) Practical /Viva:-

Date	Marks obtained

(vi) *Microteaching:-

Date	Topic	Evaluation

(*May be assessed on a scale of 1 to 10)

(4) Papers/Posters Presented:-

Sr. No.	Title of Presentation	Paper/ Poster	Event	Month/ Year	Venue

Overall Grading: _____

Remarks of Post-Graduate Guide

Certified that Dr. _____ has a total attendance of ___ % (For duration _____ to _____). His/her overall performance has been _____(satisfactory/average/unsatisfactory)

Date: Name & Signature of PG Guide

Remarks of Head of Department

Progress of Dr. _____ has been _____ (Satisfactory / Unsatisfactory)

Date: Name & Signature of HOD

Remarks of Dean

(a) Progress _____ (Satisfactory / Unsatisfactory)

(b) Term granted _____ (Yes / No)

Date: Signature of Dean

WORKSHOPS

The Students shall complete following workshops during the first year

- BLS
- ACLS
- ATLS
- PALS
- NALS
- AUTLS
- Disaster Management
- Behavioral Sciences

DISSERTATION

AIM

To Orient the students to various methodologies of research, induce them to get acquainted with them and facilitate fruitful research, which will add to existing body of knowledge in the field of Emergency Medicine.

Objectives

- Identify a relevant research question
- Conduct critical review of literature
- Formulate a hypothesis
- Determine most suitable study design
- State the objectives of the study
- Prepare a study protocol
- Get approval from the Ethics Committee
- Conduct the study, compile the data
- Analyze & interpret the data
- Draw conclusions, declare results
- Write two research papers and publish in peer reviewed journal
- Present paper/ poster at state/ national level conference

Guidelines

- Scope of the study should be such that it is possible to conduct within the resources & time available
- More emphasis should be given on methodology rather than results
- Ethical issues & consideration must be given priority.

EVALUATION OF STUDENTS FOR PG DEGREE

For Postgraduate Degree the overall evaluation of the students will consist of internal assessment and the university examinations at the end of the course.

Internal Assessment

Once a month theory 10 Short answer questions tests as per the lectures

Viva exams once in two months at the end of rotation**.**

Titles Of Theory Papers

Paper – I Basic Sciences

Paper – II Medicine &Allied Subjects

Paper - III Surgery & Allied Subjects

Paper - IV Recent Advances

Each theory paper – 100 marks

10 Structured questions of 10 marks each – 100 marks

Practical

Ten short cases	30 marks each	300 Marks
Viva – Voce	Table Viva	100 Marks

(Equipment, X-ray/CT/MRI, ECG, ABG, BLS & ACLS,ATLS, Airway and Intubation, Ventilator, Dissertation, Communication skills, 5 OSCE of 2 mark each)

Log Book

MD Emergency Medicine

Certificate

This is to certify that Dr_____has completed six terms of residency in the Department of Emergency Medicine as a post graduate student. The student has himself / herself performed the practical work as mentioned in this log book.

Date: Signature of HOD

Place: Pune

* Indicates name & LOGO will change as per the institute.

INDEX

S. Number		Page Number
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PersonalDetails

Title:

Surname:

Name:

Gender: Date of Birth :

Medical Council Number and Date of Issue :

Address for Correspondence :

Telephone Number:

E-Mail:

Details of MBBS:

1. College:
2. University:
3. Year of passing:

I certify that this is a true and recent likeness of the candidate.

_____

Signature of Guide

_____

Name and Dept
Stamp of H.O.D

ExplanatoryNotes

Introduction

Emergency Medicine' is a Specialty approved by the Medical Council of India. Training in this specialty is specified by MCI & National Curriculum, and Maharashtra University of Health Sciences and this will lead to the achievement of the Certificate of Completion of Post Graduate Specialty Training in Emergency Medicine.

Training in the specialty of Emergency Medicine is based on both summative and continuous formative assessments. The summative component includes the examinations as specified within the university curriculum. The formative component consists of a series of appraisals which each trainee is expected to undergo during all stages of training. These forms of assessment are used throughout the training period; however, the choice of clinical cases used during the assessments will aim to reflect the competencies expected to have been acquired at each stage reached, and will therefore become increasingly complex as the trainee progresses through each phase of the training programme.

The logbook for trainees in Emergency Medicine will serve both as a guide of the curriculum as well as a portfolio of appraisals and assessments. Each trainee, in higher training, is obliged to use this logbook. The documentation it contains will provide the proof that all competencies necessary for progress and for the eventual award of Post Graduate Degree has been completed.

Educational and Academic Activities: These include prerequisite courses such as BLS & ACLS or equivalent, ATLS or equivalent and PALS or equivalent. Participation in any other courses, conferences, specialty updates, academic meetings and journal clubs should also be recorded in this section.

Tutorials: These are scheduled teaching sessions with approved tutors and will cover various topics from the curriculum.

Case Sheets: This section will contain lists of interesting clinical problems encountered, learning points and interventions performed. These lists will highlight the experience gained by the trainee with respect to topics mentioned in the University and National Curriculum.

Work Place Based Assessments (WPBA): These assessments will provide feedback to trainers and trainees and are intended to be formative. They aim to test skills, knowledge, behavior and work attitudes during day-to-day practice. It is not possible to cover the whole curriculum through these assessments but the more important skills and topics are chosen to facilitate further exploration and discussion. Through these assessments the trainee can chart his / her progress and learn from feedback provided by the assessor.

The trainee must complete a preset number of each of the agreed types of assessments and competence is evaluated annually by the appointed tutor. Although the main workplace assessment is formative, summative evidence will be used during the annual review and this will contribute to the result of this evaluation. A minimum of one WPBA per month is recommended, but more may be required for particular trainees to ensure competence. The number of WPBA's completed may not necessarily mean that competence at a particular level has been achieved.

Types of WPBAs to be used

- Multi source feedback (MSF)
- Mini Clinical Evaluation Exercise (Mini-CEX)
- Case Based Discussion (CBD)
- Direct Observation of Procedural Skills (DOPS)

Multi Source Feedback (MSF)

This is a method of assessment of professional competence within a team-working environment and can also provide feedback to the trainee. MSF is undertaken annually by both Basic and Higher Specialty Trainees.

Mini-Clinical Evaluation Exercise (Mini-CEX)

This is a method of assessment of skills essential for the provision of a good standard of clinical care, and will also facilitate feedback to the trainee. Both the clinical and professional skills of the trainee are assessed while working in the Emergency Department or during rotations in other Departments. The assessments are based on clinical problems in a range of clinical settings. The way a trainee interacts with a patient is also observed and assessed. Most encounters last between 15 and 20 minutes.

The areas of competence covered are listed according to the stage of training reached in a separate section of this logbook. The Post Graduate should have a minimum of 4 mini CEXs per year.

Direct Observation of Procedural Skills (DOPS)

This is used to assess the trainees' technical, operative and professional skills in a range of basic diagnostic and interventional procedures, or parts of procedures, during routine practice and will facilitate developmental feedback. DOPS is used in simpler environments and procedures and can take place in the Emergency Department, wards or in the operating theatre. Lists of procedures that can be assessed in this manner are referenced later on in this document according to the level of training. A Post Graduate needs to undergo a minimum of 4 DOPS per year of training

Case Based Discussion (CBD)

This method is designed to assess clinical judgment, decision-making and the application of medical knowledge in relation to patient care in cases for which the trainee has been directly responsible. The method is particularly designed to test higher order thinking and synthesis as it allows assessors to explore deeper understanding of how trainees compile, prioritize and apply knowledge.

By using clinical cases that offer a challenge to the trainee, rather than routine cases, the trainee is able to explain the complexities involved and the reasoning behind choices they made. It also enables the discussion of the ethical and legal framework of practice. It uses patient records as the basis for dialogue, for systematic assessment and structured feedback. As the actual record is the focus for the discussion, the assessor can also evaluate the quality of record keeping and the presentation of cases. Most assessments take no longer than 15-20 minutes. The Post Graduate must complete 4 CBD per year.

Educational and Academic Activities

Mandatory Courses:

	Date	Location
BLS		
ATLS		
ACLS		

Other Courses, Conferences, Specialty Updates, Journal clubs:

Activity	Date	Location

Tutorial Sheet

Date	Tutorial Topic	Tutor signature

Interestingcases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

Interestingcases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

Interestingcases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

Interestingcases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

Interestingcases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

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Interestingcases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

Interestingcases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

Interestingcases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

Interesting cases

Date	Patient ID	Clinical Problems	Interventions	Learning Points

MINI-CLINICAL EVALUATION EXERCISE (CEX)

Trainee's Surname: _____

Trainee's Forename: _____

Registration Number: _____

Clinical Setting: A&E /Clinic/ Ward/ Acute Admission

Complexity of Case (Please Circle) Low High Med

Assessors Position (Please Specify) _____

Number Of Times Procedure Performed By the Trainee: (Please Circle)

0 1-4 5-9 >9

Please grade the following areas using scale heading as appropriate	Below Expectations	Border line	Meets Expectations	Above Expectations	U/C*
History Taking					
Physical examination Skills					
Communication Skills					
Clinical judgment					
Professionalism					
Organization/Efficiency					
Overall Clinical Care					

U/C – Please mark this if you have not observed the behavior and therefore feel unable to comment

Key Learning Points	**Discussion with trainer**

Assessor's satisfaction with Case Based Discussion

- Not at all satisfied / reasonably satisfied / very satisfied

Assessors Name: _____ Signature: _____ Date: _____

MINI-CLIN MINI-CLINICAL EVALUATION EXERCISE (CEX)

Trainee's Surname: _____

Trainee's Forename: _____

Registration Number: _____

Clinical Setting: A&E /Clinic/ Ward/ Acute Admission

Complexity of Case (Please Circle) Low High Med

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U/C – Please mark this if you have not observed the behavior and therefore feel unable to comment

Key Learning Points	**Discussion with trainer**

Assessor's satisfaction with Case Based Discussion

- Not at all satisfied / reasonably satisfied / very satisfied

Assessors Name: _____ Signature: _____ Date: _____

MINI-CLINICALEVALUATIONEXERCISE(CEX)

Trainee'sSurname:

_____

Trainee'sForename:_____

_____

ComplexityofCase(PleaseCircle) Low High Med

AssessorsPosition(PleaseSpecify)_____

NumberOfTimesProcedurePerformedBytheTrainee:(PleaseCircle)

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- Not at all satisfied / reasonably satisfied / very satisfied

Assessors Name: _____Signature:_____Date:_____

DIRECTOBSERVATIONOFPROCEDURALSKILLS(DOPS)

Trainee'sSurname:

_____

Trainee'sForename:_____

_____

ComplexityofCase(PleaseCircle) Low High Med

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0 1-4 5-9 >9

Please grade the following	Below Expectations	Border line	Meets Expectations	Above Expectations	U/C*
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Appropriate analgesia or safe sedation					
Technical ability					
Aseptic technique					
Seeks help where appropriate					
Post procedure management					
Communication skills					
Consideration of patient / professionalism					
Overall ability to perform procedure					

U/C:Pleasemarkthisifyouhavenotobservedthebehaviorandthereforeunabletocomment

Comments

Assessor'ssatisfactionwithCaseBasedDiscussion

- Notatallsatisfied/reasonablysatisfied /verysatisfied

AssessorsName:_____Signature:_____

Date:_____

DIRECTOBSERVATIONOFPROCEDURALSKILLS(DOPS)

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Trainee'sSurname:

_____

Trainee'sForename:_____

_____

ComplexityofCase(PleaseCircle) Low High Med

AssessorsPosition(PleaseSpecify)_____

Number Of Times Procedure Performed By the Trainee: (Please Circle)

0 1-4 5-9 >9

Please grade the following	Below Expectations	Border line	Meets Expectations	Above Expectations	U/C*
Demonstrates understanding of indications, relevant anatomy, technique of procedure					
Obtains informed consent					
Demonstrates appropriate preparation pre-procedure					
Appropriate analgesia or safe sedation					
Technical ability					
Aseptic technique					
Seeks help where appropriate					
Post procedure management					
Communication skills					
Consideration of patient / professionalism					
Overall ability to perform procedure					

U/C:Pleasemarkthisifyouhavenotobservedthebehaviorandthereforeunabletocomment

Comments

Assessor'ssatisfactionwithCaseBasedDiscussion

- Notatallsatisfied/reasonablysatisfied /verysatisfied

AssessorsName:_____Signature:_____

Date:_____

DIRECTOBSERVATIONOFPROCEDURALSKILLS(DOPS)

Trainee'sSurname:

_____

Trainee'sForename:_____

_____

ComplexityofCase(PleaseCircle) Low High Med

AssessorsPosition(PleaseSpecify)_____

Number Of Times Procedure Performed By the Trainee: (Please Circle)

0 1-4 5-9 >9

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Obtains informed consent					
Demonstrates appropriate preparation pre-procedure					
Appropriate analgesia or safe sedation					
Technical ability					
Aseptic technique					
Seeks help where appropriate					
Post procedure management					
Communication skills					
Consideration of patient / professionalism					
Overall ability to perform procedure					

U/C:Pleasemarkthisifyouhavenotobservedthebehaviorandthereforeunabletocomment

Comments

Assessor'ssatisfactionwithCaseBasedDiscussion

- Notatallsatisfied/reasonablysatisfied /verysatisfied

AssessorsName:_____Signature:_____

Date:_____

CASEBASEDDISCUSSION(CBD)

Trainee'sSurname:

_____T

rainee'sForename:_____

_____

ComplexityofCase(PleaseCircle) Low High Med

AssessorsPosition(PleaseSpecify)_____

NumberOfTimesProcedurePerformedBytheTrainee:(PleaseCircle)

0 1-4 5-9 >9

Please grade the following areas using scale heading as appropriate	Below Expectations	Border line	Meets Expectations	Above Expectations	U/C*
Clinical record keeping					
Clinical assessment (includes diagnostic skills)					
Medical Treatment					
Investigations & Treatment					
Follow up & Management Plan					
Clinical Reasoning					
Overall Clinical Care					

U/C – Please mark this if you have not observed the behavior and therefore feel unable to comment

AgreedAction:

Assessor'ssatisfactionwithCaseBasedDiscussion

- Notatallsatisfied /reasonablysatisfied /verysatisfied

AssessorsName:_____Signature:_____

Date:_____

CASEBASEDDISCUSSION(CBD)

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ComplexityofCase(PleaseCircle) Low High Med

AssessorsPosition(PleaseSpecify)_____

NumberOfTimesProcedurePerformedBytheTrainee:(PleaseCircle)

Key Learning Points	0	1-4	5-9	>9	Discussion with trainer

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AssessorsName:_____Signature:_____

Date:_____

CASEBASEDDISCUSSION(CBD)

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ComplexityofCase(PleaseCircle) Low High Med

AssessorsPosition(PleaseSpecify)_____

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AssessorsPosition(PleaseSpecify)_____

NumberOfTimesProcedurePerformedBytheTrainee:(PleaseCircle)

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AssessorsName:_____Signature:_____

Date:_____

Multi-Source Feedback

First Year

Second Year

Third Year

Work Place Based Assessment

First Year

Assessment	1	2	3	4
Mini CEX	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations
DOPS	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations
CBD	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations

Second Year

Assessment	1	2	3	4
Mini CEX	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations
DOPS	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations
CBD	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations

Third Year

Assessment	1	2	3	4
Mini CEX	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations
DOPS	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations
CBD	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations	Above Expectations As Expected Below Expectations

List of Abbreviations

BST	Basic Specialist Trainee
CBD	Case Base Discussion
DOPS	Direct Observation of Procedural Skills
HST	Higher Specialist Trainee
Mini-CEX	Mini Clinical Observation Exercise
MSF	Multi-Source Feedback
WPBA	Work Place Based Assessment

NOTES:

M.D. ANAESTHESIA - SYLLABUS

May - 2006

At the end of three years of training as residents in anaesthesia, the candidates should be fully conversant with theory and practical aspects of:

A. **Human Anatomy and Physiology of** various organ systems and cellular components in relation to Anaesthesia including muscles, neuromuscular junction, nerve plexuses, cardiovascular, respiratory, neurological, hepatobiliary, renal, endocrine and temperature homeostasis, theories of mechanism of production of anaesthesia, changes during pregnancy, various tests/investigations to evaluate the functional status of organ systems as applied to Anaesthesia Management, Intensive Care Practice and Pain Relief

B. **Pharmacology** as applied to Anaesthesia, Intensive Care Practice and Pain Relief including General Pharmacological Principles, Pharmacokinetics and Pharmacodynamics of Anaesthetic Drugs (including Uptake and Distribution of Inhaled Anaesthesia agents and All the Adjuncts used in Anaesthesia, Drugs used for treatment of various Diseases and Drug Interaction

C. **Pathophysiology of various diseases** including disorders of cardiovascular, respiratory, neurological, hepatobiliary, renal, endocrine and immune systems, various tests/investigations to grade/measure the disease process of various organ systems as applied to anaesthesia management, intensive care practice and pain relief

D. **Medicine** as applied to the practice of Anaesthesia including diagnosis and management of Diabetes, Hypertension, Bronchial Asthma, Chronic Obstructive Pulmonary Diseases, Respiratory Failure, ARDS, Myocardial Ischemia / Infarction, Arrhythmia, Shock, Congestive Heart Failure, Acute / Chronic Renal Failure, Head Injury, Unconscious patients, Status Epilepticus / Asthmaticus, Endocrine Disorders, Diseases related to Dysfunction of Hepatobiliary, Muscular, Connective Tissues and Immune system, Management of Perioperative Infection, Neuromuscular Disorders, Poisoning etc. and interpretation of ECG / Blood Gases / Other Biochemical Values and Function Tests

E. **Physics** as applied to Anaesthetic gases, vapours, anaesthesia machine, breathing systems, monitors, ventilators, therapeutic devises & other relevant equipment including physical principles involved in their construction and functioning

F. **Perioperative Anaesthesia management** including pre-operative evaluation, intra-operative management as well as post-operative care, monitoring (invasive as well as non-invasive) as applied to various surgical specialities and age groups.

G. **Theory and practice of various techniques / aspects of Routine & Emergency cases** of **General Anaesthesia** (e.g., Intravenous / Inhalational, Endotracheal / Mask / LMA / COPA, Spontaneous/Controlled mode of ventilation, induced hypotension / hypothermia etc.), **Regional Blocks** (Spinal, Epidural & Peripheral Nerve block) and **Local Anaesthesia,** including **various postures** required for anaesthetic/surgical procedures, their effects **and Recent Advances** for most minor to supra major surgeries in the field of:

- **General surgery:** e.g. minor cases like haemorrhoidectomy to supra major cases like Liver transplant
- **Gynaecology and Obstetrics**
- **ENT and Head & Neck**
- **Orthopaedics**
- **Ophthalmology**
- **Pediatric & Neonate**: Differences between adult and pediatric Anatomy, Physiology, Pharmacology, Anaesthesia principles, pediatric/neonatal emergencies, postoperative care, fluid & ventilator management etc

- **Cardiac, Vascular & Thoracic:** Conduct of closed heart as well as open heart surgeries (Valvular, Ischemic, Congenital -Cyanotic & Acyanotic), CABG (including off pump), Pulmonary Cases (Insertion of Double Lumen Tube, one lung anaesthesia), Thymus and Vascular surgeries etc. Ability to go on Cardiopulmonary bypass and disconnect from bypass, Ability to take, manage and interpret Arterial, Central Venous and P.A. Lines, postoperative care, management of re-explorations etc.
- **Neurosurgery**: Ability to monitor ICP, Management of head injuries, bleeds, tumours, etc with raised ICT. Ability to safely manage cases in sitting, prone, lateral, jack-knife positions and Anaesthetic management for neuro-radiology procedures
- **Urology**: Management of endoscopic surgeries like TURP/TURBT etc, Problems related to TURP, extracorporeal shock wave lithotripsy, percutaneous placement of nephrostomy etc., anaesthetic management of patients with acute and chronic renal failure, anaesthetic management of renal transplant cases of donor as well as recipient.
- **Plastic**: Management of burns contractures, congenital faciomaxillary abnormalities like cleft lip and palate, faciomaxillary injuries like fracture mandible, maxilla, zygoma, panfacial fractures, difficult intubations, microvascular surgeries, reconstructive surgeries, aesthetic surgeries etc
- **Dental**: Monitored Anaesthesia Care, Anaesthetic management of pedodontia patients, maxillo-facial surgeries including TMJ Ankylosis, Awake, Retrograde & Fibreoptic intubations
- **Endoscopies / laparoscopies**: Anaesthetic management, specific requirement and complications of various endoscopies like cystoscopy, ureteroscopy, PCNL, hysteroscopy, thoracoscopy, mediastinoscopy etc. and Lap. assisted/laparoscopic surgery like hysterectomy, tube ligation, appendicectomy, cholecystectomy etc.
- Anaesthesia for various **diagnostic, therapeutic and Specialized** procedures
- Anaesthesia for **Geriatric patients**
- Anaesthesia for surgery using **LASER**
- **Anaesthesia / Sedation techniques out side operating room:** Electroconvulsive shock therapy (ECT), Electrophysiologic tests, Radiofrequency ablation, Cardioversion, Cardiac catheterization, Special anaesthetic considerations in radiology and interventional radiology related to Dye allergies, Embolization, Monitoring / Equipment options in the MRI suite

H. History of **Anaesthesia**

I. Airway Management: Assessment of difficult airway, Awake, Retrograde, Use of intubating LMA's, Intubating Stylets, Various laryngoscopes designated for difficult airway, Insertion of Combitube, Ability to perform Cricothyrotomy and use of Venturi, Minitrach & Fibreoptic intubations etc

J. Basic & Advanced Cardiopulmonary & Cerebral Resuscitation (**CPCR**) for all age group of patients under different situations e.g., neonates, pregnant females, poisoning cases, trauma victims etc.

K. Acid base & Fluid management including use of Crystalloids, Colloids, blood & blood products

L. Arterial, Central Venous and P.A. Lines: Establishment, management and interpretation

M. Anaesthetic drugs used in **perioperative care**

N. Equipments (Minor to advanced monitoring) – their use, maintenance, sterilisation and care

O. Medical gases: Knowledge of Manufacturing, Storage and Central pipeline Systems

P. Day Care / Outpatient Anaesthesia.

Q. Remote Location Anaesthesia: Anaesthetic practice during **disasters** and for large turnover surgeries in **camps / mass casualties**.

R. **Emergency** Anaesthesia
S. **Monitored Anaesthesia** Care
T. **Labour Analgesia**
U. **Pain relief –** Acute & Chronic
V. **Critical care practice** including oxygen therapy, respiratory therapy, ventilatory support, haemodynamic monitoring, prevention and management of multi organ failure, and care of patients with brain damage or brain dead patients For organ Transplant
W. **Advanced Trauma Life Support** (**ATLS**)
X. **Occupational Hazards**
Y. **Safety** in Anaesthesia
Z. **Complications of Anaesthetic procedures, its prevention, detection and management**
AA. **Record keeping** in Anaesthesia
BB. **Medical Audit**
CC. **Quality Assurance**
DD. **Anaesthesia standards:** e.g., Minimum monitoring standard
EE. **Medicolegal** aspects in Anaesthesia
FF. **Ethics** in Anaesthesia
GG. **Principles of Evidence Based Medicine**
HH. **Basic Research Methodology and Clinical Trials**
II. **Bio-statistics**
JJ. **Computers:** Utility, computer assisted learning and data storage, Computerised anaesthesia records
KK. **Skills:** for planning of operation theater, pain clinic, recovery room, intensive care etc. including selection and purchase of equipments

TRAINING PROGRAMME

A. ADMINISTRATION OF ANAESTHESIA & PERIOPERATIVE PATIENT CARE

I Year Residents:–

Assisting during minor & major anaesthesia procedures and managing patients in recovery or intensive care areas (all Under Supervision)

The first month of the first year will be spent in orientation in the operating rooms and attending lectures covering the basics of the discipline. After that the first year of training will be spent in learning the fundamentals of anesthesiology with emphasis on checking of anaesthesia equipment including anaesthesia machine, airway equipment and appropriate monitors, preparation of appropriate dosages of various drugs required at specific point of time, mastering clinical skills regarding selection and implementation of an appropriate anesthesia plan, placement of lines, induction of anaesthesia, intubation, maintenance of anaesthesia, and the successful reversal of anesthetic agents. Emphasis will also be placed on learning regional anaesthesia and Cardiopulmonary resuscitation. Also the candidates will be assigned guides for thesis so as to help them prepare protocols.

To start with the first year residents will observe and then slowly become independent in giving general anaesthesia and Regional anaesthesia to patients belonging to ASA grade I & II for minor and major surgery, under graded supervision. They will be posted in rotation to the following specialties during the first year**:** Preoperative assessment area, General Surgery, Gynecology, Obstetrics, Orthopedic, ENT, and Recovery Room. They will be assigned to cases in the Operating Room at the hospitals attached to medical teaching institutes affiliated to the University under which they have registered and will gain experience under the direction and supervision of respective academic faculty.

II Year Residents:–

Assisting during minor & major procedures under anaesthesia, managing patients in recovery or intensive care areas and Independently conducting minor procedures under anaesthesia (GA/RA) for ASA grade I or II patients (excluding expected difficult airway cases and cases with expected major body fluid shift)

The second year of training will be devoted to the subspecialties/superspecialities of anesthesia at the hospitals affiliated to medical teaching institute and the university under the supervision of a faculty member with an aim to concentrate on mastering the knowledge and technical skills associated with providing anesthesia to subspecialty/superspeciality patients. Residents will be rotated in Pediatric anesthesia, Neuroanesthesia, Cardiovascular and Thoracic anesthesia, Ambulatory anesthesia, Obstetrics, Dental Surgery, Ophthalmology, Pain Clinic / Pain Management, Peripheral Theatres, Anaesthesia Outside Operating Rooms, Trauma care, Transplant Surgeries etc. They will be taught to give general anaesthesia and regional anesthesia (Extradural Block - EDB, Spinal Block, and Peripheral Nerve Blocks) to ASA grade I, II, III & IV patients under supervision for superspeciality theaters. They should be able to give GA/RA to other ASA grade I & II patients independently. Rotations in critical care areas e.g., Trauma Ward, Post Anesthesia Care Unit / ICU / Emergency Medical Service will also be part of the second year training curriculum. They should learn pediatric and trauma life support and maintain skills for basic and advanced cardiac life support. The student should be able to analyze and present scientific data and write a thesis.

III Year Residents:–

Assisting during minor & major procedures under anaesthesia, managing patients in recovery or intensive care areas and Independently conducting both minor and major procedures under anaesthesia (GA/RA) for ASA grade I or II patients (excluding expected difficult airway cases and cases with expected major body fluid shift)

The third (final) year of training will be devoted to management of most complex cases available at the institute under the supervision of a faculty member. The residents will be trained to exercise independent judgment, to take responsibility while caring for such patients, and to take part in research projects under the supervision of a faculty member. The student should be able to plan and administer anaesthesia to all patients under graded supervision including patients for Cardiac, Neurosurgery, Pediatric surgery and for all major surgery of subspeciality branches. The aim at the end is to be competent and independent soon after the third year of residency in providing anaesthesia to elective and emergency cases belonging to all specialities. The resident should be able to manage critically ill patients and treat intractable pain. They should also know how to organize mass casualty.

B. THESIS -

- The aim of thesis should be to make the student able to demonstrate capability in research by planning and conducting systematic scientific inquiry & data analysis and deriving conclusion.
- Thesis protocol should be submitted at the end of six months after admission in the course to the Research Committee of the Institute. The protocol must be presented in the department of Anaesthesiology before being forwarded. The research committee appointed by the Dean/Principal to scrutinize in references to its feasibility, statistical validity, ethical aspects, etc would approve the Protocol.
- Protocol in essence should consist of:
  - **a)** Introduction and objectives of the research project.
  - **b)** Brief review of literature.
  - **c)** Suggested materials and methods, and (scheme of work)

d) Statistician should be consulted at the time of selection of groups, number of cases and method of study. He should also be consulted during the study.

e) Bibliography

- Chief guide for thesis will be from the department of Anaesthesiology and co-guide(s), if needed, will be from the department of Anaesthesiology or from other disciplines related to the thesis.
- The thesis shall relate to the candidate's own work on a specific research problem or a series of clinical case studies in accordance with the approved plan.
- The thesis shall be written in English, printed or typed on white A4 size bond paper bearing the matter on one side of paper only and bound with cloth/rexine, with the title, author's name and the name of the College printed on the front cover.
- The thesis shall contain: Introduction, review of literature, material and methods, observations, discussions, conclusion and summary and reference as per index medicus.
- Each candidate shall submit to the Dean four copies of thesis, through their respective Heads of the Departments, not later than six months prior to the date of commencement of theory examination in the subject

C. ACTIVITIES – Participation by way of attendance / presentation in Didactic lectures, Symposia, Seminars, Group discussions, Workshops, Morbidity & Mortality meet, Panel Discussion etc. **Each Student should have actively participated in at least 6 academic sessions per year** during the total training period of three years (total 18).

D. LOG BOOK MAINTENANCE of all the clinical and academic work done by the student in his/her tenure of three years.

Minimum Procedures/Cases required to be done and entered in the log book

Regional Block	
Spinal	= 30 to do
Epidural	= 30 to do
Combined Spinal Epidural	= 20 to do
Caudal	= 10 to do
Bier Block (IVRA)	= 5 to do
Sciatic/Femoral	= 5 + 5 (to observe or do)
Ankle Block	= 5 (to observe or do)
Stellate Ganglion Block	= 3 (to observe or do)
Brachial Plexus	= 5 to observe & 10 to do
Sympathetic Block	= 3 (to observe or do)
Trigger Point injection	= 3 (observe)
Other peripheral N. Block	= 3 to do
Ophthalmic Blocks	= 5 (to observe)
Field Block	= 3 (to observe or to do)
Anaesthesia for:	
General Surgery	= 50 (to do)
Gynecology	= 50 (to do)
Obstetrics	= 20 (to do)
ENT	= 20 (to do)
Orthopedics	= 20 (to do)
Ophthalmology	= 5 (to do)
Plastic Surgery	= 5 (to do)
Endoscopy / Laparoscopy	= 5 (to do)
Urology	= 5 (to do)

Open Heart	= 5 (to observe)
Closed Heart	= 5 (to observe)
Pediatric Surgery	= 5 (to observe)
Craniotomy	= 5 (to observe)
Spinal Surgery	= 5 (to observe)
Joint Replacement	= 5 (to observe)
Anesthesia for organ transplant	= 5 (to observe - desirable)
ECT	= 10 (to do)
Radiology / CT Scan	= 5 (to do) Anaesthesia/sedation
Procedures	
Internal Jugular Cannulation	= 5 + 5 (to observe or do)
External Jugular Cannulation	= 5 to do
Subclavian Vein Cannulation	= 5 + 5 (to observe or do)
Peripheral Central Line	= 15 to do
Arterial Line Cannulation	= 10 to do
Endotracheal Intubation	= 250 to do
LMA insertion	= 30 to do
Difficult Airway Management	= 5 to do
Conduct of Cases	
ASA I	= 300 to do
ASA II	= 200 to do
ASA III	= 50 (to observe)
ASA IV	= 30 (to observe)
Labour Analgesia	= 5 (to observe or do)

ASSESSMENT (*As per Direction No. 01/2008 dtd. 26/05/2008)*

Recommended Reading

I. Books

S.No	Name	Authors / Editors	Year of publication	Last Edition	Publication House
1	Lee's Synopsis of Anaesthesia	G.B.Cashman, N.J.H Davies	2006	13th	Butterworth-Heinemenn
2	Wylie & Churchill Davidson's – A practice of Anaesthesia	Thomas E. Healy Paul R. Knight	2003	7th	Arnold
3	Anaesthesia	Miller Ronald D.	2005	6th	Elsevier Churchill Livingstone
4	Yao and Artusio's Anesthesiology	Fun-Sun F.Yao	2003	5th	Lippincott Williams & Wilkins
5	Anesthesia and Co-existing Disease	R. K. Stoelting S.F. Dierdorf	2002	4th	Churchil Livingstone
6	Anesthesia and Uncommon Disease	Fleisher	2005	5th	Saunders Elsevier
7	Clinical Anaesthesiology	G.E.Morgan M.S.Mikhail	2005	4th	McGraw-Hill
8	Understanding Anaesthesia Equipment	Jerry A. Dorsch Susan E. Dorsch	1998	4th	Williams & Witkins

9	Wards Anaesthesia Equipments	Davey	2005	5th	Baillirro Tindall
10	Anatomy for Anaesthetists	Harold Ellis Stanley Fieldman	2005	8th	Blackwell Science
11	Pharmac. & Physiology in Anaesthetic Practice	R. K Stoelting S.C.Hillier	2006	4th	Lippincott-Raven
12	Shnider and Levinson's Anesthesia for Obstetrics	Hughes Levinsons Rosen	2002	4th	Lippincott Williams & Wilkins
13	Paediatric Anaesthesia	Gregory	2005	4th	Churchil Livingstone
14	Cardiac Anesthesia	Kaplan	2005	4th	W. B. Saunders & Co.
15	Thoracic Anesthesia	Kaplan	2003	3rd	Churchil Livingstone
16	Clinical Application of Mechanical Ventilation	David W. Chang	2001	2nd	Delmar-Thomas Learning

II. "Recent Advances in Anaesthesia and Analgesia" Last two Editions: Mosby Publications

III <u>Journals</u>

1. Indian Journal of Anaesthesia	5. Anaesthesia
2. Journal of Anaesthesiology and Clinical Pharmacology	6. British Journal of Anaesthesia
3. Indian Journal of Critical Care Medicine	7. Anesthesia & Analgesia
4. Anesthesiology Clinics of North America	8. Anesthesiology

Addition of Ultrasonography in curriculum of Anaesthesiology.

(12)

ULTRASONOGRAPHY SYLLABUS

[For MD/ DA Anaesthesiology Curriculum]

The following **'Ultrasonography Syllabus'** shall be included in the learning & training programme of MD & DA courses (Postgraduate degree & Postgraduate Diploma course) in Anaesthesiology.

'Ultrasonography syllabus' learning &practical training shall be completed by postgraduate students [during their three years course of MD in anaesthesiology] of MD anaesthesiology. The students shall be posted for ultrasonography training as follows:

a) 2nd term of first year = 10days posting
b) 2nd term of second year =10days posting
c) 1st term of third year =10days posting

'Ultrasonography syllabus' learning & practical training shall be completed by postgraduate students [during their two years course of DA in anaesthesiology] of DA anaesthesiology. The students shall be posted for ultrasonography training as follows:

a) 2nd term of first year = 15days posting
b) 1st term of second year =15days posting

The necessary skills of ultrasonography shall be acquired by the MD & DA students before appearing for final university theory & practical examinations of Maharashtra University of health sciences, Nashik.

The Head of the department shall prepare the time table/ posting of MD & DA postgraduate students by rotation in the Radio-diagnosis department of their respective Medical Colleges.

As per the syllabus & in relation to anaesthesiology practical skills, the basic applied & practical trainingof Ultrasonography &Doppler shall be conducted by the faculty of Radio-diagnosis department of the respective Medical Colleges.

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KNOWLEDGE TO BE ACQUIRED BY MD & DA P.G. STUDENTS

1. **Ultrasound Physics- Image generation** = [2Theory Lecture]
   a) Ultrasound waves
   b) Piezoelectric effect
   c) A B M modes
   d) Principle of Doppler
2. **Equipment** = [1 Theory Lecture]

a) Probe selection; b) Knobology; c) Depth , Gain, MB, Needle guide etc d) Image storing & archiving

3. **Sono-anatomy of common arteries, veins and nerves** = [2 Theory Lecture]
   a) Applied sono-anatomy of Brachial Plexus, Lumbarplexus& Sacral plexus
   b) Applied sono-anatomy of thoracic, lumbar, PV areas.
   c) Ability to interpret 3D anatomy from 2D cross sectional image.
   d) Applied sono-anatomy Neck for central venous canulation of IJV, subclavian vein
   e) Applied sono-anatomy of abdomen- spleen, liver & kidney, IVC, Aorta & Portal vein. [For assessment of soft organ injury in trauma cases]
4. **Skills to be attained**

i) Image acquisition
ii) Ability to effectively apply "PART" maneuver- pressure, alignment, rotation & tilting
iii) Performance, patient, monitor- ergonomics.

2. Needling (Get the needle on the target)

i) In plane & out of plane concepts.
ii) Ability to use needle visualization preset.
iv) Ability to get the target, needle tip visualization.

5. **Teaching & Learning Methods**

- Lectures to cover up the basic principles & sono-anatomy
- Practical demonstration in the operating room
- Phantom training for needling.

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6. **Attitude and Behavior**

- Provides explanations of regional anaesthesia techniques in a way that patients can understand.
- Understand the patient anxieties about regional techniques, especially the stress of undergoing surgery while conscious.
- Recognizes the need for communication with staff about use of regional block
- Handles patient gently during performance of regional block.
- Meticulous attention to safety and sterility during performance of regional blocks.
- Enlist help/ advice from other professionals when appropriate.

7. **Workplace & training objectives**

- Trainees should take appropriate opportunities to use regional anaesthesia in patients undergoing a range of operations in specialties' such as orthopedics, gynecology, urology and plastic surgery I order to demonstrate their attainment of the listed requirements
- Lectures to cover up the basic principles and sono-anatomy.
- Practical demonstration the operation room
- Phantom training for needling

8. **USG guided central venous cannulations**

- Internal Jugular Vein; Subclavian Vein; Femoral vein

9. **Cleaning & Disinfection**

a) Knowledge about the cleaning solutions & its implication

10. PCPNDT act Rules & regulation & guidelines

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Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

P.G. CURRICULUM IN THE SUBJECT OF ANATOMY

A. Goal: To prepare the postgraduate student to become an exemplary teacher and a research scientist par excellence. To achieve this goal, the postgraduate student in Anatomy should be given an overall exposure to the subject, teaching methodologies and a sound grounding in research technologies.

B. Learning objectives: To achieve this goal, the following objectives must be fulfilled.

I. Cognitive domain: At the end of three years of postgraduate training the student should be able to

1. Describe the gross anatomy of the human body and correlate the knowledge of structure and function.
2. Describe the microanatomy including cytology of various structures of the human body and compare the knowledge of microstructure with function and interpret it accordingly.
3. Interpret the anatomical basis of symptoms and signs of clinical conditions, diagnostic procedures and treatment modalities.
4. Describe the developmental aspects of human body and interpret the developmental basis of various congenital anomalies.
5. Describe the neuroanatomy in its entirety and interpret the neuroanatomical basis of various clinical conditions.
6. Explain various aspects of genetics and describe genetic basis of disorders and principles of genetics counseling.
7. Explain and interpret radiological anatomy and sectional anatomy of the human body as studied by various imaging techniques.
8. Comprehend surface and living anatomy of the human body.
9. Relate forensic anatomy to the study with medicolegal aspects of bone in particular.
10. Explain the general principles of Anatomy Act and Transplant of Human Organ Act.
11. Explain the process of embalming.
12. Comprehend ethical aspects of biomedical research.
13. Comprehend the basis of disposal of biomedical waste.
14. Comprehend horizontal integration of various subdivisions of anatomy with relevant physiology and biochemistry.

II. Psychomotor domain: At the end of the training, the student should be able to

1 Dissect and demonstrate various parts of adult human body

2. Demonstrate surface landmarks and living anatomy pertaining to mucle power, testing of nerves and palpating vessels.

3. Dissect and demonstrate various parts of a fetus .

4. Prepare tissue blocks ,perform H&E staining and is able to explain the principles of the following special stains -silver nitrate, periodic acid Schiff, osmic acid, Masson trichome, Verhoeff and Orcein stains .

5. Prepare and deliver lectures on various topics of human anatomy using audio-visual aids.

6. Operate computers so as to prepare documents, tables, charts and projection slides.

7. Identify research topics; carry out research and prepare a dissertation on a topic.
8. Present paper / poster in conferences.
9. Set undergraduate theory question paper, evaluate students and able to compute results including internal assessment marks.

III. Affective domain: At the end training the students should be able to

1. Co-operate with and react and respond in a cordial manner in his /her interaction with peers, superiors and subordinates.
2. Project a cheerful persona to the students.
3. Inspire the students to reach greater heights.
4. Arouse an element of curiosity and wonder in the minds of students.
5. Maintain a log book (Appendix - I).
6. Develop a healthy personality and a liking and respect for the subject.

C. COURSE DESCRIPTION

I. Eligibility: As per the guidelines of Medical Council of India and affiliated university.

II. Duration: 3 years

III. Desirable qualities: The student should have an aptitude for teaching and reasonable command over spoken and written English language

IV. Details of Training: **T**he P.G. student would be a resident in the department for 3 years. The time-plan and the proposed division of curriculum will be on the following lines.

1. FIRST YEAR OF RESIDENCY

a. ***Orientation programme***- Institutional and departmental orientation including duties and responsibilities of a postgraduate student.

b. ***Time Management*** - should be conducted within 3-6 month.

c. ***Stress Management***- should be conducted within 3-6 months.

d. **Gross anatomy**: Dissection of one whole human body and study of gross anatomy and acquisition of embalming skills.

e. **Microanatomy**: Basic techniques in tissue processing, preparation of blocks, microtome sections and H & E and principles of the following special stains -silver nitrate, periodic acid Schiff, osmic acid, Masson's trichome, Verhoeff and Orcein stains.

f. To attend all undergraduate lectures held in the department of Anatomy and all the lectures organized by the university by various PG teachers at different colleges.

g. To present the topic for dissertation and the research design in front of a dissertation committee comprising of all senior and PG teachers in the department within first six months of registration. Thereafter periodic assessment of the progress of the dissertation (every 6 monthly) will be done by the concerned PG teacher and if required, by the dissertation committee.

h. Get trained to use computer for teaching and use the internet

i. Scan Anatomy journals and periodicals.

j. **OPTIONAL yet DESIRABLE**: To attend all the orations/ seminars/ workshops held for the subject in the city colleges, attend general orations held in the institution and attend regional /national conferences.

k. **TEACHING**

i. 70 hours of small group teaching with at least l/3 of these under supervision by a senior teacher.
ii. **Microteaching sessions** are mandatory before small group teaching for each and every session.
iii. Should be exposed to evaluation techniques
iv. Exposure to Medical Education Technology Workshops
v. Presentation in Journal club.
vi. Presentation in Seminars and symposia.
vii. Should complete gross and microanatomy journals.

l. **RESEARCH**

i. Basic techniques like review of literature for a given topic and collection of data.
ii. Exposure to computer for various applications.

2. II YEAR OF RESIDENCY

a. SPECIAL POSTING

Interaction with other pre, para and clinical specialties so as to prime the mind of the P.G. students in Anatomy to the growing needs of application of anatomical knowledge to other branches of medicine .This will be achieved through **horizontal and vertical integration**.

Posting

i. Horizontal Integration

(Selected topics should be taken as PG lectures by the concerned departments.)

Physiology and Biochemistry

ii. Vertical integration (Lectures to be arranged by the various departments for PG students)

Radiology, Surgery, Orthopaedics, Medicine, Obs &Gynac, Genetic Laboratory Pathology, Microbiology& Forensic.

(Posting in pathology - to gain knowledge about Frozen-sections, use of cryostat. special immunohistochemical techniques and immunological techniques and morbid and medicolegal anatomy from postmortem.)

During vacation.

b. RESEARCH

Starting the work on thesis by the beginning of second year of residency with the aim to complete the data collection & analysis by the end of second year.

c. TEACHING

i. From middle of IInd year, the P.G. students in Anatomy should be capable of giving lectures for the entire batch of students.
ii. Start teaching Embryology and Genetics in small groups after microteaching Sessions.
iii. Should be conversant with the use of various audiovisual aids

d. Presentation in Journal Club

e. Presentation in Seminars / Symposia at the departmental and institutional level

f. FETAL DISSECTION: Should have dissected at least one fetus

3. III YEAR OF RESIDENCY

a. RESEARCH

i. Completion of Dissertation
ii. Presentation of paper in conference (optional but desirable)
iii. Writing articles for publication

b. TEACHING

i. Full fledged lectures, lecture-demonstration, small group teaching
ii. Seminars / Symposia
iii. Journal Club

c. DISSECTION - Exercise in window-dissection of various regions.

V. SYLLABUS

1. Postgraduate curriculum shall include the entire undergraduate curriculum as spelt out below (Appendix III) with modifications as under:
Levels 1 & 2 of U.G. curriculum will become Level 1 of P.G curriculum.
Levels 3 of U.G curriculum will become Level 2 of P.G. Curriculum
Levels.3 of P.G. Curriculum will include current trend and recent advances in the Concerned topic and historical aspects.

2. Additional topics to be covered

a. History of anatomy
b. Embalming techniques
c. Microanatomy
   i. Principles and types of Electron microscopy: TEM, SEM
   ii. Identification of various cell organelles and their EM appearance

a. Embryology: Stem Cell.
b. Genetics : a)Exposure to various DNA technologies, including cell culture, Karyotyping, Polymerase Chain Reaction (PCR) and Fluorescent-in-Situ-Hybridization (FISH)
c. Neuroanatomy: Limbic system and Reticular Systems - Details
d. Clinical Anatomy: Application of anatomical knowledge to explain the anatomical basis of various clinical symptoms and signs, diagnostic procedures and treatment modalities
e. imaging Modalities
   i. Radiology
   ii. Ultrasonography (USG): - Principles of USG, Orientation of anatomical organs, in various USG plates. Structures as seen in 2-D echocardiography axes used and orientation of heart in various axes in 2-D echocardiography.
   iii. PET scan: Principles.

f. Forensic Anatomy: Estimation of age and sex
   i. With reference to bones including ossification
   ii. With reference to radiology pictures
g. Cross-sectional Anatomy and its correlation to C.T. scan images and MRI images
h. Comparative Vertebrate Anatomy: Basic outline
l. Anthropology: Basic principles and anthropometry

D. EVALUATION

I. FORMATIVE: Internal assessment based on

1. Teaching: to be evaluated based on a given proforma (Appendix II)
2. Dissection
3. Log Book
4. Journals-Microanatomy and Gross anatomy
5. Examinations

a. Theory:

i. At the end of first year, two papers on general anatomy, gross anatomy, and microanatomy of the

* Upper half of the body: Head (without neuroanatomy), neck, upper limb, thorax and general anatomy.

** Lower half of the body: Diaphragm (Thoracoabdominal), abodomen, lower limb and general microantomy.

ii. At the end of second year, two papers on

* Embryology and Genetics (Including a. i. **).

** Neuroanatomy and applied anatomy (Including a. i. *)

30% of the paper will be constituted by multiple choice questions of the following types: Single best response, multiple true false, multiple completion and assertion reason.

iii. At the end of third year, preliminary examination as per the university examination

b. Practicals and viva

i. At the end of first year,

* Prepare a tissue block, stain and discuss. 10 microanatomy spots.

** Window dissection and viva on Osteology and soft parts.

ii. At the end of second year

* Viva on embryology models (Including b. i. *)

** Viva on brain (Including a. i. **)

iii. At the end of third year, preliminary examination as per the university examination.

II. SUMMATIVE

1. By points system – The following point scale should be strictly adhered to Points in fractions should not be assigned.

Point System	Remarks
0(Zero)	Very poor
1(one)	Poor
2(Two)	Below Average
3(Three)	Average
4(Four)	Good
5(Five)	Very Good
6(Six)	Outstanding

a. Theory: 4 papers (***As per Direction No. 01/2008 dtd. 26/05/2008 & practical scheme is as per revised practical marksheet.)***

E. LIST OF RECOMMENDED BOOKS

I. Textbooks:

1. Cunningham's Manual of Practical Anatomy - Latest editions of volumes I, II, III
2. Regional & Applied Anatomy - R. J. Last
3. Clinical Anatomy for Medical Students - Richard Snell
4. Synopsis of Surgical Anatomy - McGregor
5. Functional Histology - Wheater, Burkit,
6. Langman's Medical Embryology
7. Embryology by Keith Moore
8. Clinical Neuroanatomy – Snell
9. The Human Nervous System - Murray Barr, John Kieman
10. Genetics by Emery
11. Human Genetics - S.D. Gangane
12. Essential of Human Genetics by Bhatnagar, Kothari and Mehta
13. Cross-sectional anatomy by Bo, Meehan and Kruger
14. Principles of General anatomy by A. K. Dutta
15. Comparative anatomy A.S. Romer.

II. Reference Books:

1. Gray's Anatomy
2. Clinical Anatomy _ NMS Series
3. Anatomy for Surgeons - Henry Hollinshead
4. Surgical Anatomy - Harold Ellis
5. Bailey's Textbook of Microscopic Anatomy
6. Embryology - Boyd & Mossman
7. Clinically oriented anatomy _ Keith Moore
8. Atlas of Human Histology – Di fiore
9. Tissues of the Human Body by Le Gros Clerk
10. Genetics by Thompson and Thompson
11. History of Anatomy - Charles Singer
12. History of Anatomy Indian Medicine - Kutumbiah
13. Dorlands Medical Dictionary

III. Journals:

1. Journal of Clinical Anatomy
2. Surgical & Radiological Anatomy
3. Journal of Anatomy
4. Development Dynamics
5. Anatomical Record
6. Journal of Anatomical Society of India

Appendix I (LOG BOOK)- Not yet FINALIZED

Log book details

Sr.No.	Date	Time	Topic /Activity	Teacher	Remarks and sign of PG teacher

*Topic – Topic of lecture/Demonstration attended
Topic of Lecture/Demonstration taught

*Activity- Dissection – Part

- Microanatomy- Practical
- Special posting- Department

** Fortnightly submission of the logbook to the concerned PG teacher and signature obtained

Appendix II

Direction- Please tick the statement, which most closely corresponds to your observation.

Name of the teacher : _____

Topic : _____

Date : _____

SrNo	Skill		Teacher Action	Yes	To some extent	No
1	Set Induction	a)	Aroused interest at the beginning			
		b)	Specified objectives of presentation			
2	Planning	a)	Organised material in a logical sequence			
		b)	Used relevant content matter			
3	Presentation	a)	Fluency in language			
		b)	Used non verbal cues, eye contact etc			
4	Interaction	a)	Allowed questions from students			
		b)	Asked Questions			
		c)	Rewarded pupil effort			
		d)	Clarified doubts			
5	Use of A V aids	a)	Used proper A V aids			
		b)	Used the aid effectively			
6	Summarization	a)	Summarized the important points at the end			
		b)	Checked that all the students understood the Points			
		c)	Lesson on the whole was effective			
7	Any suggestions for the speaker to improve the Teaching/earning exercise					

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

Syllabus / Curriculum for

MD (General Medicine)

GOAL

A postgraduate in a general medicine is expected to diagnose and treat common medical illnesses and have a sufficient knowledge of rare diseases, advances and technologies in medicine. He should be able to manage medical emergencies and carry out research and undergraduate medical teaching.

OBJECTIVES: To achieve the goal following objectives must be fulfilled:

A) COGNITIVE DOMAIN:

1. Proper history, examination and diagnosis.
2. Relevant investigations, their interpretation with reasonable accuracy.
3. Appropriate treatment and early disposal.
4. Prompt diagnosis and management of emergencies.
5. Update knowledge
6. Teach and guide undergraduate (MBBS) students.
7. Carry out research and publication.

B) PSYCHOMOTOR DOMAIN:

1. To perform diagnostic/ therapeutic procedures like central venous line insertion, lumbar puncture, pleural/ pericardial/ ascites tapping, bone marrow aspiration, liver/ kidney/ pleural biopsy, and interventions such as mechanical ventilation, tube thoracostomy, cardiopulmonary resuscitation, temporary pacing etc.
2. To be familiar with complication of procedures and be equipped in their management.

C) AFFECTIVE DOMAIN:

1. Ethical principles during work
2. Seek and give consultation when required.
3. Sympathetic behavior with patients and their relatives.
4. Respects patients' rights and privileges.
5. Supplement information about their illness.
6. Consider seeking second opinion when requested by patients.
7. Develop communication skills to interact with colleagues, senior and paramedical staff.
8. To realize that patient management is a team work.

COURSE DESCRIPTION

Duration: 3 years Residency program

SCOPE OF TRAINING

Diseases related to general medicine, relevant radiology techniques, emergency and intensive care management, maintaining records, use of computers and basic research. Patient care in the settings of outdoor, day care, indoor, emergency and intensive/ critical care.

COURSE CONTENTS

I) Knowledge a) Applied basic science knowledge
b) Diseases with reference to General Medicine **(appendix -1)**
c) Recent advances
d) Biostatistics and clinical epidemiology

2) Skills:- a) Decision making
b) Diagnostic investigation and procedures
c) Monitoring seriously ill patients
d) Counseling patients and relatives
e) Ability to teach undergraduate students
f) Ability to carry out research

TEACHING & LEARNING ACTIVITIES

a) Ward/OPD patient management
b) Long and short topic presentations
c) Ward rounds, case presentations and discussions
d) Clinico-radiological and clinico-pathological conferences
e) Journal conferences
f) PG Case presentation clinics
f) Research review
g) In-house and guest lectures
h) Conferences, symposia, seminars and CMEs
i) Participations in workshops, updates, conferences
j) Teaching undergraduates
k) Use and maintenance of biomedical equipments

STRUCTURED TRAINING PROGRAMME

(Broadly conceived):

1) First Year Residency:
   a) Outpatients/inpatients care
   b) Managing medical emergencies
   c) Learning diagnostic/ therapeutic procedures and interventions
   d) Interpreting Reports
   e) Starting Dissertation
   g) Use of computers in medicine

2) Second Year Residency:
   a) Outpatients/inpatients care
   b) Rotation (six months to one year) in existing allied specialities such as Cardiology, Neurology, Endocrinology, Hematology, Nephrology and MICU.
   c) Conducting medical procedures independently.
   d) Continuation of dissertation work.

3) Third Year Residency:-
   a) Out-patients and in-patients care
   b) Independent management of emergencies
   c) Teaching junior Residents / under-graduate students enrolled in the subject
   c) Finalisation and submission of dissertation.

DISSERTATION

- The topic should be assigned to the student by the end of 6th month of enrollment.
- The topic should be communicated to the MUHS through Head of Department and Head of Institution by 7th month of enrollment.
- The duration of the study shall be upto 17 months.
- The last date of submission of the completed dissertation to the MUHS should be six months prior to the date of commencement of the degree examination.

EVALUATIONS

Regular evaluation of the postgraduate will be carried out by assessment of postgraduate activity like case presentation, seminars etc. **(appendix-2)** and evaluation at the end of each clinical posting including superspeciality postings**. (appendix- 3).** The overall performance has to be to the satisfaction of the HOD for recommendation of candidature for MD examinations.

RECOMMENDED READING

Books.-

- Harrison's Principles of Medicine
- Oxford Textbook of Medicine
- Cecil Textbook of Medicine

Reference Books:

- API Text Book of Medicine
- Wintrobe's Hematology
- Kelly's Textbook of Rheumatology
- Patten's Neurology
- Brain's Neurology
- Crofton and Douglas Respiratory Medicine
- Hepatology by Sheila Sherlock
- Electrocardiography by Shamroth
- Braunwauld's Cardiology

Journals:

- Lancet
- British Medical Journal
- Chest
- ICMR Bulletin
- WHO Bulletin
- New England Journal of medicine
- Journal of Association of Physicians of India
- Journal of Postgraduate Medicine
- Annals of Internal Medicine
- APICON Medicine Update
- Medical Clinics of North America
- Indian Practitioner
- Journal of Applied Medicine
- Journal of General Medicine

UNIVERSITY EXAMINATIONS : (*As per Direction No. 01/2008 dtd. 26/05/2008)*

Appendix-1

Diseases in General Medicine

HAEMATOLOGY

I. Red cell disorders

Approach to a patient with anemia, nutritional, iron deficiency, aplastic, megaloblastic, haemolytic anemia, (special emphasis on thalassemia & sickle cell anemia), hereditary spherocytosis, anemia of chronic disease, autoimmune hemolytic anemia, paroxysmal nocturnal hemoglobinuina, myelodysplastic syndromes, iron overload, and sideroblastic anaemias.

II. White cell disorders

Eosinophilia, febrile neutropenia, approach to a patient with splenomegaly & lymphadenopathy, lymphomas, multiple myeloma & related plasma cell disorders, leukemias , hairy cell leukemia.

III. Bleeding & coagulation disorders

Approach and investigations in patients with bleeding disorders, hemophilia, von willebrand's disease, immune thrombocytopenic purpura, vascular purpuras, henoch-schonlein purpura, thrombotic thrombocytopenic purpura, disseminated intravascular coagulation, anticoagulant and anti-platelet therapy.

IV. Miscellaneous

Approach to a patient with thrombosis, blood groups, transfusion related diseases, blood transfusion reactions, blood component therapy, hematological manifestations of systemic diseases, drug induced hematological disorders, hypersplenism, chemotherapy, bone narrow transplantation, thrombophilias, platelet function disorders, estimation of hemoglobin/ total and differential white cell count/ erythrocyte sedimentation rate, preparation and staining of blood smears.

ENDOCRINE

I. Disorders of glucose metabolism

Glucose metabolism, physiology of insulin & glucagon secretion, glucose tolerance test, diabetes mellitus, insulin preparations, hypoglycemia, glycosuria of causes other than diabetes mellitus, glucagon secreting tumors.

II. Thyroid gland & its disorders

Iodine metabolism, anatomy & physiology of thyroid gland, thyroid function tests, goiter, hypothyroidism and hyperthyroidism, myxedema, cretinism, thyroid carcinoma, other rare syndromes of thyroid dysfunction.

III. Disorders of anterior pituitary

Anatomy & physiology of various hormones & their regulation, acromegaly, gigantism, sheehan's syndrome.

IV. Disorders of posterior pituitary
Anatomy and physiology, diabetes insipidus, syndrome of inappropriate anti-diuretic hormone (SIADH) secretion, obesity.

V. Disorders of adrenal cortex
Regulation of secretion of glucocorticoids, mineralocorticoids & adrenal sex hormones, adrenal insufficiency, Cushing's syndrome, pheochromocytoma.

VI. Miscellaneous
Dwarfism, Frohlich's syndrome, Lawrence Moon Biedel syndrome, anorexia nervosa & bulimia, hypothalmus in health & disease, Conn's disease, gynaecomastia, non-puerperal galactorrhoea, multiple endocrine neoplasia syndromes, hirsutism, adreno-genital syndromes, disorders of sexual differentiation.

CARDIO–VASCULAR SYSTEM

ECG & it's interpretation, diagnosis of arrhythmias & their management, ischaemic heart disease, hypertension, rheumatic fever & rheumatic heart disease, congenital heart diseases, heart failure, pericardial diseases, peripheral vascular diseases, deep vein thrombosis, cardiomyopathies, principles of echocardiography & abnormalities in common disorders, pacemakers, nuclear medicine in cardio-vascular disorders, tumors of the heart, aneurysm & dissection of the aorta, thoracic outlet syndrome, cardiac catheterisation, cardiac interventions.

RESPIRATORY SYSTEM

Approach to a patient of respiratory system involvement, pulmonary function tests, arterial blood gases, bronchoscopy, imaging studies, pulmonary angiography, therapeutic interventions: pulmonary artery embolisation/ video assisted thoracic surgery/ thoracotomy/ mediastinoscopy, diseases of the upper airway including avian influenza, bronchial asthma, occupational lung diseases, pneumoconioses, organic dusts & environmental carcinogens, pneumonia, bronchiectasis, obstructive airways diseases, interstitial lung diseases, diseases of the pleura: effusion/ pneumothorax/ empyema/ haemothorax, air pollution, respiratory failure, adult respiratory distress syndrome, severe acute respiratory syndrome (SARS), mechanical ventilation, mediastinal diseases, infections including tuberculosis, tumors, primary and metastatic carcinomas, hypersensitivity pneumonitis, eosinophilic pneumonias, pulmonary hypertension, sleep apnea, pulmonary thromboembolism, lung transplant.

NERVOUS SYSTEM

Investigations: lumbar puncture/ cerebrospinal fluid examination/ electroencephalography/ evoked potentials/ nerve conduction studies/ electro-myography/ imaging studies/ angiography, migraine, seizures/ epilepsy, cerebrovascular diseases, sub-arachnoid haemorrhage, dementia, extra pyramidal disorders, Parkinson's disease, motor neurone disease, disorders of cranial nerves, meniers syndrome, benign positional vertigo, diseases of the spinal cord, cranio-vertebral anomalies, tumors of the nervous system, demyelinating diseases, meningitis, infections of nervous system, nutritional and metabolic disorders, central pontine myelinolysis, Wernicke's encephalopathy, alcoholic cerebral degeneration, pellagra, subacute combined degeneration, polyneuropathies, acute and chronic inflammatory demyelinating polyneuropathies, diabetic neuropathies,

mononeuritis multiplex, mononeuropathy, leprosy, neuromuscular junction disorders including myasthenia gravis, myopathies (hereditary/ endocrine/ metabolic/ thyroid diseases/ parathyroid diseases/ diabetes mellitis), periodic paralysis, approach to a patient paralysis, dizziness & vertigo, diplopia, syncope and transient loss of consciousness, involuntary movements, delerium, ataxia, parasthesias & sensory loss, unconsciousness, bowel & bladder abnormalities, progressive supranuclear palsy, dystonia, spinocerebeller ataxia, drug induced movement disorders, inherited ataxia, traumatic injuries, subdural & epidural hematoma, radiation & chemotherapy in treatment of nervous system tumours, subdural empyema, progressive multifocal leucoencephalopathy, subacute sclerosing pan encephalitis, progressive rubella, panencephalitis, kuru, molecular treatment of neurological disorders, disorders of the autonomic nervous system, details of traumatic injuries to skull & spine, hereditary & metabolic disorders of late onset, mitochondrial myopathies, lipid storage disorders.

INFECTIOUS DISEASES

Sepsis syndromes, pyrexia of unknown origin, infective endocarditis, acute infectious diarrhoeal diseases & food poisoning, infections of the urinary tract, infections of skin/ muscle/ soft tissues, infections in intravenous drug abusers, hospital acquired infections, infection control in hospital, bacterial infections, specific infections: pneumococcal/ staphyloccal/ tetanus/ streptococcal/ diphtheria/ botulism/ gas gangrene/ meningococcal/ gonococcal/ salmonella/ shigella/ vibrio cholera/ brucella/ plague/ syphilis/ mycobacteria/ leptospira/ mycoplasma/ pseudomonas/ helicobacter pylori, viruses: herpes/ varicella/ ebstein barr virus/ cytomegalo virus/ rabies/ respiratory viruses/ influenza/ measles/ mumps/ rubella/ arboviruses, fungal: candidiasis/ aspergillosis/ mucormycosis, parasites: ameobiasis/ giardiasis/ pneumocystis carinii/ malaria/ leishnianiasis/ cryptosporidium/ microspondium/ isospora/ filariasis/ neurocysticerosis/ worm infestations, tropical diseases, pancreatitis, osteomyelitis, infections due to bites/ scratches/ burns, tularemia, pertussis, bartonellosis, arenaviruses, moraxella, legionella, nocardia, actinomycetes, borellia, chlamydiae, rickettsia, newer emerging infections: avian influenza, chikungunya, others.

HIV/AIDS: Aetiology & pathogenesis, clinical presentations, modes of transmission, universal precautions, opportunistic infections, management and treatment of the disease, opportunistic infections, complications, anti-retroviral therapy, prophylaxis: post exposure and of opportunistic infections, recent advances, historical record.

HEPATO-BILIARY SYSTEM

Liver function tests, jaundice, hepatitis, cirrhosis of liver, portal hypertension, hepatic encephalopathy, hematemesis, amoebic hepatitis, granulomatous hepatitis, hydatid cyst, primary and metastic carcinomas, liver transplant, gall bladder diseases: cholelithiasis/ cholecystitis/ diseases of bile-duct/ cholangiocarcinoma.

GASTROINTESTENAL TRACT

Peptic ulcer disease, gastrointestinal bleeding, gastritis, endoscopy, radiological procedures, infections, inflammatory bowel disease, functional gut disorders, motility disorders, malabsorption syndromes, pancreatitis, cystic fibrosis, malignancy.

KIDNEY

Renal failure, renal replacement therapies, hematuria, proteinuria, polyuria, oliguria, anuria, contrast nephropathy, urinary tract infections, glomerulonephritis, nephrotic syndromes, tubulo-interstitial diseases, kidney in systemic diseases, tumours of the urinary tract, renal calculous disease, barter's syndrome, fabry's disease, malignancy.

GERIATRIC MEDICINE

Theories of ageing, demographic patterns (world / Asia / India) and their significance to health care system, physiological changes in the elderly, diseases in elderly, pharmaco-therapy in the elderly, rehabilitation, physiotherapy, occupational therapy, psychotherapy, legal aspects (elderly abuse), psychiatric illnesses in elderly population, geriatric assessment, geriatric emergencies.

GRANULOMATOUS DISEASES

Tuberculosis, leprosy, syphilis, sarcoidosis, Wegener's granulomatosis, histoplasmosis, coccidoidomycosis, mucocutaneous leishmeniasis, midline granuloma, lymphomatous granuloma, pseudotumor of the orbit.

ETHICAL & LEGAL ISSUES IN MEDICINE

Importance and procedures of informed consent, emergency & life saving intervention & treatment, information to be given to patient & relatives, rights of patients including confidentiality, withdrawing life support systems, organ transplant from cadaver, euthanasia, consumers protection act, clinical decisions for a patient who lacks decision of signing of will, ethics committee & its role in medical research, procedures (medico legal) followed in cases of poisoning, suspected rape, adverse reaction to drugs and interventions, absconded patients, in-hospital injuries and suicide, treatment of pregnant patients with drug and interventions likely to cause fetal harm, cloning, stem cells usage and preservation, crimes performed by addicts.

POISONINGS

Diagnosis and management of specific and unknown poisonings, universal & specific antidotes, acids and alkalis, kerosene, petroleum products, organophosphates and carbamates, household disinfectants, mosquito repellants, aluminium phosphide, zinc phosphide, yellow phosphorus, heavy metals, paracetamol, barbiturates, snake and scorpion bites, botulism, drug over-dosages, international classification of poisonous chemicals, environmental hazards and poisonings, industrial toxicology, toxidromes, nuclear, biological, chemical warfare.

PREGNANCY MEDICINE

Maternal & foetal physiology, principles of maternal morbidity & fetal outcome, medical disorders during pregnancy, infections in pregnancy, metabolic disorders, hyponatremia, thyroid disorder, hypertension and eclampsia, renal failure, disseminated intravascular coagulation, diabetes, valvular heart disease, bronchial asthma, cardiomyopathies,

jaundice, HIV/AIDS, hypercoagulable state and its sequelae and complications, cortical venous sinus thrombosis in pregnancy, post partum sepsis, aminotic fluid embolisation, Epilepsy, drugs in pregnancy, poisonings in pregnancy, smoking, alcoholism, surgery and pregnancy, psychiatric diseases in pregnancy, medical disorders and infertility, genetic disorders & genetic counseling, ethical issues in pregnancy (brain death).

RADIOLOGY

Roengenograms of chest/ abdomen/ spine/ skull/ paranasal sinuses/ bones and joints, computerized tomography (CT) and magnetic resonance (MR) imagings, angiography, digital substraction angiography, imaging techniques for hepatobiliary system, barium studies, intravenous urography, scintigraphy, radionuclide imaging of kidney/ bone/ heart/ liver/ lung/ gall bladder/ thyroid/ parathyroid/ whole body, echocardiography, ventriculography, positron emission tomography (PET) scan, lymphangiography, cardiac catheterization, ultrasound, color doppler, developing and newer imaging techniques.

DISORDERS BONE & MINERAL METABOLISM

Calcium and phosphorous homeostasis, parathroid gland disorders, vitamin-D in health & disease, metabolic bone disease, osteoprosis, osteomalacia, endocrine hormonal influences on bone metabolism, phosphorus metabolism, hypophosphatemia, hyperphosphatemia, disorders of magnesium metabolism, Pãget's disease of bone, osteomyelitis, bone dysplasias, osteoarthritis, spondylosis, bone in systemic diseases.

IMMUNOLOGY

Normal immune system and its functions, hypersensitivity reactions, T-cell mediated diseases, mechanism of tissue damage, cytokine mediated injury, cytokine inhibitors, interaction of T and B cells, complement system, apoptosis, immunotherapy, immuno-modulators, immunosuppressive agents, monoclonal antibodies, stem cell transplant in immune disorders, HLA system, primary immune deficiency diseases, amyloidosis, disorders of immediate type hypersensitivity, biological response modifiers, immunologically mediated skin disorders.

RHEUMATOLOGY

Pathophysiology of inflammation, autoantibody revelance in disease processes, rheumatoid arthritis including extra-articular manifestations, glucocorticoid therapy in connective tissue diseases, systemic lupus erythematosis (SLE), organ targeted therapy, vasculitides, ankylosing spondylitis, reactive arthritis, undifferentiated spondyloarthropathy, polyarteritis nodosa, Wegener's granulomatosis, Churg Strauss disease, Takayasu's arteritis, cutaneous vasculitis, imaging techniques in systemic vasculitis, approach to acute and chronic monoarthritis & polyarthritis, diagnostic imaging in joint disease, crystal arthropathies, gout, infectious arthritis, infections in patients with connective tissue diseases, anti-phospholipid antibody syndrome (APLA), drug induced rheumatic diseases, scleroderma, sarcoidosis, fibromyalgias, haemophilic arthropathy, dermatomyositis, polymyositis, overlap syndromes, sjogrens syndrome, calcium oxalate deposition disease, psoriatic arthritis, neuropathic joint disease, osteo-arthritis.

FLUID& ELECTROLYTE

Choice of intravenous fluids, plasma expanders, potassium/ calcium/ sodium/ magnesium/ phosphate disorders, acid base balance and disorders.

CRITICAL CARE

Cardio-pulmonary resuscitation, non-invasive and invasive cardiovascular monitoring, circulatory failure, heart failure, acute myocardial infarction, pulmonary embolism, respiratory failure, pulmonary aspiration, nosocomial pneumonia, mechanical ventilation, toxicology, renal failure, status epilepticus, Guillian Barre syndrome, myaesthenia, use of blood products, intravenous immunoglobulins, plasmapheresis, hyperthermia, hypothermia, diabetic ketoacidosis, addisonian crisis, myxedema coma, endotrachial intubation, pacemakers, strokes, subarachnoid haemorrhage, near-drowning, circulatory and ventilatory support in adult respiratory distress syndrome (ARDS), asthma, obstructive airways disease, renal replacement therapy.

EMERGENCY MEDICINE

Basic and advanced life support, disaster management, use and maintenance of equipment used in life support, acute sever asthma, status epilepticus, poisonings, heart failure, shock, acute myocardial infarction, angina, arrhythmias, hypertensive emergencies, medical emergencies in pregnancy, gastro-intestinal bleeding, hepatic encephalopathy, acute gastroenteritis, hemoptyses, obstructive airways disease, tension pneumothorax, adult respiratory distress syndrome (ARDS), respiratory failure, cor-pulmonale, stroke, sub-arachnoid haemorrhage, oliguria/ anuria, coma, pneumonia, meningitis, infections, sepsis syndromes, multi-organ failure, bleeding manifestations, endocrine emergencies, electric shock, poisonings, snakebite, scorpion stings, anaphylaxis, nuclear/ biological/ chemical exposures, toxidromes, rabies, burns, strangulation, interventions and procedures: mechanical ventilation/ temporary cardiac pacing/ invasive monitoring/ needle and tube thoracostomy/ cricothyrotomy.

Appendix -2

PG - ACTIVITY ASSESSMENT SHEET

Student's Name……. Date……..

PG – CLINIC (Case presentation)

a. History & Examination
b. Investigations
c. Diagnosis & Clinical co-relation
d. Management
e. Questions & Answers

CLINICAL SEMINAR (Case discussion)
a. Case details
b. Discussion (content, update references, etc)

c. Presentation (Clarity, time, language, etc)
d. Audio-visual aides
e. Questions & Answers

SEMINAR (Problem/ syndrome based discussion)
a. Content
b. Update with references
c. Presentation (Clarity, time, language. etc)
d. Audio-visual aides
e. Questions & Answers

Appendix 3

CLINICAL WORK EVALUATION SHEET

For posting under one Unit (including super-specialty postings)
Student's Name ……. Posting period. ……to …….

Points for Assessment:
1. Punctuality and discipline
2. Quality of Ward-work
3. Maintenance of Case-Records
4. Presentation of cases in Rounds
5. Investigation Work-up
6. Bedside manners
7. Rapport with the patients
8. Rapport with Colleagues
9. Undergraduate Teaching (if applicable)
10. Counseling patient's relatives

Name of the Unit head Signature
Dated

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

Department of Pediatrics

Curriculum

For

Post-graduate Degree Course
M.D. (Pediatric Medicine)

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1. Goal

The Goal of M.D. (Pediatrics) Program is to provide training in Pediatrics and Neonatology to produce competent specialists who are able to provide basic and speciality care of the highest order to neonates, infants, children and adolescents at the community level and at primary, secondary and tertiary levels of health care, and to act as future trainers, teachers, and researchers in the field of Pediatrics and Neonatology.

2. Course Description

MD (Pediatrics)

Duration: 3 years

Eligibility: MBBS

3. Intramural and Extramural Rotation

MD (Pediatrics):

- At least 4 and not more that 8 months in Neonatology.
- At least 3 and not more than 6 months in sub-speciality areas: Intensive Pediatric Care Unit (IPCU), Genetic Clinic, Thalassemia Care Centre, Emergency Pediatric Services.
- At least nil and maximum 6 months in Allied areas: Hematology, Infectious Diseases, Dermatology, Cardiology, Nephrology, Chest Medicine, Gastroenterology.

The Department of Pediatrics will decide the posting of students in Neonatology and Allied Branches and Sub- speciality areas.

4. Syllabus

I) Basic Sciences and Laboratory Medicine as applied to Pediatrics and Childhood Diseases.

II) Clinical Epidemiology

III) Ethics in Pediatrics and Child Care

IV) Computers in Pediatrics

V) Pediatric and Neonatal Therapeutics

- Effects of physical and physiological changes on the pharmacokinetics of commonly used medications in Pediatrics.
- Recognition of drugs that are contraindicated, and used with extreme caution in specific pediatric populations.
- Effects of maternal therapy on the fetus and the neonate.
- Secretion of drugs in the breast-milk.
- Patient education and parent education for appropriate drug dosing, formulations and administration techniques.

VI) Preventive Pediatrics

- National Health programs relevant to Pediatrics and Child Care.
- Epidemiology of common health problems and diseases.
- Vital statistics: Maternal Mortality Rate, Perinatal Mortality Rate, Neonatal Mortality Rate, Under-5 mortality Rate: Definitions, National Status, Determinants, Interventions aimed at reduction of the rates.
- National Immunization Programs and policies.
- Other vaccines not included in national immunization program.

VII) Social Pediatrics

- Child labour, Child abuse, Child neglect, Failure to thrive, Social issues relevant to Pediatrics.
- Media and children
- Children at special risk
- Adoption
- Environmental health hazards.

VIII) Psychological Behavioral manifestations disorders

- Identification and assessment of Psychological and behavioral disorders.
- Intervention and management strategies for Psychological and behavioral disorders.

IX) Growth and Development

- Normal pattern and factors affecting growth and development. Recognition of normal variants of growth and development.
- Developmental assessment in infancy and childhood.
- Physiological changes during adolescence and problems facing adolescents.
- Assessment of growth.
- Deviations from normal patterns of growth and development: Recognition, Prevention, Early intervention and Management.
- Tools for assessment of growth and development at various ages including Indian adaptations.

X) Nutrition

- Understanding of energy balance in humans.
- Basic biochemistry of proteins, carbohydrates and fats.
- Proximate Principles, Vitamins, Minerals and Micronutrients: Biochemistry, Physiological Functions, Daily Requirements, Manifestations and Management of deficiency and excess states.
- Normal requirement of protein, fat, carbohydrate for newborns, children, adolescents and pregnant and lactating women.
- Nutritional values of common Indian foods.
- Breastfeeding and lactation management
- Infant feeding and weaning foods.
- Balanced diet.
- Assessment of nutritional status.
- Nutritional disorders-Etiology, Clinical features, patho-physiology, pathogenesis and management
- Pathological features of various nutritional disorders.
- Planning of diet during illness.
- Total parental nutrition.

XI) Fluids and Electrolytes

Pathophysiology of body fluids, fluid therapy, electrolytes, acid-base balance, parenteral and enteral fluid therapy

XII) Emergency pediatric services

- Pediatric resuscitation
- Evaluation of critically ill child.
- Pediatric Emergencies and poisoning.
- Pediatric injuries and injury control and accidents.
- Insect, animal and snakebites.
- Planning and management of pediatric intensive care unit
- Anesthesia, perioperative care and pain management.
- Principles of drug therapy.

XIII) Genetics

- Principles and molecular basis of genetic disorders.
- Clinical features and management of genetic and chromosomal disorders.
- Prenatal diagnostic techniques and neonatal screening tests.
- Effects of teratogenic agents.
- Genetic counseling.
- Gene therapy.

XIV) Metabolic diseases

Metabolic diseases of protein (amino acids), carbohydrates, fats, mucopolysaccharides, purines, pyrimidines, heme and others

XV) Neonatology: The fetus and neonatal infant

- High-risk pregnancy
- Assessment of fetal growth, wellbeing and maturity.
- Fetal distress: Manifestation, identification and management
- Maternal diseases and their effects on the fetus and newborn.
- Assessment of fetal wellbeing.
- Identification and management of various fetal diseases.
- High-risk infant – identification and management.

- Delivery room emergencies, resuscitation of newborn and care of normal new born.
- Birth injuries.
- Adaptation of newborn.
- Examination of newborn and assessment of maturity.
- Etiology, clinical features, pathophysiology, pathogenesis and management of various diseases of newborn.
- Neonatal transport.
- Neonatal procedures.
- Developmental assessment, and early intervention programmes for infants at high risk for developmental delay.
- Care of newborn in the community.
- Planning and organization of level I, level II, Level III Neonatal care centers.

XVI) Infectious diseases

- Clinical features, management of viral, bacterial, fungal, spirochetal, rickettsial, parasitic, protozoal and other infections.
- Prevention and management of nosocomial infections.
- Infection control and preventive measures.
- Immunization against infections diseases.
- Fever
- Laboratory techniques for diagnosis of infections diseases.
- Infections in immunocompromized host.
- Clinical syndromes caused by various infections agents.

XVII) Immunological system and its disorders

- Components of immune system and their functions.
- Disorders of immune system – Etiology, Clinical features, pathophysiology, pathogenesis and management.
- Pharmacotherapy.
- Transplantation medicine.
- Allergic diseases – etiology, clinical features, patho-physiology, pathogenesis and management.
- Relevant diagnostic and therapeutic modalities in various immunological and allergic disorders.

XVIII) Rheumatic diseases and connective tissue disorder of childhood.

Etiology, pathogenesis, manifestation, laboratory diagnosis and management of Rheumatic diseases in childhood and adolescents

XIX) Respiratory system

- Development of respiratory system, congenital anomalies.
- Physiology of respiration and mechanics of ventilation.
- Etiology, clinical features, pathophysiology, pathogenesis and management of various respiratory diseases.
- Pathological features of various respiratory diseases.
- Relevant diagnostic and therapeutic modalities in respiratory diseases in children.
- Pharmacotherapy of respiratory diseases.

XX) Cardiovascular system

- Embryology of heart and vascular system.
- Adaptations of cardiovascular system at and after birth.
- Etiology, pathophysiology, pathogenesis, clinical features and management of congenital and acquired heart and vascular diseases and rheumatic heart disease.
- Rheumatic fever – Epidemiology, clinical features, pathophysiology, pathogenesis, prevention and management.
- Relevant diagnostic and therapeutic modalities in heart diseases in children.
- Congestive cardiac failure – Etiology, pathophysiology, pathogenesis, clinical features and management.
- Pharmacotherapy of cardiovascular diseases.

XXI) Gastrointestinal tract

- Development of gastrointestinal tract, hepatobiliary system and their abnormalities.
- Physiology of digestion.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various gastrointestinal and hepatobiliary and other abdominal diseases.
- Pathological features of gastrointestinal, hepatobiliary and pancreatic disorders.
- Surgical emergencies in gastrointestinal tract diseases.

XXII) Hematology and Neoplastic diseases

- Physiology of erythropoiesis, leukopoiesis and physiology of hemostasis.
- Etiology, pathophysiology, pathogenesis, clinical features and management of hematological and oncological diseases.
- Laboratory diagnosis and other relevant diagnostic and therapeutic modalities in hematological and oncological disorders.
- Pharmacotherapy of Hematological and Oncological Diseases.
- Component therapy in Pediatric Practice.

XXII) Nephrology and genitourinary tract

- Development and developmental anomalies of the kidneys and the genitourinary tract.
- Physiology of urine formation and metabolic functions of the kidney.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various disorders of the kidney and the genitourinary tract.
- Pathological features of diseases of the kidney and genitourinary tract.
- Relevant diagnostic and therapeutic modalities for diseases of the kidney and the genitourinary tract.
- Pharmacotherapy of renal and genitourinary disorders.
- Management of end stage renal disease.

XXIV) Central and peripheral Nervous System

- Development of the brain, spinal cord and peripheral nervous system and their anomalies.
- Neurological evaluation of newborns, infants and children.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various diseases affecting central nervous system and peripheral nervous system.
- Seizures in childhood.
- Neuromuscular diseases – etiology, clinical features, pathophysiology and management.

XXV) Endocrine system

- Synthesis, physiological functions and pharmacological actions of various hormones.
- Disorders of the endocrine glands.
- Pubertal development and its disorders.

XXVI) Congenital and acquired disorders of eye, ear, nose, throat, bones and joints.

XXVII) Miscellaneous diseases

- Unclassified diseases including SIDS, Sarcoidosis, Progeria histiocytosis, chronic fatigue syndrome.
- Metabolic bone diseases.
- Genetic skeletal dysplasias.

XXVII) Development of diagnostic approach for and interpretation of symptomatology and clinical signs in infants, children and adolescents.

XXVIII) Basics of Research Methodologies and Ethical aspects of Clinical Research

5. List of skills

1. Elicitation of history from parents, guardians, relatives and patients regarding complaints previous diseases and therapy, events around birth, prenatal period, growth and development, diet and immunization, socio-educational and economic background and other relevant aspects.
2. Conduct physical examination of well and sick newborn babies, infants, children, adolescents and adults.
3. Accurately measure length or height, weight, head circumference and plot the data on an appropriate chart.
4. Accurately measure mid-arm circumference of children aged 1-5 years.
5. Identify abnormal growth patterns.
6. Interpret data obtained by anthropometric measurement and developmental assessment.
7. Assess nutritional status and determine if the child is getting adequate nutrition.
8. Provide nutritional advice for newborn babies, infants, children and adolescents.
9. Provide advice regarding breast-feeding, weaning and balanced diet.
10. Provide advice regarding healthy & hygienic practices with a view to prevent diseases, disorders, injuries, accidents and poisoning.
11. Develop a diagnostic approach for clinical problems in newborns, infants, children and adolescents.
12. Discuss the characteristics of the patient and of the illness that must be considered when making the decision to manage the patient in the outpatient setting or admit to hospital.
13. Discuss the differential diagnosis of symptoms, signs and presentations in neonates, infants, children and adolescents.
14. Undertake relevant investigations for diagnostic and prognostic evaluation taking into consideration the risks, benefits and costs involved.
15. Convince parents and guardians regarding undertaking investigations and obtain their co-operation and valid legal consent.
16. Interpretation of laboratory Reports.

Counseling parents regarding the child's health status, health needs, illness & disabilities

17. Performance of Diagnostic & Therapeutic Procedures:

- Venepuncture (10)
- Intravenous access for administration of drugs and intravenous fluids (10)
- Administration of drugs via intra-dermal, intra-muscular or subcutaneous routes (5 each)
- Administration of drugs and fluids through intra-osseous route (2)
- Lumbar puncture to draw out cerebro-spinal fluid for examination (5)
- Sub-dural tap (2)
- Ventricular tap (1)
- Peritoneal (Ascitic) tap for diagnostic and therapeutic purposes (2)
- Pleural tap for diagnostic and therapeutic purposes (4)
- Collection of blood from an artery for arterial blood gas analysis (4)
- Obtaining Central IV Access (3)
- End tracheal Intubation in Newborn babies, Infants, Children & Adolescents (5)
- Cardiopulmonary Resuscitation (5)
- Supra-pubic tap for obtaining a urine sample (5)
- Administration of drugs via a nebulizer (5)
- Catheterization of the urinary Bladder (5)
- Liver Biopsy (4)
- Kidney Biopsy (2)
- Arterial Cannulation for monitoring of Blood Pressure (5)
- Peritoneal dialysis (2)
- Cannulation of the umbilical vessels (7)
- Exchange Transfusion (5)
- Bone Marrow aspiration (2)
- Bone Marrow Biopsy (2)
- Pericardiocentesis (2)
- Cardioversion (4)

(The numbers in the brackets indicate the minimum number of the procedure that a post-graduate student needs to observe/ assist/ perform/ supervise)

6. Teaching/Learning Activities and Opportunities

Inpatient management

Outpatient Management

Presentation of cases on Clinical Rounds

Topic presentation.

Case discussions.

Clinicopathological conferences.

Clinicoradiological conferences.

Biopsy Meetings.

Mortality Review Meetings

Journal Club

Guest Lectures

In-house lectures

Conferences,

Seminars.

CME sessions

Participation in Workshops

Presentation of Papers

Teaching Undergraduate students.

Teaching Postgraduate students & paramedical staff.

Use and Maintenance of biomedical equipments and gadgets

Counseling regarding performance of procedures, disease process and prognostication

Group discussions Sessions

Assisting in diagnostic and therapeutic procedures.

Performing diagnostic and therapeutic procedures.

Patient/Health education.

7. Research

All the postgraduate students will be exposed to Research Methodologies through their participation in the Journal Club.

A candidate registered for M.D. (Pediatrics) will be submitting a dissertation to the university. This will be a pre-requisite for appearing for the MD examination. The dissertation will be done under the guidance and full satisfaction of the post-graduate teacher under whom the candidate is registered.

8. Reference Books and Suggested Reading

(A) Books & Textbooks

(I) General Medicine & Pediatrics

- Nelson Textbook of Pediatrics (Behrman)
- Forfar Textbook of Pediatrics (Campbell).
- Rudolph's Pediatrics (Rudolph).
- Pediatric Medicine (Avery).
- Textbook of Pediatrics (Udani).
- Manual of Pediatric therapeutics (Graef).
- Manual of Neonatal Care (Cloherty)
- Common symptoms (Illingworth).
- Pediatric diagnosis (Green).
- Signs and symptoms in Pediatrics (Tunnessen).
- Harrison's Principles of Internal Medicine.
- Mcleod's clinical methods.
- IAP Textbook of Pediatrics
- Harriet Lane Handbook (Barone).
- Handbook of Pediatric Physical diagnosis (Barness)

(II) Super-speciality Reference Books

Neurology : Pediatric Neurology : Principles and Practice(Swaiman)
Clinical Pediatric Neurology :A Signs and symptoms approach (Fenichel)

Nephrology: Pediatric kidney diseases (Edelmann).
Pediatric Nephrology (Holliday).
Clinical Pediatric Nephrology (Kher & Makker).

Cardiology: Nada's Pediatric Cardiology (Fyker).
Heart Disease in Infants, children and Adolescents (Adams-Moss's).
Rheumatic fever (Markowitz).
Peroiff - Pediatric Cardiology for Practitioner's (Myung Park).
How to read Pediatric ECGs (Park).

Hematology: Clinical hematology in medical practice (de Gruchy's).
Blood diseases of infancy and childhood (Miller).
Nathan & Oski's Hematology of Infancy and childhood (Nathan).
Living with Thalassemia (Aggarwal)

Gastroenterology: Pediatric Gastroenterology (Sheila Sherlock)
Liver disorders in childhood (Mowat)
Paediatric Gastroenterology (Anderson).

Respiratory: Kendig's disorders of the respiratory tract in children (Chernick).

Infectious Diseases & Parasitology:
Poliomyelitis (Huckstep).
Tuberculosis in Children. (Miller)
Essentials of Tuberculosis in children. (Vimlesh Sheth)
Parasitology (Charterjee)
Textbook of Pediatric Infections diseases(Fegin & Cherry)

Growth & Development :
The Development of the Infant and Young Child – Normal & Abnormal (Illingworth)
The Normal Child (Illingworth).

Miscellaneous : Protein Energy Malnutrition
a) Alleyne,
b) Waterlow.
Essentials of Human Genetics (Kothari & Mehta)
Genetics in Medicine (Thomson & Thomson).
Birth Defects encyclopedia (Buyses).
Smith's Recognizable Patterns of Human Malformation (Jones).
Breastfeeding – A Guide for the medical profession (Lawrence)
Medical Embryology (Langman).
Frontiers in social Pediatrics (Patwari)
Medical emergencies in children (Singh)

Immunization : Immunization in Practice (Mittal)
Immunization update (Mittal)

(B) Journals in Pediatrics & Other Periodicals

Year Book of Pediatrics – Stockman III

Indian Pediatrics

Indian Journal of Pediatrics

Pediatrics Today.

Archives of Diseases in Childhood

Pediatrics

Journal of Pediatrics

Drugs.

State of the World's Children (UNICEF)

Perinatology Clinics of North America

Recent Advances in Pediatrics

Advances in Pediatrics

Recent Advances in Pediatrics – Suraj Gupte (Ed.)

(C) Sub-speciality Journals

Pediatric Nephrology

Pediatric Cardiology

Pediatric Neurology

Pediatric Radiology

Pediatric Neurosurgery

Journal of Infection

9. Evaluation Form

(A) Postgraduate Seminars

Name: Date:

Seminar Topic:

Evaluation Points:

1. Presentation:
2. Completeness of Preparation:
3. Cogency of presentation:
4. Use of audiovisual aids.
5. Understanding of subjects:
6. Ability to answer questions:
7. Time scheduling:
8. Consulted all relevant literature:
9. Overall performance.

Guidance for Scoring	**0**	**1**	**2**	**3**	**4**
	Poor	**Below average**	**Average**	**Above average**	**Very Good**

Faculty members:

1.

2.

3.

Mean Score:

Evaluation Form

(B) Case Presentation

Name: Date:
Case Title:

1. Logical order in presentation:
2. Cogency of presentation:
3. Complete /Relevant history:
4. Accuracy of General Physical Examination:

   All signs elicited correctly.
5. Accuracy of Systemic Examination:
6. Diagnosis – Logical flow based on History & findings:
7. Order of differential diagnosis (logical):
8. Investigations required:

   (Complete list, Relevant order, Interpretation of investigations, Unnecessarily investigations asked)
9. Treatment: Principles & details
10. Patient/Relatives communication

    (Diagnosis & Management
    Health education)

Overall:

1. Abilities to react to questioning:
2. Abilities to defend diagnosis:
3. Ability to justify differential diagnosis:
4. Acceptability of plan of management
5. Confidence

Score	**0**	**1**	**2**	**3**	**4**
	Poor	**Below average**	**Average**	**Above average**	**Very Good**

Faculty members:

1.

2.

3.

Mean Score:

Evaluation Sheet
(C) Journal Club

Name: Date:

Points for consideration: Score

1. Choice of article relevant:
2. Cogency of presentation:
3. Whether understood and conveyed the purpose of the article:
4. How did he defend article:
5. Whether cross references have seen consulted:
6. Understood explained basics of statistic in article:
7. Whether relevant information mentioned from other similar articles.
8. Use of audio visual aids:
9. Presentation:
10. Response to questioning:

Score	**0**	**1**	**2**	**3**	**4**
	Poor	**Below average**	**Average**	**Above average**	**Very Good**

Faculty members:

1.

2.

3.

Mean Score:

Evaluation Form

(D) Clinical Work

Name: Date:

Points to be considered:

1. Punctuality:
2. Regularity of attendance:
3. Quality of ward work (procedures):
4. Maintenance of case records:
5. Presentation of cases during rounds (approach):
6. Investigation work up:
7. Bedside manners:
8. Rapport with patients:
9. Rapport with colleagues:
10. Motivation for blood donation:
11. UG teaching (if applicable):
12. Counseling patient's relatives:
13. Management of emergencies:
14. Knowledge of Pediatrics as a subject:

Score	**0**	**1**	**2**	**3**	**4**
	Poor	**Below average**	**Average**	**Above average**	**Very Good**

Faculty members:

1.

2.

3.

Mean Score:

M.D. IN Pathology

CURRICULUM FOR POST GRADUATE COURSE IN PATHOLOGY

M.D. IN PATHOLOGY

GOAL :

The goal of postgraduate medical education shall be to produce competent specialist.

(i) Who shall recognize the health needs of the community and carry out professional obligation ethically and in keeping with the objectives of the national health policy;

(ii) Who shall have mastered most of the competencies, retaining to the speciality, that are required to be practiced at the secondary and tertiary levels of the healthcare delivery system.

(iii) Who shall be aware of contemporary advances and developments in the discipline concerned.

(iv) Who shall have acquired a spirit of scientific inquiry and oriented to the principles of research methodology and epidemiology ;and

(v) Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

OBJECTIVES :

At the end of the course a candidate must be able to

(i) Understand and explain about the factors in causation of disease.

(ii) Understand processes involved in the gross and microscopic changes of organs and tissues and explain these changes.

(iii) Understand and explain the basis of evolution of clinical signs and symptoms.

(iv) Should be able to perform procedures designated for laboratory detection of diseases. Should be able to process and accurately interpret the representative materials obtained from the patients in order to arrive at a correct diagnosis.

(v) Should be able to recognize and report morphological changes in cells, tissues and organs.

(vi) Should be able to plan, perform and report specific research projects.

(vii) Should be able to perform clinical autopsy and present CPC (Clinico Pathological Correlation)

METHODS OF TRAINING

Duration of course – 3 years.

1.On job training

- Histopathology including techniques and reporting
- Cytology including FNAC ,fluid cytology ,exfoliative cytology- techniques and reporting
- Haematology including blood banking and transfusion medicine- techniques and reporting
- Clinical pathology- techniques and reporting
- Museum techniques
- Autopsy techniques and interpretation
- Serology- techniques and reporting
- Handling of hazardous material
- Handling, maintenance and calibration of instruments used in laboratory
- Undergraduate teaching

2.P.G. Teaching sessions

- Journal review
- Subject seminar
- Grossing discussions for autopsies and surgical material
- Slide seminar including histopathology ,haematology, and cytopathology
- Clinical case- group discussion
- Interdepartmental seminars

Post graduate students should be encouraged to attend CME, Workshops, Conferences & present papers.

TEACHING /LEARNING CONTENT

A. THEORY

I BASIC SCIENCES

1. Anatomy/histology of all structures in human body/organs
2. Physiology and biochemistry-Basic aspects of various metabolism and functioning of endocrines
3. Genetics-Fundamental / applied aspects
4. Biostatistics
5. Biomedical ethics-ethical issues related to Medical practice and research

II PATHOLOGY

1. Historical aspects
2. General pathology
3. Systemic pathology
4. Haematology
5. Blood banking and Transfusion Medicine
6. Cytopathology
7. Clinical Pathology
8. Medical autopsy: Techniques and interpretation
9. Recent advances in all fields ,related to Pathology
10. Organization of laboratory including quality control

III CLINICAL BIOCHEMISTRY

Routine biochemical investigations and various organ function tests i.e. LFT ,RFT etc.

B. PRACTICAL

Proficiency of technological methods should include the following:

1. Fields in which high degree of professional competence and theorotical knowledge is expected:-

a) Gross pathology and histopathology
b) Haematology
c) Cytopathology
d) Clinical pathology and Blood banking

2. Fields in which student is expected to achieve reasonable working knowledge and skills to be able to run laboratory services independently

a) Clinical chemistry
b) Serology

3. Fields in which student is expected to achieve general acquaintance of techniques to understand and interpret data

a) Immunopathology
b) Histochemistry
c) Immunohistochemistry
d) Cytogenetics
e) Molecular biology
f) Medical statistics

POSTING SCHEDULE:

1) Histopathology and Autopsy	:-	15 months
2) Clinical pathology Haematology Cytopathology Blood Bank	:-	15 months
3) Biochemistry	: -	1 month
4) Serology	:-	15 days
5) Museum	:-	15 days
6) Revision in all sections	:-	4 months
TOTAL		36 months

RECOMMENDED MINIMUM TEXT BOOKS AND JOURNALS

BOOKS:

1 Cotran, Kumar, Collins. Robin's Pathologic Basis of Disease, published by W.B. Saunders & Company.

2.Ivan Damjanov, James Linder. Anderson's Pathology, published by C.V. Mosby Company.

3. J. B. Walter, M.S. Israel. General Pathology, published by Churchill Livingstone.

4. Emeritus W.ST. Symmers Systemic Pathology, published by Churchill Livingstone.

5. Juan Rosai, Ackerman's Surgical Pathology, published by C.V. Mosby Company.

6. Leopold G Koss, Diagnostic cytology and its histopathologic basis published by J.B. Lippincott Company.

7. Marluce Bibbo, Comprehensive cytopathology, published by W.B Saunders Company

8. Winnifred Grey, Diagnostic cytopathology, published by Churchill Livingstone

9. Orell, Sterrett- Walters and Whittaker, Fine Needle Aspiration Cytology (Manual & Atlas), published by Churchill Livingstone

10.Greer J.P, Foerster J,Jukens J et. al Wintrobe's Clinical Haematology, published by Lippincott Williams and Wilkins

11. Firkin F , Chesterman C, Penington D, de Gruchy's Clinical Haematology in Medical Practice, published by Blackwell Sciences

12. Henry J.B Clinical Diagnostics and Management by Laboratory Methods. published by W.B. Saunders & Company.

13. Lewis S.M, Bain D.J, Bates I, Dacie & Lewis Practical Haematology published by Churchill Livingstone.

14. Hoffbrand A.V, Catovsky D, Tuddenham G.D, Postgraduate Haematology – published by Blackwell publishing

15 R.Anantnarayan , C.K.Paniker, Textbook of Microbiology , published by Orient Longman.

16. Harshmohan ,Textbook of pathology , published by Jaypee.

17. Parasitology (Protozoology & Helminthology.) in relation to clinical medicine – K.D.Chatterjee – published by Chatterjee Medical Publication.

18. Sudha R.Kini ,Colour Atlas of differential diagnosis in exfoliative and aspiration cytopathology , published by Lippincott, Williams & Wilkins.
19. Praful B. Godkar ,Clinical Biochemistry – Principles & practice , published by Bhalani Publishing House, Bombay.
20. Theory & practice of Histological Techniques edited by John .D.Bancroft- published by Chruchill Livingstone.
21. Enzinger & Weiss, Soft Tissue Tumours, Published by B.I.Publications (India.) C.V.Mosby company.
22. Elder D.E, Lever's Histopathology of the skin – Published by J.B.Lippincott Company.
23. Novak & Woodruff Edited, Novak's Gyanaecologic and Obsteric Pathology, published by – Kiaku Shoin/Saunders.
24. Christopher D.M. Fletcher, Diagnostic Histopathology of Tumours Vol.1 & 2- published by Chruchill Livingstone.
25. Recent advances in Histopathology, Haematology, Blood coagulation etc.
26. AFIP, Atlas of tumour pathology.
27. Interpretation of Breast Biopsies - Carter
28. Day D.W, Jass J.R, Price A.B, Morson and Dawson's Gastrointestinal Patholgy, published by Blackwell publishing .
29. Ellison D, Love S, Chimelli L et. al, Neuropathology , published by Mosby
30. Epstein Prostate Biopsy Interpretation, published by Lippincott- Raven
31. Fogo A.B,Kashgarian M, Diagnostic Atlas of Renal Pathology, published by Elseiver Saunders
32. Foster C.R, Pathology of the Urinary Bladder, published by Saunders
33. Fox H, Wells M ,Haines & Taylor - Obstetric and Gynaecological Pathology, published by Chruchill Livingstone
34. Ioachim H.L,Lymphnode Pathology, published by Lippincott
35. Kilpatrick, Renner, Diagnostic Musculoskeletal Surgical Pathology, Clinicoradiologic & cytologic correlations,published by Saunders
36. Kurman R.J, Blaustein's pathology of the female genital tract, published by Springer
37. LeslieK.O,Wick M.R, Practical pulmonary pathology; a Diagnostic approach, published by Churchill Livingstone
38. MacSween, Butt, Portman et al,Pathology of the liver- published by Churchill

Livingstone
39. Mills S.E, Sternberg's diagnostic surgical pathology, published by Lippincott Williams and Wilkins
40. Montgomery E.A, Biopsy interpretation of the Gastrointestinal Tract Mucosa, published by Lippincott Williams and Wilkins
41. Odze R.D, Surgical pathology of the GI Tract, Liver, Biliary Tract and Pancreas, published by Saunders
42. Owen D, Pathology of the Gall Bladder , Biliary Tract, and Pancreas, published by Saunders
43. Pilch B.Z, Head and Neck surgical pathology, published by Lippincott Williams and Wilkins
44. Rosen P,Pathology of Breast, published by Lippincott Williams and Wilkins
45. Silverberg S.G, Atlas of Breast pathology, published by Saunders
46. Weedon ,Skin Pathology, published by Churchill Livingstone
47. Wickremsinghe, Blood and Bone marrow pathology, published by Churchill Livingstone
48. Atkinson B, Atlas of diagnostic pathology, published by Saunders
49. Cibas E.S, Cytology:Diagnostic principles and clinical correlates, published by Saunders
50. Geiinger, Modern cytopathology
51. Naib Z.M,Cytopathology, published by Little Brown and company
52. Meisels A, Morin C, Cytopathology of the uterine Cervix, published by ASCP Press
53.Miettinen M,Diagnostic soft tissue pathology, published by Churchill Livingstone
54. Chandler F.W,Pathologic diagnosis of fungal infection,published by ASCP Press
55. Collins R.D, Paediatric Haematopathology, published by Churchill Livingstone
56. Hoffman , Benz, Shattil,Haematology :Basic principles and practice,published by Churchill Livingstone
57. Naeim F, Atlas of bone marrow and blood pathology, published by W. B Saunders
58. Tkachuk D.C,Atlas of clinical haematology, published by Saunders
59. WHO Classification of tumours, published by IARC Press.
60. Mollison P.L, Blood transfusion in clinical medicine, published by Oxford, ELBS & Blackwell Scientific Publication
61. Chitale A, Pathology of urinary & male genital system for urologists, general surgeons & Pathologists published by B.I. Publications
62. Saran R.K., Transfusion medicine technical manual, published by WHO

JOURNALS:

1. British Journal of Haematology, published by Blackwell Sciences.
2. CANCER, International journal of American Cancer Society, published by John Wile & Sons Inc.
3. Journal of Clinical Pathology, published by B.M.J.
4. Haematology/Oncology Clinics of North America, published by W.B. Saunders & Company.
5. American Journal of Surgical Pathology, published by Lippincott & Raven
6. Indian Journal of Pathology & Microbiology, published by IAPM.
7. Indian Journal of Cancer, published by Indian Cancer Society.
8. Indian Journal of Cytology, published by IAC.
9. LANCET published by Elsevier
10. I.C.M.R. Bulletin, published by ICMR
11. Histopathology , journal of the British Division of the International Academy of Pathology-Published by Blackwell Science
12. Acta Cytologica,The Journal of Clinical Cytology and Cytopathology
13. Archives of Pathology and Laboratory Medicine-Published by American Medical Association
14. Human Pathology- Published by W.B. Saunders & Company.
15. American Journal of Clinical Pathology published by ASCP
16. Indian Journal of Cytology
17. WHO Bulletin published by WHO
18. Indian Journal of Urology
19. Modern Pathology
20. Indian journal of Leprosy published by Indian Leprosy Association
21. New England Journal of Medicine published by Massachusetts Medical Society

ADDITIONAL READINGS:

1. Compendium of recommendations of various committees on health and development (1943 to 1975) DGHS, 1985 Central Bureau of Health Intelligence, DGHS, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi-335.

2. National Health Policy, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi-335. 1983.
3. ICMR, Policy, Statement of ethical considerations involved in research on Human subjects, 1982 ICMR, New Delhi.
4. Code of Medical Ethics framed under Section- 33 of Indian Medical Council Act , 1956 . MCI, Kotla road, New Delhi.
5. Santosh Kumar,The elements of Research ,writing and editing 1994,Dept. of Urology,JIPMER,Pondicherry
6. Srinivas D.K et al ,Medical Education Principles and Practices,1995.National Teacher Training Centres, JIPMER, Pondicherry
7. Francis C.M Medical Ethics, J.P.Publication,Banglore 1993
8. Indian National Science Academy, Guidelines for care and use of animals in scientific research, New Delhi,1994
9. International Committee of Medical Journal Editors, Uniform Requirements for manuscripts submitted to biomedical journal. N. Engl J Med 1991;424-8
10. Kirkwood B.R. Essentials of Medical Statistics, 1st ed. Oxford Blackwell Scientific Publications 1988
11. Mahajan B.K.Methods in Biostatistics for medical students,5th ed New Delhi, Jaypee Brothers Medical Publishers,1989
12. Raveendran B. Gitanjali, A Practical Approach to PG dissertation, New Delhi.J.P Publications 1998.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

Student's Record Book

M.D (Pathology)

DEPARTMENT OF PATHOLOGY

Name of the Student :

Dr. _____

Name of the Institute & Address:

_____

_____

_____

ABOUT THE LOG BOOK:

The log book has been prepared to maintain a record of academic and service activities of postgraduates and to provide an account of progress made by him/her. Maintenance of such log books will also allow a review of training programme and incorporation of improvements in the programme.

Postgraduates are required to carry the log book and get the entries made regularly. Faculty is requested to countersign. Log books have to be submitted to the head of the department before submitting the final examination form.

PERSONAL BIO-DATA

Paste Passport size Photograph here

Name of the Student : _____

Date of joining : _____

Probable date of appearing for Examination : _____

Date of Birth : _____

M.B.B.S from : _____

Year of passing MBBS : _____

Name of the State Medical Council : _____

Registration No. with date : _____

Permanent Address : _____

_____ PIN- _____

Phone No. : (_____) _____

Local Guardian's Address : _____

_____

_____ PIN _____

Phone No. : (_____) _____

_____

POSTING SCHEDULE :

SECTION	MONTH & YEAR		REMARKS	SIGNATURE OF SECTION I/C
	From…	To…..		
Clinical Pathology				
Cytopathology				
Haematology				
Blood Banking				
Histopathology				
Autopsy				
Biochemistry				
Serology				
Museum				
Revision in all sections				

ATTENDANCE AT P.G. TEACHING SESSIONS:

Month & Year	No. of Teaching Programmes held	No. of Teaching Programmes attended	Remarks	Signature of P.G. Teaching I/C

PARTICIPATION IN P.G. TEACHING ACTIVITY

Subject Seminars presented:

Date	Topic	Remarks	Signature of faculty

Journal Articles presented:

Date	Topic	Remarks	Signature of faculty

Group discussion of clinical cases:

Date	Topic	Remarks	Signature of faculty

Slide Seminars presented/participated:

Date	Topic	Remarks	Signature of faculty

SCIENTIFIC CONTRIBUTIONS

CME/ Workshops attended :

SN	Name of CME/ Workshop	Held at	Dates

Conferences attended :

SN	Name of Conference	Paper presented Yes/No	If yes, title of paper

Publications:

1. _____

_____

2. _____

_____

Awards:

_____

CERTIFICATE

This is to certify that Dr…….

has completed the tenure for M.D. satisfactorily .

P.G.Teacher.	**P.G.Teaching Programme Incharge**	**Professor & Head. Department of pathology**

EVALUATION SYSTEM

A. DISSERTATION

a) Thesis / Dissertation is compulsory. Every candidate is required to carry out the work on a selected research project under the guidance of a recognized post graduate teacher. The results of such work shall be submitted in the form of a Dissertation.

b) The Dissertation is aimed at training the candidate in research methods and techniques. It includes identification of a problem , formulation of a hypothesis , search and review of relevant literature , getting acquaintance with recent advances, designing of research study , collection of data , critical analysis of results and drawing conclusions.

c) The title of the topic along with the plan of work not exceeding 500 words in prescribed proforma should be submitted to the University with the recommendation of guide through proper channel within a period of 3 months from the date of registration for the postgraduate course. There should not be an overlap of topic, cases, material or the related data among the candidates within the department during the period of actual Dissertation work. Prior approval by the local Ethical Committee is essential .

Unless communicated otherwise within a period of 2 months from the date of receipt of plan of work by University, it shall be assumed that topic of Dissertation is approved and no communication is necessary in this regard. The last date for submission will not be extended without prior permission from the University. In case of delay in submission of topic of Dissertation and plan of work , the period of training of the candidate will be proportionately extended for which the entire responsibility shall be upon the candidate .

d) The volume of the Dissertation should be reasonable and may vary depending on the topic. The bibliography should be as per Vancouver system.

e) Four copies of the Dissertation complete in all respect certified by the guide should be submitted to the University through proper channel 6 months before the final examinations to the registrar (evaluation)

f) The identity of the candidate/ teacher/ Department /College / Place should not be disclosed in the Dissertation .Acknowledgement should not be included in the Dissertation.

g) Certificates issued by guide, countersigned by Head of the Department and the Dean certifying therein that the work done by the candidate has been carried out under the supervision of the guide to his/her entire satisfaction, should be submitted separately to the University.

h) Dissertation approval is a prerequisite for appearing at the University exam. In case the Dissertation is not accepted, the same shall be communicated to the candidate along with reasons for rejection at least 2 months prior to the commencement of theory exam.

i) The candidate may make necessary corrections and resubmit the Dissertation at least 1 month prior to the commencement of theory exam.

B. LOG BOOK (Work diary)

The postgraduate students should include all their activites in the log book. The annual assessment based on the work diary shall be done by the guide, teacher in charge of postgraduate teaching programme and HOD.

C. UNIVERSITY EXAMINATION (*As per Direction No. 01/2008 dtd. 26/05/2008)*

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

OBJECTIVES OF CURRICULUM PLANNING

FOR PG DEGREE

OBJECTIVES

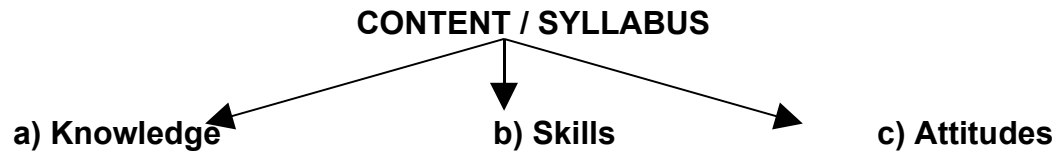
1) Therapeutic :
   a) To examine, diagnose and treat psychiatric disorders.
   b) Consultation – Liason psychiatry in general hospital.

2) Preventive and Promotive
   a) Prevention of relapses and complication of psychiatric disorders and addictive behaviour.
   b) Rehabitation of mentally ill patients.
   c) Promotion of mental health in the population in terms of improving mental well being & Quality of life.

3) To inculcate an empathic attitude that allows an integration of humanistic and Ethical approach in medicine.

4) To Apply Research Methodology in the field of psychiatry

5) To be aware of Knowledge of recent advance in psychiatry.



a) <u>KNOWLEDGE:</u>

1. BASIC SCIENCES AS APPLIED TO PSYCHIATRY

- NEUROANATOMY
  - Developmental
  - Central peripheral autonomic
  - Principles of Brain imaging

- NEUROPHYSIOLOGY
    - Normal sleep
    - Basic cell
    - Of thought ,cognition mood and Motor function
- NEUROCHEMISTRY
    - Neurotransmitters
    - In emotion, memory,behaviour
- Applied Neurophysiology., Neurochemistry., Neuroanatomy in relation to physical factors affecting psychiatric disorders.

PSYCHOLOGY

- Basic principles e.g. Learning, memory, motivation, emotion and stress etc.
- Applied psychology – behaviour science
- Sensory processes and perception
- Thinking and language
- Social perception, Influences and relationships
- Attitudes and beliefs
- Developmental psychology child development
- Personality structure
- Psychological assessment and testing (IQ and cognition)
- EEG
- Genetics

2. PSYCHIATRY, NEUROLOGY, NEUROPSYCHIATRY AND BEHAVIOURAL MEDICINE

PSYCHIATRY

- Introduction to mental health and psychiatric disorders
- History taking and clinical examination in psychiatry
- Classificatory systems.
- History of Psychiatry
- Schizophrenia and other psychotic disorders.
- Mood Disorders
- Anxiety and Somatoform and dissociative disorders
- Substance related disorders
- Sexual disorders
- Sleep disorders
- Eating disorders
- Psychiatric disorders due to General Medical Consumption including HIV
- Disaster and Psychiatry
- Special population in psychiatry
- Personality disorders
- Impulse control disorders
- Adjustment disorders
- Relational problems
- Psychiatric emergencies
- Deliberate self harm / Suicide

- Transcultural psychiatry
- Child and adolescent psychiatry
- Family psychiatry
- Geriatric psychiatry
- Community psychiatry in relation to India (NMHP)
- Forensic psychiatry (Mental Health Act)
- Ethics
- Human rights
- Rehabilitation.
- Psychosomatic disorders including stress
- Therapies
    a) Biological - ECT and Psychopharmacology
    b) Psychosocial interventions
    c) Psychotherapy
    d) Behaviour therapy
    e) Therapies based on Indian philosophy

NEUROLOGY, NEUROPSYCHIATRY

- Clinical history and CNS examination
- Head injuries
- Alcohol and substance
- Toxic & metabolic & endocrine Disorders
- Nutritional
- Dementias
- Delirium
- SOL

- Infections and inflammatory diseases including HIV
- Movement disorders
- Epilepsy
- CVA
- Investigations

MEDICINE AS RELATED TO PSYCHIATRY

Consultation liason psychiatry

Medicine and allied

Surgery and allied

Gynecology and Obstetrics and allied

b. **SKILLS**

- Communication skills
- History taking and interview
- Mental status evaluation & Physical Examination with neurological examination
- Diagnostic formulation and comprehensive plan of management
- Appraisal of Psychometry ie Intelligence , personality
- Handling emergencies and liaison services
- Psycho-education skills
- Ethical discharge of duties
- Tackling medico legal issues
- Psychotherapy and counseling
- Behavior Therapy
- Interpretation of EEG, C T, MRI
- Biological therapies including ECT & Psychopharmacology

c. ATTITUDES AND VALUES

- For professional and ethical conduct
- Humanistic and empathic relationship with patients, relatives and colleagues.

d. TEACHING LEARNING METHODS

Cognitive:

- Lectures
- Tutorials
- Seminars
- Symposium
- Didactic Small group teaching
- Workshop
- Self study
- Inter disciplinary conference
- Research forum

Skills:

- Demonstrations
- Case conference
- Research project
- Workshops
- Bedside clinics
- Journal review
- Psychotherapy and Behavior Therapy session

Attitude:

- Roll play
- Audio-visual
- Workshops
- Demonstration

EVALUTION: (*As per Direction No. 01/2008 dtd. 26/05/2008 & practical scheme is as per revised practical marksheet.)*

Dissertation /Thesis

- **Time spent should be one year**
- **Supervision**
- **Evaluation mandatory**

Log book of all the academic activities of students

- **Attitude:**
    - Structured evaluation and Scales
    - Group Discussion
    - Log Book
    - Clinical - patient relationship

RECOMMENDED BOOKS AND JOURNALS:

- Psychology - Morgan King
- Anatomy - Snelles
- Physiology – Guyton
- Symptoms in the mind – Sims
- Comprehensive Textbook of psychiatry – Kaplan
- Postgraduate psychiatry – Niraj Ahuja(Indian text book)
- Oxford Text book of Psychiatry
- Organic psychiatry – Lishmann
- Indian Journal of Psychiatry

SYLLABUS FOR M.D. (RADIO-DIAGNOSIS & IMAGING SCIENCES).

GOAL:- The broad goal of the teaching & training of Post-graduate student in Radio-Diagnosis is to
make them understand & implement the knowledge regarding the role of various imaging modalities,
helpful in the management of different clinical conditions. At the end of his/her training, he/she should be
capable to take up a career in teaching institution or in diagnostic center or in research..

OBJECTIVES :-

a) Knowledge:- At the end of the course the student shall be able to:
1) Explain the interaction of tile X-rays with mater to produce an image.
2) Fromiliarize with the principles of various imaging modalities (e.g. .US/CT/MRI) & their applications
in medicine.
3) Explain the biological hazards of ionizing radiation & protective measures.
4) Explain the normal Anatomy, Physiology of various organs and their deviation from normal) & its
consequences.
5} Summarize the fundamental aspects of embryology & alteration in development with reference to
congenital anomalies.
6) Select appropriate imaging modality for- study of specific condition.
7) Explain .the role of imaging, pre-operative, intra-operative & post-operative Conditions.
8) Evaluate role of imaging modalities in various therapeutic applications (lnterventional Radiology)
9) Update information about recent advances in imaging sciences.
10) Effectively organize & supervise the diagnostic proceduces to ensure quality control/assurances

b) Skills:-

At the end of the course the student shall be able to :
1) Make use of conventional & other imaging sciences to achieve definitive diagnosis.
2) Analyse & interpret imaging data.
3) Demonstrate the skills of solving Scientific & clinical problems & decision making.
4) Develop skills as a self:-directed learner recognize cointinuing educational needs, select & use
appropriate learning resources.
5) Demonstrate Comperence in basic concepts of research methodology & be able to critically aualyse
relevant literature.

c) Integration-

Knowledge acquired in Radio diagnosis shall help the students to integrate imaging techniques
with structure & function of the human body in health & disease.

M.D. (RADIODIAGNOSIS)

PAPER –I

Radiation Physics. Protective measures & Radiological procedures,
TOPICS

1) Radiations and production of X-rays
2) X-ray generators
3] Basic interactions between X-Rays and matter
4] Attenuation.
5] Filters and grids.
6] Luminescent screens.
7] Physical and Photographic characteristics of X-ray film & film processing
8] Computed tomography.
9] Ultrasound.
10] Radiation's hazards and protection.
11] Digital Radiography.
12] Nuclear magnetic resonance.
13] Magnetic resonance imaging.
14] Wet processing of films -Chemistry of Developer, fixer etc,
15] Dry processing – chemistry of films & its processing.
16] Radiological procedures(IVU, barium procedures, antegrade pyelography , fistulography, sialography, DCG)

PAPER- II

Radiological Imaging in congenital & systemic diseases- I

a. Respiratory system: Congenital anomalies, Pediatric chest, Chest wall, pleura, diaphragm, Mediastinum, Pulmonary infections, Airway obstruction, Pulmonary neoplasms, Diffuse pulmonary diseases.
b. Cardio-vascular system: Congenital heart Disease's, left-to-right shunts Cyanotic heart diseases,Acquired valvular heart diseases, Ischemic heart disease, Pulmonary circulation, cardiomyopathy, cardiac tumors, Pericardium, thoracic aorta.
c. Gastro Intestinal Tract: Oesophagus, Stomach, Duodenum, Small intestine large bowel, mesentry & omentum, Pediatric abdomen.
d. Hepato-biliary: Liver, Biliary tract, Pancreas.

PAPER-III

Radiological Imaging in congenital & systemic diseases-II

a. Skeletal system: Skeletal trauma benign lesions, malignant lesions, Myeloproliferative & similar disorders, metabolic and endocrine diseases, skeletal dysplasias and malformation syndromes,joint disease, bone and joint infection, radiology of soft tissues, musculo-skeletal system inchildren.
b. Genito-urinary system: Renal parenchymal diseases, Renal masses. Calculus disease and urinaryobstruction, urinary bladder and prostate, Reno-vascular

disorders, injuries, Renal failure andtransplantation, pediatric uroradiology Imaging in obstretics and gynecology, imaging of breast.

c. CNS: Skull, Intra-cranial tumors, Intra-cranial infections, Cerebro-vascular disease, cranial and intracranial malformatins trauma, CSF disturbances, degenerative diseases of spine infections of spine, spinal tumours.

PAPE R – IV

Miscellaneous, Interventional Radiology & Recent advances and Newer imaging.

a) Orbit , ENT, dental
b) Reticuloendothelial system
c) Interventional radiology:
    I. HSG & FTR
    II. 4 vessel angiography
    III. Biliary intervention(PTBD,PTC)
    IV. PCN
    V. Laser ablation of varicose veins
    VI. RFA/ chemoembolisation of hepatic tumour and malformations.
    VII. Vertebroplasty.
    VIII. Hemangioma and AVM management.

Syllabus for MD

A. RADIOLOGICAL PHYSICS & X-RAY TECHNOLOGY:

1. Radiation
2. Production of X -Rays
3. X- Ray Generators :
4. Basic Interaction between X- Rays and Matter
5. Attenuation
6. Filters
7. X- Ray beam restrictors
8. Physical characteristics of x- Ray films & film Processing
9. Photographic characteristics of X- Ray films
10. Fluroscopic imaging and image intensifier
11. Viewing & recording of the Fluroscopic Image
12. The Radiographic Image
13. Geometry of the Radiographic Image
14. Computed Tomography
15. Ultrasound
16. Digital Radiography
17. Nuclear Magnetic Resonance
18. Magnetic Resonance Imaging
19. Radiation hazards & Protection
20 Electric & Protection
21. Cine Angiography:
22. Atomic structure, Radioactive Isotopes & Gamma Camera
23. Positron Emission Tomography
24. Digital Subtraction Angiography
25. Catheters, guides wires, dilators, balloons & stents
26. Pictorial Achieving & Communicating System (PACS)
27. DICOM

B. DARK ROOM TECHNIQUES:

1. Intensifying screens /construction, types and advantages :
2. Rare earth intensifying screens :
3. Intensification factor :
4. Cassette: .construction & care
5. Factors affecting image details :
6. Factors affecting image contrast & density :
7. Grids : construction & types
8. Cones & collimeter :
9. X Ray films -construction, types & storage :

C. BASIC RADIOLOGY

I. IMAGING TECHNIQUIES AND MODALITIES

a) Department Organization: Digital Imaging and PACS:
   i. Digital imaging and PACS: Picture Reliving and Communication System
   ii. Digital Imaging and PACS: what should a radiologist expect from PACS
   iii. Digital Imaging and PACS: Image processing in Computed Radiography
b. Intravascular Contrast Media
c. Whole body Computed Tomography: Recent Advances
d. Magnetic Resonance Imaging Basic Principles
e. Ultrasound : general Principles
f. Radionuclide imaging
   i. Radionuclide imaging: General Principles
   ii. Radionuclide imaging: Pediatric Nuclear Medicine
g. Dual Energy X-ray Absorptiometry
h. Functional and Physiological Imaging
i. Medicolegal issues in Diagnostic Radiology
j. Radiation Protection and patient doses in diagnostic radiology

II. RESPIRATORY SYSTEM :

1.1 Techniques of Investigations

1.11 Standard Techniques
1.1.2 Tomography: a) Conventional film Tomography
b) Computed Tomography
1.1.3 Digital Radiography
1.1.4 Magnetic Resonance Imaging
1.1.5 Radionuclide Imaging a) Ventilation
b) Other thoracic scanning techniques
1.1.6 Ultrasound
1.1.7 Angiography
1.1.8 Lung Biopsy & Other Interventional Techniques.

1.2 Normal Chest:

1.2.1 The Lungs (Radiological Anatomy} & CT Terminology)
1.2.2 The Central Airways
1.2.3 The Lungs beyond Hila
1.2.4 The Hila
1.2.5 The Mediastinum :
a) CT & MRI
b) Plain film appearances
   i. The junctional lines :
   ii. The right Mediastinum above azygous vein
   iii. The left Mediastinum above Aortic arch
   iv. vi) The supra aortic Mediastinum on lateral view
   v. v) The right Middle Mediastinum border below azygous arch.
   vi. vi) The left cardiac border below aortic arch
   vii. vii) The para spinal lines
   viii. viii) The retrosternal line
1.2.6 The Diaphragm

1.3 The Chest Wall, Pleura & Diphragm

1.3.1 Chest Wall :

i) Soft tissue /Breasts

ii) Ribs /Sternum/Clavicle, Spine

1.3.2 The Pleura :

i) Normal Pleura

ii) Pleural Pathologies

1.3.3 The Diaphragm :

i) Height/ Eventration/Movements/Paralysis

ii) Hernias/Trauma/Neoplasm

1.4 The Mediastinum :

1.4.1 Techniques. .

1.4.2 Mediastinal Masses: i) Thyroid/ Para Thyroid Messes/Thymic tumors/Tymic hyperplasia/Teratoma/ Cermcell Tumor.

ii) Mediastinal lymphadenopthy

iii) Neurogenic Tumors

iv) Extra medullar heamatopes/Mesenchymal Iumors/ Hernarationof / Mediastinal lipomatosis/ Aneusyrum

1.4.3 Differential Diagnosis:

1.4.4 Other Mediastinal Lesions: i) Acute/ fibrosing Medlastinitis

1.5 Pulmonary Infections in Adults .

1.5.1 Pneumonia

1.5.2 Associated features and complications of pneumonia

1.5.3 Pulmonary tuberculosis

1.5.4 HIV & AIDS

1.6 Large Airway Obstruction :

1.6.1 Collapse: General features /Collapse of individual lobes / entire lung/ segmental collapse/

Rounded /obstructive collapse

1.6.2 Obstructive Pneumonities/ Bronchoscope/Broncheietasis

1.7 Pulmonary lobar Collapse essential considerations :

1.8 Chronic inflow Obstruction :

1.8.1 Asthama:

1.8.2 Choronic Bronchitis and Emphysema

1.8.3 Bronchiolitis

1.9 Pulmonary Neoplasms :

1 Bronchial Carcinomas

2 Benign Pulmonary Tumors

3 Malignant Lymphoma

4 Metastases

5 The solitary Pulmonary Nodule

2.0 Diffuse Pulmonary. Disease / Industrial Lung Disease / HRCT :

1 Pulmonary Oedema :

2 Diffuse pulmonary Haemorrhage

3 Inhalation of particulate matter

4 Diffuse pulmonary Fibrosis

5 Sarcoidosis / Collagen Vascular Disease *I* Systemic Vasculitidis *I* Lymphoid Disorders of Lungs / Pulmonary Eosinophilia *I* Drug induced Lung Disease

2.1 Chest Trauma :

2.2 Pulmonary Thromboembolism :

Imaging Chest Radiograph/ Radionuclide Study *I* Pulmonary Arteriography/ CT / MRI

2.3 .Post Operative & Critically ill Patients :

1 Cardiopulmonary Disease
2 Post Thoracotomy Radiograph
3 Support and Monitoring apparatus
4 Radiation Therapy

2.4 Chest Radiography after Lung Transplantation :

2.5 Congenital Pulmonary Anamolies :

1 Abnormal Development of Lung Bud
2 Abnormalities of separation of the lung had from the foregut
3 Abnormalities of Pulmonary Vasculature
4 Ectopic of Hamartomatous Development

2.6 The Infant and Young Child :

1 Pathologies of Diaphragm
2 Pleural Abnormalities
3 Inflammation
4 Airway Obstruction
5 Diffuse Lung Disease .
6 Respiratory Distress in Newborn Baby

2.7 Interventional Techniques in Thoracs:

1 Biopsy Procedures
2 Thoracic Drainage Procedure
3 Thoracic Sympathectomy
4 Therapeutic Embolisation
5 Dilatation & Stenting Techniques
6 Extraction Techniques.

III. THE HEART AND GREAT VESSELS

3.1 Cardiac Anatomy and Enlargement- :

3.1.1 Plain Radiography
3.1.2 Enlargement of various chambers on Plain Radiography

3.2 Magnetic Resonance of Heart and Circulation .

3.3 Congenital Heart Disease :

1 General Principles
2 Left to right shunts .
3 Central Sinuses
4 Other Congenital Heart Disease

3.4 Aquired Heart Disease: i) Non Rheumatic/ Rheumatic Mitral VD
ii) Tricuspid VD
iii) Aortic VD

3.5 Ischaemic Heart Disese : i) Coronary Atreriography
ii) Left Ventriculography
iii) Angina Pectoris
iv) Myocardial Infarction
v) Mechanical Complication of MI

3.6 Pumlonary Circulation : i) Anatomy and Physiology
ii) Pulmonary Vascularity in Heart Disease
iii) Pulmonary Arterial hypertension/ Its Imaging
iv) MR in Pulmonary Vascular Abnormalities .

3.7 Cadiomyopathy, Cardio Tumors, Trauma
3.8 The Imaging of Prosthetic Cardiac .Valves
3.9 The pericardium
3.10 Thoracic Aorta

IV .THE GASTROINTESTINAL TRACT:

The Esophagus
1 Anatomy .and Functions
2 Methods of Examination
3 Pathologies of Esophagus
4 Motility Disorders
5 Extrinsic lesions/ miscellaneous conditions

The stomach
1 Radiological anatomy and methods of examination
2 Inflammatory Diseases
3 Neoplastic Conditions
4 Radionuclide Studies in Stomach

The Duodenum
1 Anatomy and Normal Appearances
2 Methods of Radiological Examination
3 Peptic ulceration
4 Gastro heterotopia /diverticula
5 Neoplasms benign and malignant

The Small Intestine
1 Anatomy and normal appearances
2 Methods of radiological examination
3 Crohns disease/Coeliac Disease/Neoplasms/various conditions

The Large Bowel
1 Anatomy and Normal Appearances
2 Methods of Radiological Examination
3 Tumors
4 Diverticular Disease
5 Colitis
6 Aids
7 Miscellaneous Conditions

Peritoneum, Mesentery and Omentum
1 Peritoneal spaces and reflections
2 Abnormalities of Peritoneum
3 Abnormalities of Mesentry
4 Abnormalities of greater Omentum

Gastrointestinal Angiography.
1 General Consideration
2 Gastro intestinal bleeding

Interventional Radiology in Gastrointestinal tract

1 Introduction
2 Esophagus
.3 Stomach and Duodenum
4 Small Intestine
5 Colon and Rectum

Pediatric Gastrointestinal Radiology

1 The Neonate
2 The Infant and Older Child

V. Liver, Biliary tract, Pancreas, Endocrine System and Lymphoma

Liver

1 Normal and variant Anatomy
2 Liver Imaging Techniques
3 Diffuse Disease
4 Focal Disease
5 Intervention

The Biliary Tract

1 Anatomic Consideration
2 Methods of investigation
3 Biliary Disorders

Interventional Techniques Hepatobiliary System

1 Liver Biopsy
2 Biliary Obstruction
3 Malignant Biliary Obstruction
4 Percutaneous Cholangiography and Biliary Drainage Procedures
5 Vascular Interventional Techniques in Hepatobiliry System

The Pancreas

1 Embryology and Anatomy
2 Congenital Anomalies
3 Multisystem Diseases with Pancreatic involvement
4 Pancreatitis
5 Pancreatic Neoplasms
6 Trauma
7 Interventional Radiology in Pancreas

Imaging of the Endocrine System :

1 Hypothalamic-Pituitary Axis
2 Pineal Gland
3 Thyroid Gland
4 Parathyroid Gland
5 Pancreatic & Gastrointestinal Endocrine Disorders
6 Carcinoid Tumors
7 Adrenal Glands
8 Female Reproductive System .
9 Male Reproductive System

Reticuloendothelial Disorders : Lymphoma

1 Epidermilogy
2 Histopathological Classification
3 Staging Investigation and Management
4 Extranodal Manifestation of Lymphoma
5 Monitoring response to therapy

Reticuloendothenial Disorders: The Spleen

1 Imaging Techniques
2 Normal Anatomy
3 Splenomegaly
4 Benign Mass Lesions
5 Malignant Mass Lesions
6 Splenic Trauma

VI Genito Urinary Tract :

6.1 Methods of Investigation :

6.2 Radionuclide Imaging in Genito Urinary Tract :

6.3 Urodynamics

6.4 Reno Vascular Disease:

6.4.1 Renal Arteriography
6.4.2 Vascular Abnormalities
6.4.3 Radiological Management of Reno Vascular Disease

6.5 Renal Parenchymal Disease

6.5.1 Normal Appearance
6.5.2 Renal Parenchymal Disease
6.5.3 Parasitic Infections

6.6 Renal Masses :

6.6.1 Methods of Analysis
6.6.2 Pathological Renal Masses
6.3 Neoplastic Renal Masses

6.7 Calculus Disease & Urothelial Lesions

6.7.1 Calculus Disease
6.7.2 Nephrocalcinosis
6.7.3 Urothelial Tumors

6.8 Urinary Obstruction:

6.8.1 Pathophysiology
6.8.2 Causes of Obstruction

6.9 Radiological Evaluation of Urinary Bladder, Prostrate & Urethra :

6.10 Injuries to the Genito Urinary Tract :

6.11 Renal Failure and Transplantation :

6.12 Interventional Uroradiology :

6.13 Imaging of the Kidneys & Urinary Tract in Children

6.13.1 Embryology
6.13.2 Techniques .
6.13.3 Interventional Procedure "

6.14 Imaging of Paediatric Pelvis :

6.14.1 Imaging Techniques ;
6.14.2 Normal Anatomy
6.14.3 Congenital Anomalies
6.14.4 Pelvis Masses
6.14.5 Scrotal Disease

VII Skeletal System :
7.1 Skeletal Trauma
7.2 Bone Tumors : Generals Characteristic & Benign Lesions
7.3 Bone Tumors : Malignant Lesions
7.4 Myelproliferative and Similar Disorders
7.4.1 Generalised/Localised Decreased in Bone Density
7.4.2 Generalised/Localised Increased in Bone Density
7.4.3 Delayed Skeletal Matuarity
7.5 Metabolic and Endocrine Disease of the Skeletal
7.6 Skeletal Dysplasias and Malformation Syndrome
7.7 Joints Diseases :
7.7.1 Rhumatiod Arthritis
7.7.2 Other Connective Tissue Disease
7.7.3 Crystal Deposition Arthropathy
7.7.4 Degenerative Joint Disorders/Degenerative spine
7.7.5 Arthrography/ HPOA/ Pachy Dermoperiostritis
7.8 Bone and Soft tissue Infection :
7.9 Imaging of Soft tissue :
7.10 Bone Tumors in Children :
7.10.1 Imaging approach
7.10.2 Benign Bone Tumors
7.10.3 Malignant Bone Tumors
7.11 The Radiology of Non Accidental Injry in Children :
7.12 Paediatric Musculo -Skeletal Trauma
7.13 Radiology of Arthritides in Children
7.14 Radiology of Soft tissue in Children
7.15 Bone and Soft tissue infection in Children.
VIII. The Reproductive System :
8.1 Ultrasound in Obstetrics and Gynaecology
8.1.1 Indication
8.1.2 Instrumentation in US Techniques
8.1.3 Gynecological infertility
8.1.4 Assesing Tubal Patency
8.2 Imaging in Gynaecology
8.3 Hysterosalpingography
8.4 The Breast & its Imaging
8.5 Breast Cancer
8.6 Male Reproductive System
IX Central Nerve System :
9.1 Skull and Brain : Methods of Examination and Anatomy
9.2 Cranial and Intracranial Pathology : Tumors in Adults
Cerebro Vascular Disease and Non Traumatic
Intracranial Haemorrhage
Infections, AIDS, Demyelinating and Metabolic
Disease
9.3 Spine: Method of Investigation
9.4 Imaging of Spinal Pathology
9.5 Scoliosis in Children
9.6 Neonatal Head and Spine Sonography
9.7 Neurology in Children

X. The Orbit; ENT; Face; Teeth:

10.1. The Orbit

10.1.1 Anatomy / Techniques
10.1.2 Intraoccular Abnormalities
10.1.3 Lacrimal Gland Tumors
10.1.4 Muscular Tumors
10.1.5 Intra/Extra Canal Tumors

10.2 Ear, Nose and Throat Radiology

10.2.1 The Ear
10.2.2 Nose and Paranasal Sinuses
10.2.3 Phrynx

10.3. Maxillofacial Radiology

10.3.1 Fractures of Maxilla
10.3.2 TM Joint
10.3.3 Salivary Glands

10.4. Dental Radiology

10.5. Pediatrics, Eye & Orbit :

10.5.1 Imaging Techniques
10.5.2 Child with Proptosis or an Orbital mass
10.5.3 Child with Orbital Infection
10.5.4 .Child with White Eye
10.5.5 Child with Development Abnormalities

10.6. Paediatric ENT Imaging

XI) Interventional radiology:

1. HSG & FTR
2. 4 vessel angiography
3. Biliary intervention(PTBD,PTC)
4. PCN
5. Laser ablation of varicose veins
6. RFA/ chemoembolisation of hepatic tumour and malformations.
7. Vertebroplasty.
8. Hemangioma and AVM management.

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

BOARD OF STUDIES MEDICAL FACULTY(P.G.EDUCATION)
MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES
NASHIK-422004.

GOAL

1. **To develop competent specialist and medical teachers who can appreciate health needs of the community, perform professional obligations observing ethics and keeping in view the objectives of national health policy at various levels of health care delivery system as well as be aware of contemporary and recent developments in the concerned discipline and updating with latest advances.**

A) General suggestions .

i) Uniform nomenclature – it is unanimously decided that the nomenclature of Post graduate degree and diploma should be broad based. (either Respiratory Medicine / Pulmonary Medicine) eg. MD (Branch V) Respiratory Medicine,
Diploma in Respiratory Medicine (DRD) or Diploma in Pulmonary Medicine.

ii) Duration -PG Diploma should be of two years duration & PG degree should be of three years duration

iii) Affiliation- The department of a Medical College / Institution should be affiliated. It should be confirmed/ approved and then the teacher functioning in approved department should be recognized.

a. Criteria for affiliation-

- Institution should be first affiliated to university as per laid down norms under 11.2 minimum requirements for PG institution (M.C.I).
- Department on clinical side should have:

1. No. of units – (at least one)

2. Teaching component – teacher should posses the qualifications and experience prescribed by Medical Council of India

Total teaching experience in the subject of 8 years for which recognition is sought out of which at least five years as lecturer or Asst. Prof.

a) HOD Professor (preferably either recognized or eligible to be recognized for PG teacher ship)

b) Unit head – Prof./ Addl. Prof / Asso. Prof. (preferably either recognized or eligible to be recognized for PG teacher ship) if there is one unit it should be headed by Professor only but second or subsequent additional unit may be headed by either Prof ./ Addl. Prof/ Asso. Prof.

c) Other faculty – at least one more qualified teaching faculty (preferably either recognized or eligible to be recognized for PG teacher ship)

Any PG teacher can simultaneously be recognized for MD and PG diploma and can enroll students for both. In addition their teachership should be accorded permission for DNB (National Board of examinations) , Diploma / fellowship of college of Physicians and Surgeons Mumbai, along with certification / fellowship courses that are likely to be started by MUHS in the light of paucity of registration available for Maharashtra State students.

d) Bed strength – minimum 30 sanctioned beds in an indoor unit (at least one unit) For MD / MS and minimum 20 sanctioned beds in an indoor unit for PG Diploma if recognition is for both MD & PG Diploma minimum 30 sanctioned beds in an indoor unit (at least one unit) required.

e) Residents – minimum one resident per 10 beds- (3-residents per 30 beded unit) They are name as Junior Residents for broad specialty JR I (first year) JR II (second year) JR III (third year) Fourth year residency may be adopted to complete three years teaching experience to fulfill eligibility criteria for lecturer post. This post should only be given to PG degree qualified resident.

One teaching unit should have minimum two qualified teaching faculty (preferably either recognized or eligible to be recognized for PG teacher ship)

f) Other staff :

In addition to teaching faculty staff the strength of technical paramedical staff shall be as per the staff strength prescribed for admitting 50 – 100 – 150 or multiple of 100 MBBS admissions regulations

G. Enrolment :

Each PG teacher can enroll only one student for MD / MS per year and one PG Diploma students per year.

4) Laboratory facilities:

a) Central Lab facilities -for training Postgraduate students should be available preferably computerized automatic analytic type equipments be available.Central Direct microscopy, Fluorescent microscopy, Culture & Susceptibility for organism inclusive of AFB be available

b) Equipments -should be functional throughout the year quality control and accuracy be monitor periodically. The facilities should be updated in lieu of the advancement in knowledge, technology and research.

c) Central Biomedical waste management is mandatory.

5) Radiology :

Conventional, Ultrasound, Spiral CT/ Multislice CT, MRI, 2D Echo, Colored venous and arterial Doppler, CT guided Biopsy are few of the facilities that should be available. Further as per the advancement in our knowledge the facilities should be updated.

Department as well as Central **Medical Record Section** should be available (preferably computerized).

6)Library:

Department as well as Central medical library in possession of standard text books, index journals, year books, recent advances periodical should be available.

At least central Library should have PC's with colored laser printer, Internet facilities, Fax, Xeroxing machine along with educational CD's.

7) Equipments:

Each unit of the department should have clinical/ procedure room with facilities for pleural tapping and biopsy, FNAB, Pulse oximeter, multifunction bed, trolleys, with at least four X-ray and scanplate mountable viewing box, four to five nebulizers.

a)Pulmonary Function Laboratory having facilities to perform spiormetry, Airways resistance and conductance, diffusion study, Bronchial challenge test, allergy-testing facility with emergency management arrangement, six minutes walk work test facilities.

b)Bronchoscopy room having flexible fibroptic bronchoscope, with standard accessories, leakage tester, monitor , CCTV camera, recording facilities, nebulizer scope sterilization tray central cupboard to hang the scope with punch biopsy, brush biopsy, channel cleaning forceps, suction and oxygen ports or portable machine and cylinder.

c)Respiratory critical care/ high dependency ward: to take care of seriously/ critically ill patients. Preferably at least four bedded ward having facilities of centralized oxygen and suctioning Non – invasive/ invasive ventilators and different types of masks and oxygen canulae. If departmental critical center is not available hospitals central intensive care unit must be available with easy access to the patient from the department.

d) Sleep Laboratory:

1. Polysomnography machine with adequate channels, SPO2 measurement having facilities for up gradation
2. Monitoring treatment modality with unilevel / bilevel positive airway pressure equipment.
3. Separate room with proper ventilation

CURRICULUM
(syllabus)
BASIC SCIENCES

I - ANATOMY OF THE LUNG & DEVELOPMENT & GENETICS OF LUNG DISEASES.

II - PHYSIOLOGY :

- Respiratory Mechanics
- Physiology of Respiration & Ventilation.
- Physiological basis of pulmonary function testing & arterial blood gases.
- Acid based disturbances
- Physiology aspects related to mechanical ventilation
- Physiology related to endocrine aspects of lung
- Sleep physiology
- Patho-physiology of all disorders pertaining to pulmonary medicine.

III - PUBLIC HEALTH & EPIDEMIOLOGY:

- Epidemiological aspects of major respiratory and public health problems like tuberculosis, asthma, interstitial lung disease & occupational & environmental disorders.

IV - PULMONARY REHABILATION

V -SURGICAL ASPECTS;

- Surgical interventions in various pulmonary disorders including trauma, infections & lung transplantation & minimally invasive interventions.

VI- MEDICO-LEGAL ASPECTS:

- Principles of care for patient requiring mechanical ventilation.
- Long term oxygen therapy
- Compensation (occupational lung disorders)
- Fitness & disability evaluation.
- Personal Protective measures for occupational health, biosafety guidelines for medical equipment & waste disposal.
- Human Rights, ethical aspects, consent for procedures/newer drug development. Aspects related to medical procedures & interventions performed in various pulmonary disorders.

VII- RECENT ADVANCES :

- Drug development in respiratory medicine.
- Sleep Medicine
- Invasive diagnostic techniques
- Lung in extreme conditions.

VIII- INFECTIONS :

- Tuberculosis (pulmonary & extrapulmonary)
- Opportunistic infections related to immunocompromised state & other infections in immunocompetent individuals.
- Infections related to systemic illnesses

IX - ENVIRONMENTAL MEDICINE RELATED TO PULMONARY MEDICINE WITH SPECIAL REFERENCE TO AIR POLLUTION & OCCUPATIONAL DISEASES.

X - PULMONARY CRITICAL CARE ASPECTS :

XI -CONVENTIONAL CHEST RADIOLOGY & LUNG IMAGING

XII - PULMONARY CIRCULATORY DISORDERS.

XIII - DISEASES OF AIRWAYS

XIV - NEOPLASTIC DISEASES

XV - DISEASES OF MEDIASTINUM

XVI - INTERSTITIAL LUNG DISEASE

XVII - PULMONARY INFECTIONS.

XVIII - PROBLEM BASED LEARNING FOR THEORY & PRACTICAL ON EACH ASPECT (REFERENCE : W.H.O.) :

- Cause of the complaint
- Ways to differentiate between possible causes
- Pathophysiological mechanisms responsible for the complaint and clinical conditions.
- Best possible management strategies.
- Prevention of recurrence.

In addition to the above-cited syllabus a student should acquire theoretical knowledge, dissertation, clinical and communication skills as well as training in research methodology.

B) Recognition of textbooks, reference books & journals

a) **Text Books**:
Respiratory Diseases (I & II) - Crofton & Douglas
Pulmonary Diseases & Disorders - A. Fishman
Diseases of Chest (I,II,III &IV) - Fraser & Pare

b) **Reference books:**
Principles of Critical Care - Farokh E. Udwadia
Pulmonary Function Testing - Gregg L. Ruppel
Bronchoscopy -Udaya B. S.Prakash
Principles & Practices of Sleep Medicine - Kryger & Roth
Clinical application of Blood Gases - Barry A.Shapiro
Occupational Lung Disorders - Park & Park
High Resolution CT of the Lung - W. Richard Webb
Surgical Aspects of Tuberculosis - Gibbons
Tuberculosis - Toman

c)**Journals:**
Thorax
American Review of Critical Care & Respiratory Diseases.
Indian Journal of Chest Diseases
European Journal of Respiratory Diseases.
Clinics in Chest Medicine.
Recent Advances in Respiratory Medicine.

C) Pattern of P.G.Degree and Diploma Examinations

(As per Direction No. 01/2008 dtd. 26/05/2008)

Appointment of examiners:

a. There will be two internal examiners and two external examiners (from out of state).

b. If the total number of the candidates are more than 39 then instead of four eight examiners four internal & four external can be appointed.

c.In the event of more than eight candidates the practical examination should be held for more than one day depending upon the number of candidates in the multiples of eight.

d.If a corum of four / eight examiners is not completed than the external examiners can be appointed from the existing list however at no point of time both external examiners will be retired internal examiners empanelled as externals.

e. In case of crisis examination can be carried out with minimum of three examiners of which at least one should be an external examiner with prior permission of M.C.I.

f.. An internal examiner ordinarily be appointed for not more than two terms in succession or with in two years at any turn of the college.

g.examination of MD/ MS and PG diploma can be held in Jan & July Each year .

h. For PG degree and diploma four examiners are to be appointed and the same set of examiners can conduct both MD/ MS and PG diploma in there respective term to void duplication and extra expenses thereof.

i.Same set of examiners should assess dissertations, theory and practical of all the candidates appearing for the same examination.

J.PG students only should be allowed to appear for examination on passing assessment of dissertations by the respective set of examiners.

k.There will be chairman/ convener who is supposed to moderate paper setting and practical examination, submission of result to the university. Such person should essentially be an internal examiner and who will officiate for only one term at the time and not more than one in succession.

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

The Curriculum

Goals

The goals of postgraduate training course in Surgery would be to train a MBBS doctor who will Practice surgery efficiently and effectively backed by scientific knowledge and skill .
No syllabus can be comprehensive but the following topics are not intended to be prescriptive but it is a guide to the topics which need to be covered during training.
At the end of the training and evaluation,

• He will develop right attitudinal skills which will ensure effective and correct communication with patients, relatives, colleagues and superiors
• Continue to develop keen interest in continuing surgical education irrespective of whether he is in a teaching institution or is in Private practice
• Be a motivated 'teacher' - defined as a surgeon keen to share his knowledge and skills with a colleague or a junior or any learner.

Objectives of the Course

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The objectives may be considered under the subheadings

1. **Knowledge (Cognitive domain):** Knowledge and information about the subject, Recall of and Analysis of available information to be used for the treatment of patients.
2. **Skills (Psycho motor domain)**: The correct skills to be developed by working in a dry lab as well as surgeries on animals (Minimal access Surgery). He/She should develop surgical skills by assisting seniors as well as being assisted by seniors
3. **Human values**: Ethics involved in Surgical practice

At the end of the training, the candidate must be able to:

Knowledge:

• Describe etiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children.
• The candidate should be conversant with Homeostatic mechanism and Fluid Electrolyte balance and replacement therapy including blood transfusion, plasma expanders and treatment of various types of shock.

• Nutrition : Assessment, Management of parenteral and enteral nutrition

•Disorders of coagulation pertaining to surgeries, DVT , Thrombophilia

• Describe common malignancies in the country and their management

• Recognize conditions that may be outside the area of his specialty / competence and appropriate referral to specialist

• Advise regarding the operative or non-operative management of the case and to carry out this management effectively.

• Update himself by self-study and by attending courses, conferences and seminars relevant to surgery.

• Teach and guide his team, colleagues and other students.

• Undertake audit, use information technology tools and carry out research, both basic and clinical, with the aim of publishing his work and presenting his work at various scientific forums.

Skills

• Take a proper clinical history, examine the patient, perform essential diagnostic procedures and order relevant tests and interpret them to come to a reasonable diagnosis about the surgical condition.

• Perform *minor* operative procedures and common general surgical operations independently and the *major* procedures with help from a senior surgeon.

• provide basic and advanced life saving support services (BLS & ALS) in emergency situations

• manage acute abdominal emergencies and poly trauma.

• Undertake thorough wound management, including burn wounds.

• Undertake complete patient monitoring including the preoperative and post operative care of the patient.

•Use of antibiotics in Surgery, Surgical infections' & use of Prophylactic antibiotics

Human values, Ethical practice and Communication abilities

• Adopt ethical principles in all aspects of his surgical practice. Professional honesty and integrity are to be fostered. Surgical care is to be delivered irrespective of the social status, caste, creed or religion of the patient.

• Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.

• Provide leadership and get the best out of his team in a congenial working.atmosphere.

• Apply high moral and ethical standards while carrying out human or animal research.

• Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed.

• Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

Course Contents

Essential Knowledge

A list of objectives related to knowledge and higher cognitive abilities that are expected to be achieved during the course is given. The course contents have been identified and categorized as essential knowledge as under. This is to enable the student to achieve the objectives of the course. It is recognized that General surgery today mainly covers Gastrointestinal & Hepatobiliary disorders, basic urological problems, abdominal wall herniae, Breast & thyroid disorders, knowledge of some common problems in allied specialities. Further he should be familiar with complications, current controversies and recent advances in these topics.

The topics are considered under:

- Basic sciences,
- General Surgery topics and
- Specialty topics.

There will be an overlap between the General surgery and specialty categories.

Basic sciences include anatomy, physiology, biochemistry, microbiology and pathology and Radiology, as found in current text books. These standard topics are recommended to be studied as much as they are applicable to the practice of surgery.

General Surgery Topics include the following:

History of surgery

Clinical History and examination - detailed systematic history taking, clinical examination of various systems, coming to a provisional working diagnosis.

Rationale of diagnostic tests - Ordering diagnostic tests with prioritizing the needs,based on the clinical, hospital and the patient's socioeconomic condition

Informed consent / Medico legal issues - Understanding the implications of acts of omission and commission in practice. Issues regarding Consumer Protection Act. - Implications in a medico-legal case like accidents, assaults etc.

Concept of Essential Drugs and Rational use of drugs

Pharmacoeconomics

Surgical audit - Understanding the audit of process and outcome. Methods adopted for the same.

Basic statistics

Evidence based medicine - Understanding journal based literature study;
the value of text book, reference book articles; value of review articles; original articles and their critical assessment. Understanding the value of retrospective, prospective, randomized controlled and blinded studies. - Understanding the principles and meanings various biostatistical tests applied in these studies.

Use of computers in surgery: Retrieval of important information, Record keeping, Powerpoint presentations for teaching, Statistical methods

Preoperative evaluation of patients with Co-morbid conditions

Principles of operative surgery like asepsis, antisepsis, sterilization. Basic surgical techniques; properties of suture materials; appropriate use of sutures, drains, prosthetic grafts. Postoperative care - concept of recovery room care; airway management; assessment of wakefulness; management of cardiovascular instability in this period. Post operative pain management as well as care of terminally ill patients especially cancer patient. Basic surgical instrumentation - Principles of surgical instrumentation; their maintenance and troubleshooting. Familiarize with minimal access surgery instruments, Diathermy & lasers.

Wound management: wound healing; factors influencing healing;
Assessment of trauma; Assessment of head, chest and abdominal trauma and triage - Assessment of a trauma victim; resuscitation; care at the site; triage; care in the accident department; criteria for immediate surgery; immediate workup and logical referral criteria. Multiple injured patient, closed abdominal and chest injuries, penetrating injuries; fractures pelvis; urological injuries; vascular injuries; trauma scores.

Surgical infections - asepsis and antisepsis; microbiological principles; rational use of antibiotics; special infections like synergistic gangrene and diabetic foot infections. Hepatitis and AIDS

Surgical nutrition - nutritional assessment; metabolic response to stress; need for nutritional support; enteral nutrition; routes of access to GI tract; parenteral nutrition; access to central veins for nutritional support.

Acute abdomen - Appendicitis / Peritonitis / Perforated viscus / Intestinal obstruction

Hernias - simple and complicated - various types of hernias; their repair; prosthetic materials

Critical care - Cardiorespiratory failure - management of shock; including monitoring; sepsis scores; pharmacological support.

Fluid and electrolyte balance / Acid - Base metabolism - The body fluid Compartments; metabolism of water and electrolytes; factors maintaining homeostasis; causes for and treatment of acidosis and alkalosis.

Pain control - acute and chronic pain; cancer and non-cancer pain; patient controlled analgesia.

Principles of oncology - cell kinetics; causation of tumours; principles of oncologic surgery, radiotherapy and chemotherapy; paraneoplastic syndromes; cancer pain management; palliative care

Principles of burn management - types of thermal injury; assessment of extent; immediate management; late management; skin cover; rehabilitation

Principles of fracture management - fracture healing; principles of immobilization; complications; principles of internal fixation.

Airway obstruction / management - anatomy of the airway; principles of keeping the airway patent; mouth to mouth resuscitation; oropharyngeal airway; endotracheal intubation; crico-thyroidetomy; tracheostomy.

Breast disease - benign and malignant disease; diagnosis; investigation; screening for cancer; genetics of breast cancer

Thyroid disease - solitary nodule; investigations; multinodular goiter; Hashimoto's disease; cancer

Specialty Topics Include

GI endoscopy and Laparoscopy:

Principles of GI endoscopy

Diagnostic and therapeutic GI endoscopy including upper GI, lower GI and pancreato-biliary systems.

Physiology of pneumoperitoneum. Diagnostic laparoscopy & Laparoscopic therapeutic procedures

Neurosurgery :

Head and neck trauma; acute management and rehabilitation

Concept of brain death / medico-legal implications

Peripheral nerve injuries

Neoplasms of the brain and meninges

Acute and chronic infections of the brain and meninges

Hydrocephalus

Spinal injuries

Monitoring intracranial tension

Urology:

Urological injuries

Urothelial tumours / Chemotherapy

Prostatic hypertrophy

Hypospadias

Pyelonephritis / perinephric abscess

GU tuberculosis

Scrotal disease

Endourology

Peritoneal dialysis / CAPD / haemodialysis

Transplantation / harvesting kidney

Urinary diversion

Infertility / Vasectomy

Pyeloplasty / hydronephrosis

Oncology:

Breast, thyroid and GI malignancies

Chemotherapy / Adjuvant therapy

Head and neck tumours

Imaging CT/ MRI CT guided FNAB/C

Post excision reconstruction

Radiotherapy

Plastic Surgery

Burns management

Cleft lip and palate

Congenital defects of hand

Details of skin flap

Facial injuries

Hand injuries / tendon injury

Hypospadias

Nerve repair

Pressure sores .

Principles of microsurgery

Principles of tissue transfer

Vascular repair

Cardio-thoracic surgery

Flail chest / thoracic trauma Bronchogenic carcinoma Lobectomies

Pneumonectomy

Endocarditis prophylaxis

Pulmonary function tests

Control of major haemorrhage

Operations on the diaphragm

Coronary artery disease

Valvular heart disease

Lobectomies and pneumonectomies

Oesophageal disease

Operations on thoracic aorta

Mediastinal tumours

Basics of congenital heart disease

Vascular Surgery

Vascular imaging

A V malformations

Exposure of major arteries and veins / vascular anastamosis

Varicose veins

Chronic venous insufficiency.

Vascular emergencies - trauma, embolism

Peripheral vascular disease - Atherosclerosis, arteritis

Details of vascular prosthesis

Paediatric Surgery

Fluid and electrolyte management

Preparation for surgery / post op care

Hernias

Spinal fusion defects Ventral defects

Operative Skills:

Emergency Room Procedures

Application of Splints for Fractures
Arterial and Venous Lines
Assessment and initial management of Poly trauma
Cardiopulmonary Resuscitation
Management of Airway Obstruction
Management of Shock and Cardiac Respiratory failure

Pre-operative Workup

Ability for adequate pre-operative preparation in special situations like Diabetes, renal failure, cardiac and Respiratory failure etc. and risk Stratification
Communication skills with special reference to obtaining Informed Consent
Proper pre-operative assessment and preparation of patients including DVT prophylaxis, Blood transfusion and Antibiotics

Post-operative Care

Airway management
Basic Physiotherapy
Management of epidural analgesia
Management of Fistulae
Management of postoperative hypo and hypertension
Postoperative pain control
Skills for Nutritional rehabilitation of patients
Skills for proper Fluid & Antibiotic management
Stoma care

Minor O. T. procedures

Circumcision under Local Anesthesia
Drainage of Abscesses
FNAC
Major dressings
Minor Anorectal Procedures (Haemorrhoids -Banding, Cryotherapy, suturing etc.
Anal dilatation and Fissures), Fistulectomy
Minor Biopsies - Lymph node, ulcer, swellings etc.,
Reduction and plaster application of simple fractures and dislocations
Removal of simple subcutaneous swellings
Sigmoidoscopy and Upper OJ. endoscopy
Suturing Techniques
Vasectomy
Wound debridement

Major Operating room techniques

Instrument anangement and trolley layout
Skills in Sterilization techniques, O.T.Layout and Asepsis
Skin preparation - painting and draping
Technique of scrubbing and gowning

General Surgical Operative Procedures

Appendicectomy

Cholecystectomy

Closure of Colostomy

Closure of peptic ulcer / under-running bleeding ulcer / vagotomy drainage

Colostomy

Cysts and sinuses of the neck

Diagnostic laparoscopy

Drainage of breast abscess / Excision of breast lump

Groin Hernia repair

Gynaecomastia

Haemorrhoidectomy / Fissurectomy / simple fistulectomy

Hemicolectomy

Herniotomy / Orchidopexy in children

Laparotomy for abdominal trauma / splenectomy

Laparotomy for intestinal obstruction / bowel resections / bowel anastamosis Management of complex wounds

Mastectomy

Opening and closing the abdomen

Opening and closing the chest

Parotidectomy

Release of bands and simple adhesive obstruction

Thyroid lobectomy

UGI endoscopy / Flexible sigmoidoscopy

Ventilation

Wide excision of breast tumours / mastectomy / microdochectomy

Gastrostomy / Feeding jejunostomy

Speciality Procedures

There will be repetition of the procedures listed under this category and those listed under General surgical procedures.

Laparoscopy And GI Endoscopy

Diagnostic and therapeutic Upper and Lower GI endoscopy

Diagnostic laparoscopy

Diagnostic Upper GI endoscopy

Laparoscopic Cholecystectomy

Neurosurgery

Craniotomy
Management of paraplegia
Peripheral nerve repair
Treatment of nerve injury specific operations
Suturing complex scalp wounds
Trephining

Urology

Carcinoma penis
Diagnostic cystoscopy
Inguinal Block Dissection
Meatotomy
Nephrectomy - partial & total
Nephrolithotomy
Orchidectomy
Orchidopexy
Retroperitoneal lymph node dissection
Supra pubic cystostomy
Total amputation of penis
TURP / Open prostatectomy
Ureterolithotomy
Urethral J Urogenital injuries
Urethral dilatation
Varicocele
Vasectomy

Oncology

All radical operations - Breast, Thyroid, GI and Facio-maxillary malignancies
Breast lumpectomy
Functional neck node dissection
Gastrectomy / Bowel resection
Metastatic workup

Plastic Surgery

Burn resuscitation

Lip surgery

Local blocks in anaesthesia

Minor hand injuries

Nerve repair

Post excision reconstruction

Reimplantation of digits

Skin flap surgery

Stitch craft

Tendon repair PA

Wound debridement

Paediatric Surgery

Anorectal anomalies

Circumcision I meatoplasty

Herniotomy

Intercostal aspiration

Laparotomy for peritonitis

Lymph node biopsy

Non operative treatment of volvulus

Orchidopexy

Ostomies

Paediatric emergencies

pyloromyotomy

Cardiothoracic Surgery (Not essential)

Canulation of artery and vein

Chest injuries PA

Empyema drainage / decortication

Endotracheal intubation

Intercostal drainage

Lobectomies and pneumonectomies

Oesophageal surgery

Opening and closing the chest

Operations on the root of the neck

Pericardiectomy

Removal of FBs

Remove pulse generator (pacing)

Rib resection PA

Tracheos tom y

Undertake sternotomies

Vein and arterial harvesting

Ventilator management

Vascular Surgery

Teaching and Learning Activities

A candidate pursuing the course should work in the institution as a full time student.He should be included in Residency program No candidate should be permitted to run a clinic/laboratory/nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not remain absent himself / herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below. Depending on the facilities available, any or all of these methods may be employed.

1.**Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

a)Didactic Lectures: Recommended for selected common topics for post graduate students of all specialities. Few topics are suggested as examples:

1)Bio-statistics

2)Use of library

3)Research Methods

4)Medical code of Conduct and Medical Ethics

5)National Health and Disease Control Programmes

6) Communication Skills etc.

These topics may preferably taken up in the first few weeks of the 1st year.

b)Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics, eg Jaundice, Diabetes mellitus, Thyroid Topics to bs taken by Basic sciences specialist etc.

2.**Journal Club:** Recommended to be held once a fortnight All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. Further, every candidate must make a presentation from the allotted journal(s) of selected articles at least two times a year and a total of 6 presentations in three years. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A time table with names of the student and the moderator should be announced at the beginning of every year.

3.Subject Seminar: Recommended to be held once a month All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. Further, every candidate must present on selected topics ai least" four times a year and a total of 12 seminar presentations in three years. The presentations would be evaluated using check lists and would carry

weightage for internal assessment (See Checklist II of Internal Assessment). A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of every year.

4.Student Symposium: Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.

5.Ward Rounds: Ward rounds may be service or teaching rounds.

a)Service Rounds: Postgraduate students and Interns should do ward rounds every day for the care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.

b)Teaching Rounds: Every unit should have 'grand rounds' for teaching purpose. A diary should be maintained for day to day activities by the students.

Entries of (a) and (b) should be made in the Log book.

6.Clinico-Pathological Conference: Recommended once a month for all post graduate students. Presentation be done by rotation. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

7.Inter Departmental Meetings: Strongly recommended particularly with departments of Pathology and Radio-Diagnosis at least once a week. These meetings should be attended by post graduate students and relevant entries must be made in the Log Book.

Pathology: A dozen interesting cases may be chosen and presented by the post graduate students and discussed by them as well as the senior staff of Surgery department. The staff of Pathology department would then show the slides and present final diagnosis. In these sessions the advance immuno-histochemical techniques, the burgeoning markers other recent developments can be discussed.

Radio-diagnosis: Interesting cases and the imaging modalities should be discussed.

8.Teaching Skills:: Post graduate students must teach under graduate students (Eg. medical, nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc.

Assessment is made using a checklist by surgery faculty as well students. Record of their participation be kept in Log book. Training of post graduate students in Educational Science and Technology is recommended.

9.**Continuing Medical Education Programmes** (CME) : At least 2 state level CME programmes should be attended by each student in 3years.

10.**Conferences:** Attending conferences is optional. However it should be encouraged.

11.**Dissertation** Every candidate pursuing MS degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

Rotation and posting in other departments

The listed knowledge and skills are to be learnt over a period of 3 years. The process is a continuous one. However the recommended period and timing of training in basic subjects, allied departments and speciality departments are given below.

In the first year, during the morning session, student should work in the parent department. It is recommended that 2 years and 4 months be spent in General Surgery and 8 months in allied and specialty departments. Depending on the time and opportunities available, some of the procedures listed for second year activity can be shifted either to the first or the third year. Students must be 'on call' on a regular basis. The total duration of postings in core and other specialities will be eight months.

Basic Sciences

Basic science should be an essential part of training. It should be done as concurrent studies during the 1 st year of training. At least two hours daily may be in the first six months of the course.

In the afternoons basic science teaching relevant to surgery can be done in the respective departments.

Topics for study to include Anatomy, Physiology, Pathology, Microbiology, Pharmacology, Anaesthesia and Radiology

Pathology - Concurent study - Recommend daily Grossing sessions, weekly Surgical pathology sessions and monthly Clinico Pathological Conferences. Radiology - Concurrent study - adequate exposure to modern imaging modalities like ultrasound sonography, CT scan, MRI and angiography.

Allied Specialty Subjects

Students should to be posted to core allied speciality subjects Viz. Anaesthesia and ICU for one month and Orthopaedics including trauma (accident and emergency) for 2 months during the second year of training. Posting to the Department of Obstetrics and Gynaecology for one month is optional. This posting may be in lieu of one of the other specialties (except the core specialties) depending on the choice of the candidate.

Other Surgical Speciality Subjects

Postings to other speciality departments will be during the second year. The departments and duration of postings are as under:

Department	Duration
• Paediatric surgery	4wks
• Plastic surgery	4wks
• Urology	4 wks
• Oncology	4 wks
• Cardiothoracic surgery	2 wks
• Neurosurgery	2 wks

Dissertation

1.The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

2.Every candidate shall submit to University in the prescribed proforma, a synopsis containing particulars of proposed dissertation worK within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

3.Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

4.The dissertation should be written under the following headings:

1.. Introduction
11. Aims or Objectives of study
111. Review of Literature
IV. Material and Methods
V. Results
VI. Discussion
V11. Conclusion
V11l. Summary
IX. References
X. Tables
Xl. Annexure

5.The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other Checklists. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" X 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

6.Four copies of dissertation thus prepared shall be submitted to the University, six months before final examination on or before the dates notified by the University.

7.The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the Universityexamination.

8.**Guide:** The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work be as per Medical Council of India Minimum Qualifications for Teachers in Medical Institutions Regulations, 1998. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining post graduate degree shall be recognised as post
graduate teachers. A **Co-guide** may be included provided the work requires substantial contribution from a sister department or from another medical institution recognised for teaching/ training by the University /Medical Council of India. The co-guide shall be a
recognised post graduate teacher

9.**Change of guide:** In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

Practical Examination:

(As per Direction No. 01/2008 dtd. 26/05/2008)

SYLLABUS FOR POST GRADUATE DEGREE IN OBST. & GYNAECOLOGY (M.D.)

OBSTETRICS :

1. Basic sciences

A) Applied Anatomy in females of genito urinary system, abdomen, pelvis, pelvic floor, anterior abdominal wall and breast.

B) Anatomy of fetus

C) Fundamentals of reproduction

Gametogensis fertilization, implantation & early development of human embryo.

Placenta - development, structure, functions

Amniotic fluid - formation and function

Fetal growth & development, fetal physiology

Birth defects,Genetics & teratology & counselling.

Physiological changes during pregnancy, labour and puerperium

Endocrinology of pregnancy.

Lactation

Immunology of pregnancy

Molecular biology

2. Normal pregnancy, labour & puerperium.

Breast feeding - baby friendly initiative

3. Early recognition and prompt management of pregnancy complications, - Hyperemesis gravidarum, abortions, ectopic pregnancy, hydatidiform mole,

Pre-eclampsia, eclampsia, Pathophysiology of PIH,

Antepartum hemorrhage, multiple pregnancy, polyhydramnios, Oligohydramnios &Prolonged pregnancy.

4. Management of pregnancies complicated by medical,surgical or gynaecological diseases, in consultation with the concerned specialities by team approach.

* Anemia,Heart disease,diabetes mellitus, liver disorders,Respiratory diseases, Renal diseases**,** CNS disorder, Skin, Psychiatry

Hypertensive disorders .

* Acute abdomen, Acute Appendicitis, Intestinal obstruction, perforations.

- Fibroids, Ovarian tumors, Carcinoma cervix, genital prolapse.
- Recent advances in medical and surgical management.

5. Infections in pregnancy.

Malaria, Toxoplasmosis, viral infections (Rubella, CMV, Hepatitis B, Herpes) syphilis and Other sexually transmitted infections including HIV, Leptospirosis.

Parents to child transmission of HIV infection. (PPTCT)

6. Evaluation of the fetal and maternal health in complicated pregnancy by making use of available diagnostic modalities and plan for safe delivery of the fetus while safeguarding the maternal health. Identification of fetus at risk and management.

High risk pregnancy - Post caesarean pregnancy, prolonged gestation, preterm labour, fetal growth restriction, premature rupture of membranes, blood group incompatibility, recurrent pregnancy wastages. Imaging techniques, CTG

7. Prenatal diagnosis of fetal abnormalities and appropriate care. Fetal therapy. PNDT Act and its implications.
8. Partographic monitoring of labour progress, early recognition of dysfunctional labour and appropriate interventions during labour including active management of labour.
9. Obstetrical analgesia and anesthesia.
10. Induction and augmentation of labour.
11. Management of abnormal labour : Abnormal pelvis, soft tissue abnormalities in birth passage, Malpresentation and malpositions of fetus, abnormal uterine action, obstructed labour and cervical dystocia. Third stage complications - PPH including surgical management, retained placenta, uterine inversion, post partum collapse, amniotic fluid embolism.
12. Abnormal puerperium, Puerperal sepsis
Thrombophlebitis, Mastitis, Puerperal venous sinus thrombosis,Psychosis.
13. National Health Programmes to improve the maternal and child health, social obstetrics and vital statistics. (Maternal and Perinatal mortality)
14. Drugs used in obstetric practice including prostaglandins.FDA Classification
15.Coagulation disorders in obstetrics, Blood and component therapy.

16.Operative obstetrics - decision making, technique, recognition and management of complications - C.S. instrumental delivery, obstetrics hysterectomy, role of destructive surgery.Manipulations-version,MRP etc.
Forceps,Vaccum, Internal iliac artery ligation

17. Intensive care in obstetrics for critically ill patient. Fluid and electrolyte balance, volume status maintenance, protecting vital organ function.
18. Provision of safe abortion services - selection of case, techniques, and management of complications. Septic abortion, Criminal abortion, MTP Act Adoption laws.

NEW BORN

1. Care of newborn
care of preterm, S.G.A.neonates, infants of diabetec mother
2.Asphyxia & Neonatal resuscitation (Respiratory distress syndrome and Meconium aspiration syndrome)
3. Neonatal sepsis - prevention, Early detection & management.
4. Neonatal hyperbilirubinemia, investigation and management.
5. Birth trauma - prevention, early detection & management.
6.Detection of congenital malformations in new born and make timely referrals for surgical corrections.
7. Management of the common problems in neonatal period.

GYNAECOLOGY :

Basic sciences

Development of genital tract and associated malformations. Basics of breast diseases related to ob/gy

Applied anatomy of female genital tract, abdominal wall and urinary tract.

Physiology of menstruation and ovulation

Physiology of spermatogenesis

Endocrinology - hypothalamus pituitary, thyroid and adrenal glands Neurotransmitters

Common menstrual disorders and their management

3. Diagnosis and surgical management of clinical conditions related to congenital malformations of genital tract. Reconstructive surgery in gynaecology

4. Chromosomal abnormalities and intersex. Ambiguous sex at birth

5. Reproductive Endocrinology : Evaluation of primary and secondary amenorrhoea, management of hyperprolactinemia, Hirsutism, chronic anovulation and PCOD,. Thyroid dysfunction.

6. Endometriosis and adenomyosis - medical and surgical management.

7. Infertility evaluation and management. Use of ovulation induction methods and Tubal microsurgery, Assisted reproduction techniques , management of immunological factors in infertility. Adoption law, medico-legal and ethical issues.

8. Reproductive Tract Infections, Sexually Transmitted Infections, HIV/AIDS : Prevention, Diagnosis and management.Genital Tuberculosis.

9 Screening for genital malignancies - cytology, colposcopy and biochemistry. Management of premalignant lesions

10. Benign and malignant tumors of genital tract - Early diagnosis and management.
11. Principles and practice of oncology in gynaecology - chemotherapy, radiotherapy, palliative treatment.
12. Supports of pelvic organs , genital prolapse,surgical management of genital prolapse.
13. Common urological problems in gynaecology - SUI, voiding difficulties, VVF, urodynamics, surgical repair of genital fistulae, ureteric and bladder injuries**.**
14. Management of menopouse, prevention of complications, HRT, cancer screening - genital, breast.
15. Recent advances.
16. Newer diagnostic aids - USG, interventional sonography, other imaging techniques, endoscopy.
17. Hysteroscopy, laporoscopy - diagnostic, simple surgical procedures, including laparoscopic tubal occlusion , endometrial ablative techniques, colposcopy**.**
18. Medicolegal aspects, ethics, communications and counselling.(SEXUAL / ASSAULTS)
19. Operative gynaecology - Selection of case, technique and management of complications of minor and major gynaecology procedures.

- Abdominal and vaginal hysterectomy
- Surgical procedures for genital prolapse
- Surgical management of benign and malignant genital neoplasms.
- Repair of genital fistulae, SUI
- Operative endoscopy – Laparosocpic, Hysteroscopic

20. Recent advances in gynaecology - diagnostic and therapeutic
21. Special groups - Pediatric and adolescent gynaecology, geriatric gynaecology
22. Evidence based management

FAMILY PLANNING :

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1. Demography and population Dynamics.
2. Contraception - Temporary methods. Permanent methods (vasectomy and female sterilization) Legal issues.
3. MTP Act and procedures of MTP in first & second trimester.(Recent Amendments, Legal/ethical issues)
4. Emergency contraception.
5. Recent advances, New development, Future research work in contraceptive technology.

OBSTETRICS AND GYNAECOLOGY - M.D. EXAMINATION

(As per Direction No. 01/2008 dtd. 26/05/2008)

Recommended Books

OBSTETRICS

SN	Must Read	Desirable to Read	Good to read
1	C.S.Dawn's Text book of Obstetrics and Neonatology	Medical Disorders in Pregnancy by DeSwiet	High Risk pregnancy by James
2	Ian Donald Practical Obstetrics problems	Obstetrics by Ian Donald	Williams Obstetrics
3		Arias, High Risk Pregnancy	
4	Munro-Kerr's Operative Obstetrics	Progress in OBGY, Studd	Operative Obstetrics by Douglas
5			Recent Advances in Obst/Gyn
6			All on net
7			FOGSI Books

GYNECOLOGY

SN	Must Read	Desirable to Read	Good to read
1	Novacs Gynecology	Reproductive Endocrinology by Speroff	Gynecology Devherst
2	TeLindes Operative Gynecology	Infertility by Insler	All on net
3	C.S.Down's Textbook of gynecology and contraception	Endocrinology by Rajan	FOGSI Books
4	Bereks gynecological Oncology	Gynacology by Gold	
5	Gynecology by P.K.Devi		Shaws textbook of gynecology
6	Jeffcoat's Principles of Gynaecolgy	Bonney's Operative Gynecology	
7	Standard Operating Procedures in Obstetrics and Gynecology by Dr. shrinivas Gadappa	---	---

FAMILY PLANNING

SN	Must Read	Desirable to Read	Good to read
1	Family Planning Practices by S.K .Chaudhary	Reproductive endocrinology by Speroff	Population reports
2	C.S.Dawn’s book on Contraception		

Journals/ Periodicals;

SN	Must Read	Desirable to Read	Good to read
1	Clinic in Obst. & gynecology	Year books	Am J Obst Gynec
2	North Americal clinic in ObGy	Annuals	Br. J Obst Gync.
3	J. Obst. Gyn India		Obstet Gynec Survey
			Fertility & Sterility

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

SYLLABUS FOR POST GRADUATE COURSES IN OPHTHALMOLOGY

1. Every candidate for the post graduate courses in ophthalmology must have obtained the Bachelor of Medicine and Bachelor of Surgery Degree of this University.
2. He or She should complete two years and three years academic terms for Post-graduate Diploma and Degree course in Ophthalmology as per MCI norms.
3. Every candidate presenting himself for these courses must send to the registrar with his application for admission of registration the following certificates –

1. Certificate of having MBBS degree.
2. Maharashtra Medical Council Certificate.
3. Eligibility Certificate.
4. Simultaneous registration for degree and diploma courses shall not be permitted.
5. Holder of diploma in any subject are not been give any concession of duration for completing post – graduate degree.
6. The subject for study shall be

A) Anatomy and Embryology of Eye including the contents of the orbital bones in relation thereof and the central nervous system as far as it refers to eye.(this includes anatomy of each structure of the eyeball for e.g. – Cornea, Iris, Choroid, Retina, Lens, Vitreous, Lids, etc)

B) Physiology of the Eye – Which includes physiology of vision, optics, binocular vision, Aqueous secretions, tear secretion, metabolism of various structures of the ye like cornea, lens, etc.

C) Various errors of refraction and their principles and optics.

D) Ophthalmic Medicine and Surgery (All Diseases related to various structures of the eye for eg – Lid, Adnexa, Conjunctiva, Cornea, Uvea, Lens, Vitreous, Retina,optic Nerve, Extraocular muscles, Tumors .)

E) Pathology and Bacteriology of the Eye.

F) Relation of ophthalmology to general medicine.

G) Eye Banking and its aspects.

H) National Program for Control of Blindness and its applications in Community Ophthalmology.

I) Various new innovations in Ophthalmology for example like Lasers in Ophthalmology, New Drugs in Ophthalmology, New techniques in operative skills, various transplant surgeries like – Keratoplasty, Stem cells transplant, amniotic membrane transplant.

J) Therapeutics in Ophthalmology

K) Radio therapy in Ophthalmology.

EXAMINATION PATTERN – For M.S. Ophthalmology –
(As per Direction No. 01/2008 dtd. 26/05/2008)

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

SYLLABUS OF M.S. ORTHOPAEDICS

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

NASHIK - 422 005.

Syllabus for M.S. (Orth.)

Syllabus :

1) Basic Sciences Related to Locomotor system.

1) Development, histology of bone, cartilage, collagen, muscles and nerve.
2) Physiology of bone, carliage, muscle & nerve.

2) Surgical pathology related to bones, cartilage, muscle, collagen & nerve in various congenital affections, infections, Tumours and timorous conditions and metabolic affections.

3)Orthopaedic diseases

- Metabolic bone disease
- Bone infections – Acute and Chronic
- Congenital deformities and development conditions of upperextremity, lower extremity, spine general defects.
- Diseases of joints
- Tumours of Bones
- Orthopaedic Neurology including spine bifida, Poliomyelitis andcerebral palsy.
- Diseases of muscle, fibrous tissue and vessels
- Regional orthopaedic conditions related to neck, shoulder, elbow,wrist, hand, hip, knee, ankle , foot, back and pelvis.
- Special subject–Orthopaedic Radiology Amputation and disarticulation physiotherapy and rehabilitationRecent advances in orthopaedic diseases.

4)General principles of Surgery and Traumatology.

- Wound healing
- Fracture healing
- Rehabilitation after bone and joint injuries
- Systematic response to injury
- Acute trauma care and early management of injured
- Injury to head, face, chest, abdomen, vessels & nerves.
- Polytrauma
- Fracture & dislocations in all bones and joints including diagnosis, classifications, various modalities of investigation and operative non- operative treatment including complications.
- Fractures in children
- Pathological fractures
- Recent Advance in various fractures and complications management.

5)Exposure to surgical techniques & surgical approaches to various regions to manage common infection, tumor, joint diseases, different type of trauma, congenital, neurological and miscellaneous conditions.

6)Principles of Arthroscopy microsurgery & Arthroplasty.

7)Orthotics & Prosthetics, disability calculation, Bio-mechanics of gait, splints.

8)Thesis – Aim is to train the PG student in research work. Topics should be in experimental, clinical, retrospective analysis or combination such that students is encouraged to do exhaustive reference work. Topics should be relevant to subject and region of work. Topics should allotted within first three months of training. The candidate should complete review of literature by end of the first year and submit his completed thesis six months before the final examination. Subject of thesis should be approved by University within first six months.

9)Under Graduate teaching in clinical methods.

10)Seminar presentation on common topics.

11)Journal reading and discussion.

12)Case presentation, ward record maintenance.

13)Adequate experience in closed reducation of various fractures, as isting major operation, independent operative management of common orthopaedic condition.

14)Preparation of paper for presentation in conference.

15)Preparation of article for publication.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

NASHIK - 422 005.

Scheme of Theory Exam. in Orthopaedics for M.S. (Ortho.) Exam.

(As per Direction No. 01/2008 dtd. 26/05/2008

Provisional Syllabus for Diploma in Orthopaedics

1) Basic Sciences related to Locornotor System

i) Histology of bone, cartilage, muscles, collagen, Nerves

ii) Physiology of bone, cartilage, muscles, collagen and Nerves

2) Surgical Pathology related to Bones, cartilage, Muscle, collagen and Nerves in various.

Congenital affection, infections, Tuirnours and turnours conditions a metabolic affection.

3) General principles of surgery and Traurratology

i) Wound healing

ii) Fracture healing

iii) Rehabilitation after bone and joint injury

iv) Systemic response to injury

v) Fracture and dislocation in all bones its management including complications.

vi) Injury to chest, abdomen and head

vii) Ploytrauma

viii) Fractures in children

4) Orthopaedics diseases

i) Metabolic Bone Disease

ii) Bone infections – Acute and chronic

iii) Congenital and development Deformities
- upper extremity
- Lower extremity
- Spine
- General defects

iv) Disease of joints

v) Tumours of Bones

vi) Orthopaedics Neurology – Spina bifida, Polio, Cerebral Palsy

vii) Disease of muscles, nerves , vessels and fibrous tissues

viii) Regional Orthopaedics related to spine, shoulder

ix) Elbow, wrist, hip, knee, ankle and foot.

x) Special Subjects
- Orthopaedics Radiology
- Amputation
- Physiotherapy
- ALTS
- First Aid

Examination Scheme for D. (Ortho)
(As per Direction No. 01/2008 dtd. 26/05/2008

Theory Exam. Total three papers, each of three hours duration and carrying 80 marks each. Total = 240 Marks.

Paper I	-	Anatomy, Physiology and Pathology as applicable to Orthopaedics.
Paper II	-	Traumatology and general Surgery,
Paper III	-	General Orthopaedics

Each paper will have four questions of 25 marks each.

Practical Exam.

Total Marks	=	300
Long Case 1	=	100
Short Case 2	50 X 2 =	100

Tables : 100

1) Instruments	=	20
2) X-rays	=	20
3) Specimen & Bones and splints	=	20
4) Ward round	=	20
5) Operation	=	20

Internal Exam.

Total Marks	=	100
Theory	=	50
Practical	=	50

For further examination the internal assessment marks should be calculated based on periodical tests in theory and practical at every term i.e. 4 tests for D. (Ortho)

Passing will be 50% of the marks in each head separately i.e. Theory, Practicaland internal examination. Total marks should be 50% of the total marks for passing

BOOKS RECOMMENDED:

REFERENCE BOOKS:

1) Hardikar's Orthopaedics Operations Text and Atlas by- Shrinivas S. Shintre, Sharad M. Hardikar, Vijay M. Panchandikar