

UNIVERSITY OF JAMMU

(NAAC ACCREDITED A GRADE UNIVERSITY) Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

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<u>NOTIFICATION</u> (24/Dec./Adp/8\)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, has been pleased to authorize the adoption of the Guidelines and Syllabus of the following **M.D./M.S Courses** as per National Medical Commission applicable from the batch 2023, 2024 and 2025:

- 1. Anaesthesia
- 2. Obst. & Gynae
- 3. Opthalmology
- 4. Otorhinolaryngology
- 5. Microbiology
- 6. Biochemistry

The Syllabi of the course is available on the University Website: www.jammuuniversity.ac.in

-SD-DEAN ACADEMIC AFFAIRS

No. F.Acd/11/24/ 12-988-13008 Dated:07/12/2024

Copy for information & necessary action to:-

- 1. Principal & Dean, Faculty of Medical Science.
- 2. Principal, ASCOMS, Sidhra, Jammu
- 3. Sr. P.A to the Controller of Examinations.
- 4. All Members of the concerned Board of Studies.
- 5. C.A to C.E
- 6. Deputy/Assistant Registrar (Exams, Prof./Confidential/Evaluation Prof.).
- 7. Jacharge, University Website.

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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 necessifiated 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.

Dr. NANDITA MEHTA Specific learning objectives: M.D.

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- 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:

. 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 Dr. NANDITA MEHTA

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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 speciality 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

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- 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 angesthetic 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
 - ٠. 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;

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- 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. Caphograph: values and changes in values and waveform.
 - d. Pulse oximetry: values and changes in values
 - Neuromuscular blockade monitor
 - Invasive arterial pressure: waveform and changes in the waveform
 - . 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

Dr. NANDITA under supervision including patients for Cardiac, Neurosurgery, Pediatric surgery, M.D.

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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 ancurysm 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)

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- 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:

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- 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, Hepatifis) 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 postoperality pulmonary complications
 - Understanding of the operation of mechanical ventilators including different ventilatory modalities non-invasive ventilation, complications and modes of weaping.
 - Principles and application of Oxygen Therapy
 - Glycernic 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), neuroablation, 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.

Dr. NANDITA MEHT& Observe and practice following blocks: Infra-orbital nerve, Intercostal nerve

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- 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:
 - 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.

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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-atctation 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.

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Demonstrate practice of Paediatric Anaesthesia

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- 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 aprea, laryngospasm, acid-base and electrolyte disturbances, febrile and convilising 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

Dr. NANDITA MEHTA Assessment of a child with URTI, with a heart murmur.

M. S. Management of fluid and electrolytes in children.

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- Anaesthetic management of a malignant hyperthermia susceptible child. ÷
- Anaesthetic management of FB bronchus, oesophagus, Wilm's tumour, ۵ 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. ٠
 - Lumbar puncture and CSF drainage. ٠
 - 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 brainstern 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

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- Suctioning and physiotherapy of wet lung
- 7. Intubation in Neonates
- 8. Initiation and management of ventilation
- 9. Combined Spinal Epidural
 - Brachial Plexus Block
 - Intravenous Regional Anaesthesia
 - Elbow, Wrist, Digital, Sciatic, Fentoral, Lateral Cutaneous Nerve
 - of thigh, Ankle each
 - Cervical-Superficial and Deep, Stellate, Splanchnic each
 - Central Venous Line by Brachial, Jugular and Subclavian veins
 - Radial and Femoral Artery cannulation
 - CVP monitoring
 - Pulmonary Capillary Wedge Pressure
 - Neuro-muscular transmission Monitoring
 - 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,

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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) humbar 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.

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-specialities 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.
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- 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

Dr. NANDITA MEHTA blood flow and ICP.

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- 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 anaestheticsintra-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.
 - . 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

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- 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
- Geriatric and pediatric anaesthesia 6.
- 7. Emergency, ENT, orthopedic, ophthalmology, obstetrics, dental, radio-diagnosis and radiotherapy.
- Medical statistics relevant to data collection, analysis, record keeping in 8. anaesthesia, comparison and estimation of significance,
- Care of terminally ill, Hospices management. Do not resuscitate orders. 9.

10. Postures and anaesthesia.

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- Induced hypothermia, incidental, environmental safety of patient. 11.
 - Malignant hyperthermia, myasthenia gravis, GB syndrome and other

neuromuscular diseases, obesity, COPD, Diabetes mellitus, bronchial asthma and hypertensive crises..

Third world anaesthesia.

Inherited metabolic diseases and anaesthesia.

The course contents of 3rd year should cover the following:

- 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. Dr. NANDITA _ME

HTA Principles of human resources and material management.

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- 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 lests/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

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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.

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- Pre-anaesthesia clinic
- 2: Pain clinic
 - Recovery and Post anaesthesia Care Unit (PACU)
 - Intensive Care Units
 - Dialysis and transplant
 - All specialty theatres

Peripheral areas: Radiology, MRI, ECT and other interventional laboratories

The suggested schedule of the Operating Theatre can be as follows: This may change a per availability of specialities.

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ICU Pain

Recovery

Organ Transplant

(Radiology, Radiotherapy)

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posting in the other areas.

ECT, Cardiac Cath)

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; if 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:

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 studen appraisal form (Annexure I)

SUMMATIVE ASSESSMENT training assessment the

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. Dr. NANDITA MEHTA M.D. Profes & Heg

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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:	 Paper I: Basic Sciences as applied to Anaesthesiology Practice of Anaesthesia: Anaesthesia in relation to associated systemic and medical diseases. Proser III: Appendix a in relation to subspecialties/superspecialties 	
Paper II:	Practice of Anaesthesia: Anaesthesia in relation to associated syst	emic
:. ::.	and medical diseases.	
Paper III:	Anaesthesia in relation to subspecialties/superspecialties	At i

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 Fhilds, Nerve Bocks (skeleton).

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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

Miller's Anesthesia

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Stoelting RK, Miller RD Basics of Anaesthesia

11. ICU Book, Paul Marino

12. Text Book of Critical Care, by Fink et al

Regional Anaesthesia, P Prithviraj
 Practical Management of Pain, Raj

Stoelting and Dierdorf. Anaesthesia and Co-existing Disease

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

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 Dr. NANDITA MEHTA M.D.

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Postgraduate Students Appraisal Form Pre / Para / Clinical Disciplines

Name of the Department/Unit _ :

Name of the PG Student ;

Period of Training	
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Sr. No.	PARTICULARS	Satis	Not ifactory	5a	tisfa	tory	More Than Satisfactory	Remarks
		1	2:3		45	6	789	
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	124						
5.	External and Outreach Activities / CMEs							
6.	Thesis / Research work							
7.	Log Book Maintenance			\top	÷			

Publications	Yes/ No.
Remarks*	

TREMARKS: 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

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SIGNATURE OF HOD

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MD ANAESTHESIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024,2025

SUBJECT : MD ANAESTHESIOLOY

1.	Course No.	MD (Anaes.)	4.	Category	Compulsory
2.	Subject Code	201	5.	Examination Duration	3 Hrs
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3.	Course title	Basic sciences as applied to anaesthesiology	6.	Theory marks	100

SYLLABUS

Paper -1(BASIC SCIENCES AS APPLIED TO ANAESTHESIOLOGY)

- <u>1.</u> Anatomy related to respiratory system, heart, coronary circulation, regional anaesthesia, arterial and venous canulation, patient positioning under anaesthesia.
- 2. Physiology of respiratory cardiovascular, hepatobiliary ,renal endocrine, pregnancy, hematological, neuromuscular, cerebral blood flow and ICP, central, autonomic and peripheral nervous systems.
- <u>3.</u> Biochemistryrelevant to fluid balance and blood transfusion perioperative fluid therapy, acid base hemostasis.
- 4. Pharmacology of drugs in anaesthesia practice.
- 5. Principles of Physics that governs functions of basic anaesthesia delivery equipment, airway devices breathing system and monitors fiber optics ,pacemaker and defibrillators, monitoring equipment.
- <u>6.</u> Principles of sterilization and universal precautions maintenance of anaesthesia and related equipments.
- <u>7.</u> Blood gas analysis and other relevantbiochemical measurement technique .
- <u>8.</u> Blood coagulation mechanisms and disturbances, rational use of blood and blood components .
- 9. Research methodology and basics of biostatistics

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Protessor & Head Analistoesie of y Deptt. ASCOMS & Hospital Sidbrey 14

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MD ANAESTHESIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024,2025

Subject: MD ANAESTHESIOLOGY

1.	Course No.	MD (Anaes.)	4.	Category	Compulsory
2.	Subject Code	202	5.	Examination Duration	3 Hrs
3.	Course title	Practice of anaesthesia:Anaesth esia in relation to associated systemic and medical diseases	б.	Theory marks	100

SYLLABUS

PAPER II (Practice of anaesthesia:Anaesthesia in relation to associated systemic and medical diseases)

- Malignant hyperthermia, myasthenia gravis, GB syndrome, other neuro muscular diseases, obesity, COPD, DM, bronchial asthma and hypertensive crises.
- Inherited metabolic diseases and anaesthesia.
- Anaesthesiafor patient's with severe cardiac ,respiratory, renal and hepatobilliary disorder posted for unrelated surgery.
- Shock types, pathogenises and management of patients in shock, renal failure, critically ill on or off ventilator.
- Multiple organ failure.
- Immune response and anaesthesia.
- Special anaesthetic techniques as relevant to :Out patientanaesthesia, hypotensive anaesthesia , anaesthesia in abnormal environment including rural area calamities situation associated medical disorders in surgical patients.
- Case of terminally ill, hospices management and do not ressucitate orders.

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1.	Course No.	MD (Anaes.)	4.	Category	Compulsory
2.	Subject Code	203	5.	Examination Duration	3 Hrs
3.	Course title	Anaesthesia in relation to subspecialities/ superspecialities	6.	Theory marks	100 *

Paper III(Anaesthesia in relation to subspecialities/ superspecialities)

Syllabus

- Priciple and practice of anaesthesiology.
- Neonatal anaesthesia, anaesthesia for infant and children
- Anaesthesia for elderly
- Obstructive anaesthesia and analgesia.
- Anaesthesia for gynaecological, urological, laproscopic procedures.
- Anaesthesia for liver surgery.
- Anaestesiapateint for liver disease.
- Anaesthesia for organ transplant.
- Anaesthesia for dental and orofacial surgery,
- Anaesthesia for ENT procedures and laser surgery.
- Anaesthesia for ophthalmic surgery.
- Anaesthesia management for patient with endocrine disease.
- Anaesthesia for out patient.
- Anaesthesia for orthopaedic surgery.
- Anaesthesia for neurosurgery.
- Anaesthesia for vascular surgery.
- Anaesthesia for thoracic surgery
- Anaesthesia and major oncological surgey.
- Inta operative and anaesthetic implication for laproscopic surgery.

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MD ANAESTHESIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024,2025

Subject: MD ANAESTHESIOLOGY

1.	Course No.	MD (Anaes.)	4.	Category	Compulsory
2.	Subject Code	204	5.	Examination Duration	3 Hrs
3.	Course title	Intensive care medicine Pain medicine Recent advances	6.	Theory marks	100

SYLLABUS

PAPER 4 (INTENSIVE CARE MEDICINE, PAIN MEDICINE, RECENT ADVANCES)

- Resuscitation ACLS and BCLS, cardiac and trauma life Support, Neonatal resuscitation
- Intensive care of critical patients with introduction to artificialventilation ,Management of unconscious patients , oxygen therapy, Shock pathophysiology and management
- Malignant hyperthermia, Myasthenia gravis GBSyndrome and other neuromuscular disease.
- Shock types, Pathogenesis&management of Patients in shock, renal failure, Critically ill and or on Ventilator
- Multiple organ failure
- infection Control ,cross contamination in ICU
- Acupuncture, acupressure and other non-conventionalmethod of treatment.
- Principles of neonate resuscitation ventilation and critical care.
- ICU design and placing
- General principles of medical audit critical incident reporting

PAIN MEDICINE

- · Introduction of acute , chronic pain and management
- Monitoring equiptments used for assessments of neuromuscular blockade
- Pharmacology of local anaesthetics and opiods used for pain management
- Chronic pain therapy and therapeutic nerve blocks

- LASER
- Fibreoptics
- Computers in anaesthesia
- Anaesthesia in robotic surgery and space

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MD ANAESTHESIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025 Subject MD Anaesthesiolgy

-	S.No	Subject Code	Course title	ſ	Viarks
			· .	Theory	Practical
	1.	201	Basic sciences as applied to anaesthesiology	100	
	2.	202	Practice of anaaesthesia: anaesthesia in relation		
	₽		to asspciated systemic and medical disease	100	•
	3	203	Anaesthesia in relation to subspecialities /	100	300
	4.	204	Intensive care medicine, pain medicine and	100 🍝	
P-			Kecent advances		< · · ·

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Total Marks

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1	Course no	Md anaesthesia	
2	Subject code	201	_
	2	202	
		203	
	·	204	
3	Practical marks	300	

PRACTICAL MARKS

1	Long case	100	
2	Short case	50	
3	Short case	50	<u> </u>
4	Viva voce	100	·

RECOMENDED READING

BOOKS:

- 1. Lee's Synopsis of Anesthesia
- 2. Clinical Anaesthesiology by Morgan
- 3. Clinical anaesthesia by Barash Cullen and Stoelting
- 4. Pharmacology and physiology for Anaesthetists by stoelting
- 5. Miller's Anesthesia
- 6. ICU Book, Paul Marino
- 7. Stoeltingand Dierdorf:anaesthesia and coexisting disease
- 8. Clinical anaesthesia by PG Barash
- 9. ECG by Shamroth/ Goldman
- 10 Dorsch and dorsch : understanding anaesthesiaequipment
- 11 . Anesthesia for neonates and infants by Smith
- 12 Principles of obstetric Anesthesia by Craford.

Journals

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3-5 International Journals and 2 National journals

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MD ANAESTHESIOLOGY EXAMINATION TO BE HELD IN MAY / JUNE 2023 ,2024,2025

Subject : MD Anaesthesiology

1 2.	Course No. Subject Code	MD (Anaes) 201	4.	Category	compulsory
3.	Course Infle	Basic Sciences as applied to Anaesthesiology	5.	Examination duration	3 hours
			6.	Theory marks	100

NOTE FOR THE EXAM SETTERS

1. Paper 1 : Basic sciences as applied to anaesthesiology

2. Paper shall be of three hours duration .

3. Paper shall carry maximum 100 marks

4. Paper shall contain 10 questions.All the questions shall be compulsary, having no choice.

5. All questions shall carry 10 marks each.

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1	Course No.	MD (Anaes)	4.	Cate	gory	compu	llsory
2. 3. dis	Subject Code Course Title ease	202 practice of anaes In relation to ass Systemic and me	sthesia: ociated dical	5.	Exami duratio	ination on	3 hours
				6.	Theor	/ marks	100

NOTE FOR THE EXAM SETTERS

- 61 Paper 1 : Basic sciences as applied to anaesthesiology
- 02. Paper shall be of three hours duration .
- 63 Paper shall carry maximum 100 marks

64 Paper shall contain 10 questions.All the questions shall be compulsory ,having no choice.

TosAll questions shall carry 10 marks each.

Dr. NANDITA MEHTA M.D. Professor & Gead Anaesthesiology Deptt. ASCOMS & Hospital Sidhra, JAMMU

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Subject : MD Anaesthesiology

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1	Course No.	MD (Anaes)	4.	Category :	compulsory
2. 3.	Subject Code Course Title	203 anaesthesia in relation to Subspecialities/	5.	Examination duration	⊁ 3 hours
sup	erspecialities				

6. Theory marks 100

NOTE FOR THE EXAM SETTERS

- **0**1. Paper 1 : Basic sciences as applied to anaesthesiology
- 02. Paper shall be of three hours duration .
- 03. Paper shall carry maximum 100 marks
- 64. Paper shall contain 10 questions. All the questions shall be compulsory ,having no choice.

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05. All questions shall carry 10 marks each.

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Subject : MD Anaesthesiology

 1
 Course No.
 MD (Anaes)
 4.
 Category :compulsory

 2.
 Subject Code
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 3.
 Course Title
 intensive caremedicine, Pain medicine,
 5.
 Examination 3 hours duration

 Recent advances
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6. Theory marks 100

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NOTE FOR THE EXAM SETTERS

06. Paper 1 : Basic sciences as applied to anaesthesiology

3. Paper shall carry maximum 100 marks

O⁴/Paper shall contain 10 questions. All the questions shall be compulsory , having no choice.

All questions shall carry 10 marks each.

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Projectsor & Head Anaest Residency Deptt. ASCOMS & Hospital Sidhra, JAMMU.

1.	Course No.	MD (Anaes.)	4.	Category	Compulsory
2.	Subject Code	201	5.	Examination Duration	3 Hrs
3.	Course title	Basic sciences as applied to anaesthesiology	6.	Theory marks	100

PAPER-I

Basic sciences as related to anaesthesiology Maximum marks :100

Time:3 hrs

^

1) What is cerebral autoregulation ?What is the effect of various anaesthetic drugs on cerebral blood flow?

2) Draw a labeled diagram showing various lung volume and capacities discuss the importance of FRC in anesthesia practice.

3) Describe coronary circulation. Discuss factors affecting oxygen demand and supply to the myocardium.

4) Classify antihypertensive drugs .Describe management of hypertensive episode during anesthesia.

5) Describe the functional analysis of bains circuit.Describe the test used for checking the integrity of bain circuit.

6) Describe the pharmacokinetics and pharmacodynamics of etomidate. Describe bliefly its role in clinical practice.

7) Define base excess. How do kidneys compensate for acid base balance?

8) Define fink effect, diffusion hypoxia and second gas effect. How they are important to the anaesthetist?

Write a short note on a)capnography

b) TIVA

c) Oxygen dissociation curve

Dr. (9) AST 10) Describe a) physiological changes of pregnancy b) patient controlled analgesia . Radiology Dept

Professor & Head Anzesthesiology Deptt. MS & Hospital
MD ANAESTHESIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

Subject: MD ANAESTHESIOLOGY

1.	Course No.	MD (Anaes.)	4.	Category	Compulsory
2.	Subject Code	202	5.	Examination Duration	3 Hrs
3.	Course title	Practice of anaesthesia:Anaesth esia in relation to associated systemic and medical diseases	6.	Theory marks	100

MODEL QUESTION PAPER PAPER II

Practice of anaesthesia:Anaesthesia in relation to associated systemic and medical diseases

Max marks: 100

time:3 hrs

- 1. Discuss the preoperative evealvuation and peri operative management of a 28 years old term pregnant patient with severe preeclampsia scheduled for elective cessarian section.
- 2. Discuss the anaestetic problems and management of a 65 year old patient posted for TURP with history of MI 6 months back.
- 3. Describe preanaestheticevalvuation and anaesthetic management of a patient with bronchial asthmascheduled for laproscopic cholecystectomy.
- 4. 16 year old patient of scoliosis is posted for corrective surgery. Discuss pre anaestheticevalvuation and monitoring.
- 5. Discuss intrra operative management of cynotic spell in a 3 year old child with TOF/
- 6. Discuss the anaesthetic management of a case of fracture neck femur with ischemic heart disease for surgical fixation.
- 7. Describe preanaestheticevalvuation and anaesthetic management of a 40 year old female patient with BMI of 40 kg/m2 posted for gastric sleeve surgery.
- 8. Describe preanaestheticevalvuation and anaesthetic management of a 50 year old patient with carcinoma head pancreas with obstructive jaundice for whipple's surgery.
- 9. Describe preanaestheticevalvuation and anaesthetic management of a 60 year old diabetic patient with intestinal obstruction for exploratory laprotomy.
- 10. What is end stage renal disease? Describe preanaestheticevalvuation and anaesthetic management of a 40 year old patient posted for renal transplant surgery. M.D.

Professor & Head Deptt.

Fiot B HOD Badiology Depn

MD ANAESTHESIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024,2025 Subject: MD ANAESTHESIOLOGY

1.	Course No.	MD (Anaes.)	4.	Category	Compulsory
2.	Subject Code	203	5.	Examination Duration	3 Hrs
3.	Course title	Anaesthesia in relation to subspecialities/ superspecialities	6.	Theory marks	100

MODEL QUESTION PAPER

PAPER III (ANAESTHESIA IN RELATION TO SUBSPECIALITIES/SUPERSPECIALITIES)

Maximun marks :100 Time : 3 hours.

- 1. Discuss the perioperative evaluation and perioperative management of a 28 year old term pregnant patient with severe preeclampsia scheduled for elective cessearian section.
- 2. Discuss the anaesthetic problems and management of a 65 year old patient posted for TURP with history of MI 6 months back.
- 3. 16 year old patient of scoliosis is posted for corrective surgery. Discuss pre anaestheticevalvuation and monitoring.
- 4. Describe preanaesthetic evaluation and anaesthetic management of a patient with bronchial asthma scheduled for laproscopic cholecystectomy.
- 5. Discuss perioperative management of a 4 day old neonate posted for repair of tracheoesophageal fistula.
- 6. Describe the anatomy of larynx along with its nerve supply .Illustrate the vocal cord position in various palsies.
- 7. Write short note on a)Stellate ganglion block

b)TURP syndrome

6. Discuss anaesthetic management of a case posted for pneumonectomy.

- 9. Anaesthetic implication of laproscopicsurgery .
- 10. Discuss recent trends in transfusion of blood and blood products .write a note on TRALI

Dr. NANDITA MEHTA M.D. 1AMMU

Fiadiology Dept

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ANAESTHESIOLOGY EXAMINATION TO BE HELD JUNE 2023, 2024, 2025 IN

JUBJECT: MD ANAESTHESIOLODIY

1.	Course No.	MD (Anaes.)	4.	Category	Compulsory
2.	Subject Code	204	5.	Examination Duration	3 Hrs
3.	Course title	Intensive care medicine, pain medicine, recent advances	6.	Theory marks	100

MODEL QUESTION PAPER **EXAMINATION PAPER 4** INTENSIVE CARE MEDICINE, PAIN MEDICINE, RECENT ADVANCES

MAX MARKS: 100

- 1. a.VAS (Visual Analogue Score) and it's interpretation. b. Adjuvants in regional anaesthesia for pediatrics patient.
- 2 What are newer modes of ventilation?
- 3 . Discuss ventilation strategy for an established case of ARDS?
- 4 Describe the criteria and clinical tests for confirmation of brain death.?
- Write the short note on : 5
 - a. Ropivacaine
 - b. Celiac plexus block.
- 6 write short note on
 - a Central venous pressure monitoring
 - b Metabolic acidosis
- 7 .What is the management of case of pulseless electric activity.
- 8 Write a short note on :
 - a. GCS (Glasgow Coma Score)
 - b. Anaesthesia in space.

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- ✓Write a short note on
 - a Anaesthesia in robotic surgery.

Dr. NANDITA MEHTA

b Sedation in ICU

10 Draw a diagram of brachial plexus? Discuss supraclavicular block in detail.

M.D.

eptt.

She She Dept

TIME:3 HRS

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.

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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.

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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.

- 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

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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.

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- 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 Obstetries 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.

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- 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.
- 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

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)

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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

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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 Twinis, common fetal mathemations / 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.

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Provide advice on management of HIV infections in pregnancy, relationship of

- RTI-and HTV 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:

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- 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, Oligoannios.
- 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 phologies etc.
- Prenatal djagnosis (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 utents, 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, armiotic 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:

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- 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 II

Clinical Gynaecology and Fertility Regulation

Epidemiology and etiopathogenesis of gynaecological disorders.

Diagnostic modalities and management of common benign and malignan 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

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- 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).

Unlogical 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

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Operative Endoscopy

Family Welfare and Demography

Definition of demography and its importance in Obstetrics and Gynaecology.

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- 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.
 - 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 (fortility 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 make
- 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 (clinicpathological, 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 elifical practice guidelines.

The postgraduate students shall be required to patticipate in the teaching and training programme of undergraduate students and interns.

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- 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. é

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)

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a. A	llied posts should	be done during the course
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i.	Neonatology	- 2 weeks
ii.	Anaesthesia	2 weeks
iii.	Radiology/Rad	iotherapy - 2 weeks
iv.	Surgery	- 2 weeks
v	Oncology	- 2 weeks

v. Oncology

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.

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working under supervision of senior residents and leaching faculty.

- for 8 weeks

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 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 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, during the training includes

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, it., assessment at the end of training The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

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Postgraduate Examination shall be in three parts:

Thesis 1_

2.

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.

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

Clinical/Practical & oral/viva voce Examination: shall be as given below:

a) Obstetrics:

3.

Clinical

Long Case: 1 case

2 cases with different problems

Short Case/ Spot Case: 1 case

Viva voce including:

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16

- 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

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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

Sr. No.	PARTICULARS	Şati:	Not sfac	tory	Sa	tisfa	icto	ory -	More Than Satisfactory	Remarks
		1	2	3	Ī	4 5	5	6	789	
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	1			1					

Publications

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Yes/ No

Remarks⁴

*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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Deptt of Obst/& Gunsee Acharya Shri Chamadi - o est Medical Sciences - crospit MITHERA (Jamme

Subject: MD Obstetrics & Gynaecology

1.	Course No.	MD/MS(OBG)	4.	Category	Compulsory
2.	Subject Code	121	5.	Examination Duration	3 Hrs
3.	Course Title	Basic Science Applied to Obstetrics & Gynaecology	6.	Theory Marks	100

SYLLABUS

PAPER-I BASIC SCIENCES AS APPLIED TO OBSTETRICS & GYNAECOLOGY

1. BASIC SCIENCE

- 1. Normal and Abnormal development, structure and functions of female and male urogenital system and female breast.
- 2. Applied anatomy of genito-urinary system, Abdomen and pelvis.
- 3. Physiology of spermatogenesis.
- 4. Endocrinology of Male & female Reproduction.
- 5. Anatomy and Physiology of reproductive tract, genitourinary system and lower GI tract.
- 6. Development, structure, function, normal and abnormal pathology of placenta, umbilical cord, Amniotic fluid.
- 7. Anatomical & physiological changes during pregnancy, labor and puerperium.
- 8. Anatomy, development, physiology and circulation of fetus.
- **9.** Physiological and neuro-endocrinological changes during puberty, adolescence, menstruation, ovulation, fertilization, climacteric & menopause.
- 10. Biochemical, Biophysical and endocrine changes during pregnancy.

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- 11. Detailed pharmacology of identified drug used during pregnancy, labor post-partum and gynaecological disorder.
- 12. Hormones in Obstetrics & Gynaecology
- 13. Markers in Obstetrics & Gynaecology (neoplactic and non-neoplastic diseases).
- 14. Pathophysiology of female Reproductive tract in diseased and healthy condition.
- 15. Normal and Abnormal microbiology of female genital tract.
- 16. Immunology in obstetrics & Gynaecology.
- 17. Development of Embryo.
- 18. Lactation

2. MEDICAL GENETICS

- 1. Basic medical genetics including cytogenetics.
- 2. Pattern of Inheritance.
- 3. Chromosomal Abnormalities
- 4. General principles of Teratology
- 5. Screening , counseling and prevention of developmental Abnormalities
- 6. Birth defects

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Subject: MD Obstetrics & Gynaecology

11.	Course No.	MD/MS(OPC)		· · · · · · · · · · · · · · · · · · ·	
		(UDG)	4.	Category	Compulsory
2.	Subject	122	-+		
	Code		5.	Examination	3 Hrs
3.	Course Title	Clinity Lot		Duration	
		Clinical Obstetrics	6.	Theory Marks	100
	· · · · · · · · · · · · · · · · ·			<u> </u>	

SYLLABUS

PAPER-2 (CLINICAL OBSTETRICS)

1. Antenatal Care

- 1. Prénatal care of normal pregnancy.
- 2. Identification and management of complications of pregnancy- abortion, ectopic pregnancy, vesicular mole, Gestational trophoblastic Diseases, hyperemesis gravidarum, multiple pregnancy, antipartum hemorrhage, pregnancy induced hypertension, preeclampsia, eclampsia, heart disease ,renal and hepatic diseases, preterm-post term pregnancies, intrauterine fetal growth retardation, Hydramnios, Oligoamnios.
- 3. Neurological, hematological, dermatological diseases, Immunological disorders, Endocrine disorders and other medical and surgical disorder (acute Abdomen) associated with pregnancy.
- 4. High risk pregnancy.
- 5. Diagnosis of contracted pelvis (CPD) and its management.
- 6. Prolonged gestation.
- 7. Preterm labor, premature rupture of membranes.
- 8. Blood group incompatibilities
- 9. Diagnostic modalities in Obstetrics including modern one (USG ,DOPPLER, ELECTRONIC MONITOR)

10.Infections in pregnancy

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- **11.** Sexually transmitted Infections (STDs)
- 12. Mother to fetal transmission of infections.
- 13. Malpositions and malpresentations and their management.
- 14. Gynaeological disorder associated with pregnancy
- 15.Fetal Therapy
- 16.M.T.P, PC & P.N.D.T Act etc.
- 17. National health MCH programs, social obstetric & vital statistics.

2. Intra-partum care:-

- 1. Normal Labor and abnormal labor
- 2. Partogram
- 3. Induction & augmentation of labor.
- 4. Analgesia & anaesthesia in labor.
- Maternal & fetal monitoring in normal & abnormal labor
- 6. Intrapartum complications

3. Post Partum

- 1. Complication of 3rd stage of labor.
- 2. Identification and management of genital tract trauma.
- 3. Management of critically ill woman
- 4. Postpartum shock, sepsis and psychosis.
- 5. Postpartum contraception.
- 6. Breast feeding practice; counseling and importance of breast feeding .Problem in breast feeding & their management.
- 7. Neonatal resuscitation & management of early neonatal problems.
- 8. Normal & abnormal puerperium.
- 9. Use of blood & blood products.

4. Operative Obstetrics

1. Vaginal instrumental delivery, Caesarian section, Obst. Hysterectomy, destructive operation, manipulations (External/Internal podalic version, manual removal of placenta etc).

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- 2. Medical Termination of Pregnancy -safe abortion- selection of cases technique and management of complications. MTP law
- 5. New Born

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- 1. Care of new born Normal and high risk new born (including NICU care). 2. Asphyxia and neonatal resuscitation. 3. Neonatal hyper-bilirubinemia
- 4. Neonatal sepsis
- 5. Birth trauma

6. Detection and management of fetal/neonatal malformation 7. Management of common neonatal problems.

na. Deptt of \$ Acharya Shri Ottabder Co Medical Sciences & Hospin UDHRA (jamm.

MD/MS OBSTETRICS & GYNAECOLOGY EXAMINATION TO BE HELD IN

MAY/JUNE 2023, 2024, 2025

biect: MD Obstetrics & Gynaecology

Sub	piect: MD Obsta	etrics & Gynacosis			Compulsory
	Course No.	MD/MS(OBG)	4.	Category	
1.	cubiect	123	5.	Examination	3 Hrs
2.	Code Course Title	Clinical Gynaecology & Fertility	6.	Theory Marks	100
		Regulation			 ,

SYLLABUS

PAPER-3 (CLINICAL GYNAECOLOGY & FERTILITY REGULATION)

1. Epidemiology and etiopathogenesis of gynaeological disorders.

- 2. Common benign and malignant gynaecological diseases.
- 3. Fibroid uterus
- 4. Endometriosis and adenomyosis.
- 5. Endometrial hyperplasia.
- 6. Genital prolapse (uterine and vaginal).
- 7. Cervical erosion, cervicitis, cervical polyps, cervical neoplasia.
- 8. Vaginal cysts, vaginal infections, vaginal neoplasia(VIN).
- 9. Benign Ovarian pathologies
- 10. Malignant genital neoplasia –of ovary, Fallopian tubes, uterus ,cervix, vagina, vulva and Gestational Trophoblastic diseases ,Cancer Breast.

11. Congenital malformations of genital tract. Reconstructive surgery in

- 12. Intersex, ambiguous sex and chromosomal abnormalities.
- 13. Reproductive endocrinology.
- 14. Infertility Evaluation and Management.
- 15. Obesity and other Infertility problems.

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16. Advanced Assisted Reproductive Techniques (ART)

- 17. Reproductive tract Infections:
- 18. Radiotherapy and chemotherapy in gynaeologocal malignancies.
- 19. Rational approach in diagnosis and management of endocrinal
 - abnormalities
- 20. Urological problems in Gynaecology
- 21. Orthopedic problems in Gynaecology
- 22. Menopause
- 23. Pediatric, Adolescent and Geriatric Gynaecology.
- 24. 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 and Minimal Invasive surgery
- 25. Family Welfare and Demography - Demography and its importance in Obstetrics and

Statistics regarding maternal mortality, perinatal mortality/morbidity,

- birth rate, fertility rate.
- National health policies and program.
- Male and Female contraception
- Medical Treatment of Pregnancy: Act, its implementation, providing safe
- and adequate services.
- Demography and population dynamics.

Subject: MD Obstetrics & Gynaecology

1.	Course No.	MD/MS(OBG)	4.	Category	Compulsory
2.	Subject Code	124	5.	Examination Duration	3 Hrs
3.	Course Title	Recent Advances in Obstetrics & Gynaecology	6.	Theory Marks	100

SYLLABUS

PAPER-4 (RECENT ADVANCES IN OBSTETRICS & GYNAECOLOGY)

- 1. Recent advances in Assisted Reproductive Technology.
- 2. National Programmes.
- 3. New bills (PC,PNDT, Surrogacy,ART).
- 4. Imaging technique.
- 5. Stem cell therapy in Obstetrics & Gynaecology.
- 6. Minimal Invasine surgery & Robotic surgery
- 7. New Drugs in Obstetrics and Gynaecology.
- 8. Recent advances in medical and obstetric disorders of pregnancy.
- 9. Recent advances in fetal imaging and therapy.
- **10.**Recent advances in Gynaecological oncology.
- **11.**Recent advances in Endometriosis and benign conditions of gynaecology.
- 12. Advances in contraception.

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Jecc	Code	Course Title			
No	Subject Cour		The	eory	Practical
 	121	Basic Science as applied to Obstetrics & Gynaecology Clinical Obstetrics	10	00	
2.	122	Clinical Gynaecology Fertility Regulation	& 1	100	400
4.	124	Recent Advances in Obstetrics &		100	
		Gynaecoro		400	800
		Total Marks			

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Subject: MD Obstetrics & Gynaecology

1.	Course No.	MD/MS(OBG)	4.	Category	Compulsory
2.	Subject Code	121	5.	Examination Duration	3 Hrs
3.	Course Title	Basic Science Applied to Obstetrics & Gynaecology	6.	Theory Marks	100

MODEL QUESTION PAPER

PAPER-I

Basic Sciences as Related to OBG

Max.Marks:100

Time:3 hrs

- 1. Describe with diagram Anal sphincter complex. Discuss classification, presentation and treatment of OASIS (obstetrics anal sphincter injuries).
- 2. Describe cohort study & Discuss various sampling techniques.
- 3. Describe development and structure of umbilical cord .Discuss clinical features ,effects and management of cord prolapse.
- 4. Describe the cervical changes in pregnancy and labour.
- 5. Describe the extra -peritoneal spaces of true pelvis and their surgical importance.
- 6. Discuss the blood supply of pelvic organs. Describe its clinical importance.
- 7. Describe the development of female internal genital organs. Discuss the mullerian anomalies and the clinical significance.
- 8. Describe the physiology of trophoblastic implantation and its clinical significance.
- Describe the anatomy of Perineum and write the management of 3rd degree perineal tear.

10.Write immunology of Recurrent Pregnancy loss

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Subject: MD Obstetrics & Gynaecology

14.	Course No.	MD/MS(OBG)	4	Catal	
2.	Subject Code	122	5	Event	Compulsory
3.	Course Title	Clinical Obstetrics	6	Duration	3 Hrs
<u>_</u>				Theory Marks	100

MODEL QUESTION PAPER

PAPER-II

Clinical Obstetrics

Max.Marks:100

- 1. Describe causes of Rh isoimmunization. Elaborate management of Rh –
- 2. What is TOLAC? What are the factors to be considered prior to TOLAC?
- Describe intrapartum monitoring in a women undergoing TOLAC. 3. Describe various manoeuvres in Assisted Breech delivery. What are complication of assisted breech delivery.
- 4. Management and complications of shoulder dystocia. 5. What are high risk factors for developing gestational diabetes.Describe management of diabetic ketoacidosis in pregnancy.
- 6. Factors predicting preterm labour. Explain principles of management of
- 7. Management of molar pregnancy. What are the indications for
- 8. Classify perineal tears .Describe management of 3rd and 4th degree perineal
- 9. USG in multiple pregnancy.
- 10. Describe pudendal nerve block in labour.

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Subject: MD Obstetrics & Gynaecology

1.	Course No.	MD/MS(OBG)	4.	Category	Compulsory
2.	Subject Code	123	5.	Examination Duration	3 Hrs
3.	Course Title	Clinical Gynaecology & Fertility Regulation	6.	Theory Marks	100

MODEL QUESTION PAPER

PAPER-III

Clinical Gynaecology & Fertility Regulation

Max.Marks:100

Time:3 hrs

- 1. Define stress urinary Incontinence. Describe the etiology and evaluation in brief of a 40 year old nulliparous female with SUI.
- 2. Enumerate various tumor markers used in gynaecology. Describe its clinical significance.
- 3. WHO medical eligibility criteria for injection medroxyprogesterone acetate as contraception. How will you manage a case of missing thread in patient with IUCD in situ.
- Describe stages of follicular development during normal menstrual cycle. Discuss in detail its clinical application in management of infertility.
- 5. Describe the colposcopic finding in invasive Ca cervix. How will you manage a recently married nulliparous patient of 29 yrs of age with Ca cervix stage IA2.
- 6. Discuss in detail indications, contraindications and complications of operative hysteroscopy.
- 7. Discuss role of laser in gynaecology.
- 8. Describe diagnosis and management of genital tuberculosis.
- 9. Describe causes and management of recurrent vulval ulcer.
- 10.Describe types, indications and contraindications of long acting reversible contraception.

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Subject: MD Obstetrics & Gynaecology

1.	Course No.	MD/MS(OBG)	4.	Category	Compulsory
2.	Subject	124	5.	Examination Duration	3 Hrs
3.	Course Title	Recent Advances in Obstetrics & Gynaecology	6.	Theory Marks	100

MODEL QUESTION PAPER

PAPER-IV

Recent Advances in Obstetrics & Gynaecology

Max.Marks:100

1. Discuss the antepartum and intrapartum care of pregnancy complicated by Lethal fetal anomalies.

- 2. Discuss the Diagnostic criteria of PCOS and role of inositol in management of PCOS.
- 3. (a) Discuss the ethical Issues in prenatal Diagnosis.
 - (b) Define epigenetics. Role of epigenetics in diseases and its uses.
- 4. (a) Write about MTP amendment ACT,2021

(b) Discuss COVID vaccination in pregnancy.

- 5. (a) Describe the classification of hysterectomy.
 - (b)What are the complications of laparoscopic hysterectomy.
 - (c) What is the role of MIS in Gynae oncology?
- 6. (a) Discuss indications, techniques and advantageous of thermal ablation.
- (b) Describe the components and goals of the WHO call for cervical cancer eliminations to be achieved by 2030. Enumerate the difficulties in achieving these goals in India.
- 7. (a) Discuss the phases of acute wound.
 - (b) What are the types of wound healing.
 - (c) Discuss the role of topical negative pressure therapy in wound healing.

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Time:3 hrs

8, (a) JSSK

(b) Write short note on Obstetric Audit.

9. (a) HPV Vaccine.

(b) Role of MRI in obstetrics and Gynaecology.

10.(a) Discuss the role of stem cell therapy in obstetrics and gynaecology.

(b) Discuss the indications and drugs used in menopausal hormone therapy.

11.Long term and short term complications in children born of ART.

12. Technique to improve the quality of embryo in IVF.

13.Management of fetal anaemia.

14.Indications and methods of female fertility preservation.

15.Next generation sequencing – the future of reproductive genetics.

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Subject: MD Obstetrics & Gynaecology

Sub	oject: MD Obso			C-hogon/	Compulsory
1. 2.	Course No. Subject Code	MD/MS(OBG) 121	4. 5.	Examination Duration Theory Marks	3 Hrs 100
3.	Course Title	Basic Science Applied to Obstetrics & Gynaecology			

NOTE FOR THE EXAM SETTERS:

- i. Paper I: Basic Sciences as related to Obstetrics & Gynaecology.
- ii. Paper shall be of three hours duration.
- iii. Paper shall carry maximum 100 marks.
- iv. Paper shall contain ten Questions. All the question shall be compulsory, having no choice.
- v. All questions shall carry 10 marks each.

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MD/MS OBSTETRICS & GYNAECOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

Subject: MD Obstetrics & Gynaecology

1.	Course No.	MD/MS(OBG)	4.	Category	Compulsory
2.	Subject Code	122	5.	Examination Duration	3 Hrs
3.	Course Title	Clinical Obstetrics	6.	Theory Marks	100

NOTE FOR THE EXAM SETTERS:

- i. Paper II: Clinical Obstetrics .
- ii. Paper shall be of three hours duration.
- iii. Paper shall carry maximum 100 marks.
- iv. Paper shall contain ten questions. All the question shall be compulsory, having no choice.
- v. All questions shall carry 10 marks each.

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MD/MS OBSTETRICS & GYNAECOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

Subject: MD Obstetrics & Gynaecology

1.	Course No.	MD/MS(OBG)	4	Category	
2.	Subject Code	123	5.	Examination	3 Hrs
3.	Course Title	Clinical Gynaecology & Fertility Regulation	6.	Theory Marks	100

NOTE FOR THE EXAM SETTERS:

- i. Paper III: Clinical Gynaecology & Fertility Regulation.
- ii. Paper shall be of three hours duration.
- iii. Paper shall carry maximum 100 marks.
- iv. Paper shall contain ten Questions. All the question shall be compulsory, having no choice.
- v. All questions shall carry 10 marks each.

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MD/MS OBSTETRICS & GYNAECOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

Subject: MD Obstetrics & Gynaecology

1.	Course No.	MD/MS(OBG)			
2.	Subject Code	124	<u>4.</u> 5.	Category Examination	Compulsory 3 Hrs
3.	Course Title	Recent Advances	+	Duration	5 115
		in Obstetrics & Gynaecology	0.	Theory Marks	100

NOTE FOR THE EXAM SETTERS:

- i. Paper IV: Recent Advances in Obstetrics & Gynaecology.
- ii. Paper shall be of three hours duration.
- iii. Paper shall carry maximum 100 marks.
- iv. Paper shall contain ten questions. All the question shall be compulsory, having no choice.
- v. All questions shall carry 10 marks each.

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MD/MS OBSTETRICS & GYNAECOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

Subject: MD Obstetrics & Gynaecology

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<u> </u>	Course No.	MD/MS(OPC)
2.	Subject Code	
		122
		122
Ĺ		123
3,	Practical Marks	124
		400

Practical Marks:-		
Long Case	Obstetrics 100 Marks	Gynaecology 100 Marks
Short Case	50 Marks	50 Marks
Viva-Voce	50 Marks	50 Marks
Total	200 Marks	200 Marks = 400 Marks

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Recommended Reading

Books (latest edition)

Obstetrics

- 1. William Textbook of Obstetrics
- 2. High risk Obstetrics-James
- 3. High risk Pregnancy-lan Donald
- 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 Gynaceoloy-Novak
- 2. Text book of Operative Gynaecoloy –Te –Lindes
- 3. Textbook of operative Gynaecology Shaws
- 4. Text book of Gynaecology and Reproductive Endocrinology-Speroff
- 5. Text book of obstetrics & Gynaecology –Dewhurst
- 6. Manual of Gynaeological Oncology-Desal
- 7. Principles of Gynaeocology-Jeffcoates.

Journals:-

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

of Other & Gonacon Dept/ Acharya Shri Ebander Co me Medical Sciences & Hospic-TORRA (James

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN OPHTHALMOLOGY

Preamble:

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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.

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.

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.

Prof. & H OD. Depactment of ENT. ASCO S & Hospital Sidhra Jammu

Dr Kulde Singh Mehta Profe sor & Head Departm ent of Surgery 4SCOM & Hospital aកាតាប

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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.
- 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.
 - 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.
 - 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:

- 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.
- 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.
- 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:

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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.

Ophthalmic pathological/microbiological/biochemical sciences

Be able to interpret the diagnosis in correlation with the clinical data and routine materials received in such cases.

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 :

5.

- 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.

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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.
- 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 and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

Psychomotor domain

At the end of the course, the student should acquire following clinical skills:

Essential diagnostic skills:

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- Examination techniques along with interpretation
- 1. Slit lamp Examination
 - 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

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II. Basic investigations along with their interpretation

1. Tonometry

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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

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

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:

- I. 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) / Opfic 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

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III.

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
 - 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



 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

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- 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
 - Comeal

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

ii -

Therapeutic and optical

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

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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 postoperative 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:

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These are only broad guidelines and are illustrative, there may be overlap between sections.

I. Basic Sciences:

i.

- . Orbital and ocular anatomy
 - Gross anatomy
 - ii. Histology
 - iii. Embryology
 - 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

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r Kuldcep Singh Mehter Professor & Head Department of Surgery ASCOMS & Hospital Jammu Dr. RENU HASHIA M.B.B.S. M.S. (Ophthol Prod. A. MOD Deedd. No.384) Prod. A. MOD Deedd. No.384) (Debachnont of Ophthalmologia (Debachnont of Ophthalmologia (Debachnont of Ophthalmologia) 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
- xy. 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 intradepartmental 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:

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.

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- 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.

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.

l) 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.

- 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

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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.

3. Rotations: Specialty clinics

The student may rotate in the following subspecialty clinics:

- Anterior segment and cataract
- Glaucoma
- Oculoplastics
- Paediatric ophthalmology and strabismus
- Retina and Uyea
- Cornea, Contact lens and low vision

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- 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).

 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.

 Maintenance of log book: Log books shall be checked and assessed periodically by the faculty members imparting the training.

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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:

I. 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

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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 & OpticsPaper II:Clinical OphthalmologyPaper III:Systemic Diseases in Relation to OphthalmologyPaper IV:Recent Advances in Ophthalmology and Community Ophthalmology

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

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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.
 - Fundamentals of Clinical Ophthalmology Series. Coster D. Cornea. Blackwell Publishing Limited,
 - The Contact Lens Manual. A practical guide to fitting. Gasson A, Morris A J. Butterworth Heinemann Elsevier.
- 15. Steinert's cataract surgery.
 - Shields Text book of glaucoma
- 17. Smith and Nozik : Uvea

16.

- 18. Rootman's diseases of the orbit
- 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.
- Management of Strabismus and Amblyopia. Pratt-Johnson and Tilson: Thieme Verlag.
- 23. Handbook of Pediatric Eye and Systemic disease. Wright, Spiegel and Thompson.

- 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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- 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.
- Management of Complications of Refractive Surgery. Alio JL, Azar DT. Springer.
- 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
- 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
- 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.
 - Inherited Retinal Diseases. A Diagnostic Guide. Jimenez Sierra JM, Ogden TE, Van Boemel GB. Mosby.
 - Clinical Ophthalmology. Kanski JJ. Butterworth/Heinemann.
 - ABC of Resuscitation. Colquinum, M. C., Evans, T. R., Handley, A. J. BMJ Publishing Group.
 - 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
- International Council of Ophthalmology Residency Curriculum available at http://www.icoph.org/

Journals

41.

42

43.

44

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

Department of EN1. ASCO IS & Hospital Sidhra Jammu

Dr Kuldoce Singh Mehta Professor & Head Department of Surgery ASCOMS & Hospital Jammu Dr. RENU HASHIA M.B.B.S. M.S (Ophilio) Prof. & HOD (Regd: No.394) Department of Ophthalms(QG) ASCOMS & HOSPITAL & RHRA, JAMMU.

Annexure **í**

Postgraduate Students Appraisal Form Pre / Para /Clinical Disciplines

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Name of the Department/Unit

Name of the PG Student

Period of Training

Sr. No.	PARTICULARS	Sati	Noi sfac	: tory	/ Si	atis	fact	ory	More Satisfa	Than ctory	Rem	arks
	· -· · · · · · · · · · · · · · · · · ·	1	2	3		4	5	6	78	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		t, see a								:.	
5.	External and Outreach Activities / CMEs		···· :	:						.A.		•
6.	Thesis / Research work		-							(858) (858)		· · · ·
7.	Log Book Maintenance	·										

Publications

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

KHUD.

Prof. & H & D. Department of ENI. ASCOMS & Hospital Sidhra, Jammu.

Dr Kuld Singh Mehta Professor & Head Department of Surgery ASCOMS & Hospital R $k \sigma m u$

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Dr. RENU HASHIA M.B.B.S; M.S (Ophtho) Profile HOD (Regd. No.334) Department of Ophthalaight ASCOMS & HOSPITAL EIDHRA, JAMMU.

Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	151	5.	Examination Duration	3 Hrs
3.	Course title	Basic Ophthalmology	6.	Theory marks	100

SYLLABUS

PAPER -I (BASIC OPHTHALMOLOGY) ANATOMY (a). Anatomy & embryology of the eye (b). Anatomy of orbit (c). Anatomy of ocular adnexae (d). Extraocular muscles action & nerve supply PHYSIOLOGY (a). Ocular circulation (b). Ciliary epithelium & aqueous humour dynamics (c). Intraocular pressure (d). Accommodation & Presbyopia (e). Pupil (f). Color vision (g). Central visual pathways (h). Binocular vision (i). Physiology of vision. **Ocular Pathology Ocular Biochemistry Ocular Micro-Biology** Immunology with particular reference to Ocular Immunology Genetics in Ophthalmology **Ocular Oncology OPTICS & REFRACTION** (a) Physical optics (b) Geometric optics & clinical refraction (c) Applied optics including optical devices (d) Disorders of Refraction (e) Contact lenses. (f) Low vision. (g) Aberrations uldeep Singh Me ofessor & Head am Singh Jamwal Surg DLO, MS ENT ់ភូទដំ Reg. No. 1816 Protessor Dept. of ENT and Head & Neck Surgery Jaminu Prot & HOD Department of Ophthalmology ASCOMS, Sighte Jammu ASCONT & Hognital ginter any mark

Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory	
2.	Subject Code	152	5. Examination Duration		3 Hrs	
3.	Course title	Clinical Ophthalmic	6.	Theory marks	100	

SYLLABUS

PAPER -II (CLINICAL OPHTHALMOLOGY)

Diseases Of The Eye

Anterior Segment Diseases.

- a) Disorders of the conjunctiva
- b) Disorders of the ocular adnexa
- Corneal diseases c)
- d) Eye banking & keratoplasty
- e) Disorders of the Sclera
- f) Disorder of the lacrimal system
- g) Disorder of the Uval tract
- h) Lens, cataract & its management.
- Intraocular lenses. i)
- i) Glaucoma.

Posterior Segment Diseases

a) Hereditary retinal & choroidal diseases.

- b) Acquired macular diseases
- c) Retinoblastoma & leukokoria

d) Diabetic retinopathy.

e) Vascular anomalies of the Retina.

f) Peripheral retinal neovascularization.

g) Vitreal diseases.

h) Disorders of the Optic Nerve & Visual Pathway

i) Congential anomalies & Intraocular tumours.

Diseases Of The Orbit

Orbital & Adnexa Tumours: -

- Orbital tumours & treatment a)
- Tumours & related lesion of the eyelid & conjunctiva b)

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Sidh's Lampin

Oculoplasty

1. Basic occulopastic surgery

Enucleation & evisceration

camofacial anomalies

Strabismus & Amblyopia

Singh Mehta Dr

partment of Surgery SCOMS & Hospital

Jammu

Head

Department of Ophthalmolog ASCOM State Itospital

dor Cingh Jamwel DLO, MS E .o i**616** Reg Protessor Dept. of ENT and Peac & Neck Suggery ASCOMS. 2

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Subject: MS Ophthalmology

1	Paediatric	Onhthalmology
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- 2. OCULAR EMERGENCY & TRAUMA
- 3. OCULAR ANAESTHESIA & SURGERIES Anaesthesia
- a) Surface, infiltration, regional anesthesia
- b) Premedication, sedation for local anesthesia
- c) Premedication for general anesthesia
- d) Akinesia & intraocular tension during anesthesia
- e) Cardio pulmonary complication with anesthesia
- f) Cardiac arrest & local anaesthetic emergency
- **Operative Surgeries** ۶
- **OCULAR THERAPEUTICS & TOXICITY** ×
- **OCULAR DIAGNOSTIC & OPERATIVE INSTRUMENT** >
 - Radiology in ophthalmologic diagnosis. I.
- Ultrasonography A scan & B scan. Н.
- Fluorescein angiography. III.
- ERG & EOG. IV.
- Pachymeter. V.
- Autoperimeter. ٧Ľ
- Autorefractometer. VII.
- Applantion tonometery. VIII.
- Direct Ophthalmoscope. IX.
- Indirect ophthalmoscope. Х.
- XI. VEP.

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- Operating microscope. XII.
- Slit lamp. XIII.
- Keratometer. XIV.
- XV. Specular microscope.

Department of Ophthalmology PTOI & HUD ASCOMS & Hospital sidhia tammir

Jamwal Dr. Pada OLO, MS ENT Reg No. 1816 Dept. of ENT and Head & Neck Surgery ASCOMS, Stu. 1, Jammu

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Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	153	5.	Examination Duration	3 Hrs
3.	Course title	Principle and Practices of Surgry and Related Topics	6.	Theory marks	100

PAPER-III (PRINCIPLE AND PRACTICES OF SURGERY AND RELATED TOPICS) 1. Ocular Manifestations Of Systemic Diseases: Diabetes mellitus. a. Hypertension. b. Infectious diseases like: - aids, tuberculosis, sarcodosis, leprosy, etc. ¢, Haemotological diseases. d. Connective tissue disorders. e. Hyperlipoproteinemias, amyloidosis. f. Immune Ocular Disorders g. Inborn metabolic disorders & the eye. 2. Genetics & eye diseases. 3. Retinal vascular occlusions. 4. Neuro-ophthalmology. 5. a) Ophthalmic manifestation of brain tumours. b) Ophthalmic manifestation of vascular diseases of brain. c) Optic nerve disease. d) Migraine. Community Ophthalmology & National Programmes 6. Dr. Padath Singh Jamwal DLU, MS ENT Barlio No. 1816 Dept. of ENT and Head & Neck Surgery ASCOMS erot & HOD Department of Ophthalmoton ap Stanth Mehtascows & Hospital. essor and Sidh a tamma Dr K $g_{\rm eff} = 0$ Depterne MSSplint AS Jainmu

Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	154	5.	Examination Duration	3 Hrs
3.	Course title	Recent Advances in Ophthalmology	6.	Theory marks	100

SYLLABUS

PAPER -- IV (ADVANCES IN OPHTHALMOLOGY)

- 1. Recent Advances In Surgical Management Of Cataract.
- a) Phacoemulsification.
- b) Newer intraocular lens implant.
- 2. Recent advances in diagnostic procedures, medical & surgical management of glaucoma.
- 3. Recent advances in lasers in ophthalmology
- 4. Recent advances in vitreous substitutes & perfluorocarbons. 4.1.5: Recent advances in retinal detachment surgery.
- 5. Recent advances in ultrasonography.

- 6. Recent advances in indocyanine green angiography 4.1.8: Recent advances in optical coherence tomography. 4.1.9: Newer antibiotics, antifungals & antivirals.
- 7. AntiVEGF therapy

fuldaut Singh Mehta Dr. Padam Singh Jamwal Professor & Head $\mathbf{D}\mathbf{r}^{1}$ DLO, MS ENT Department of Surgery Vo. 1815 ASCOMS & Hospital Dept. of For and Head & Neck Surgery Jammu ASCOMS, Sidhra, Jamici Department of Ophthalmolog & HOD 1075 ASCOM5 & Hospital. Sidhra fammu

Subject: MS Ophthalmology

S.No.	Subject Code	Course Title		Marks
			Theory	Practical
01.	151	Basic Ophthalmology	100	
02.	152	Clinical Ophthalmology	100	
03.	153	Principle and Practices of Surgery and Related Topics Ophthalmology	100	400
04,	154	Recent Advances in Ophthalmology	100	
			400	
		Total Marks		800

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ASCOMS & Hospital

Reg. No. 1816 Professor Dr. I Dept. of ENT and Head & Neck Surgery ASCOMS, Sidhra, Jammu

Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	151	5.	Examination Duration	3 Hrs
3.	Course title	Basic Ophthalmology	6.	Theory marks	100

MODEL QUESTION PAPER

MS (Ophthalmology) Paper-I **Basic Ophthalmology** Max. Marks: 100 Time: 3 hrs Which structures of eve have ectodermal origin. Describe diagrammatically the development of crystalline lens. List techniques to examine fundus of eye. Diagrammatically show the optics of direct 11 ophthalmoscopy. Define Accomodation. How it is affected by age and what do you understand by progressive Ш glasses. ŧ۷ Briefly write about Histology of ciliary body(pars plicata). What is the role of ciliary epithelium in aqueous formation. v Shortly write about iris histology. Describe blood supply of choroid. Describe two methods of subjective detection VI What is subjective correction of astigmatism. of astigmatism. Role of systemic steroids in eye diseases especially uveitis. Discuss various side effects of its VII long term use. Discuss biochemical and anatomical features of vitreous. How its degeneration affects the health of VIII retina. What do you understand by tear drainage pathways. Write in detail about the lacrimal pump. IX Briefly discuss one most important theory of colour vision. Briefly write about colour vision Х tests. singh \mathcal{D} Surgery e t Hospital Dr. RedamTSinah lamwal DLO. MS ENT Reg. No. 1816 Professor Dept. of ENT and Head & Neck Surgery ASCOMS, Sidhra, Jammu CTOL & HOD Department of Ophthalmology ASCOMS & Hospital. Sidhua lammu

Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	152	5.	Examination Duration	3 Hrs
3.	Course title	Clinical Ophthalmic	6.	Theory marks	100

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MS (Ophthalmology) Paper-II Clinical Ophthalmic

Max. Marks: 100

· Time: 3 hrs

- Discuss pathological features of Retinoblastoma with diagram and effect of pathological presentation and management.
- II Discuss etiology and management of VIth nerve palsy.
- III Discuss the management of Delayed post operative endophthalmitis.
- IV Discuss pathology and management of congenital glaucoma.
- V Write about the pathology and its clinical implications in a patient with Chronic Simple Glaucoma.
- VI Write about pathology of ARMD and illustrate its clinical significance in management of ARMD.
- VII How will you investigate a case of ulcerative keratitis of 7 days origin with reference to basic microbiological investigations.
- VIII Aeitiopathogenesis of blunt trauma to orbit and surgical management of fracture roof of maxillary sinus.
- IX Enumerate Biochemical and Pathological changes in Endocrine Exophthalmos with their significance.
- X Write about the pathology of senile catarict. How these changes affect the Cataract management with phacoemulsification.

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Department of Ophthalmolog ASCOMS & Hospital Sidhia tamme Dr. Papaim Singh Jamwal DLO, MS ENT Reg. No. 1815 Protessor Dept. of ENT and Head & Neck Surgery ASCOMS, Sidh a. Jammu



Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	153	5.	Examination Duration	3 Hrs
3.	Course title	Principle and Practices of Surgery and Related	6.	Theory marks	100

MS (Ophthalmology) Paper-III

Principle and Practices of Surgery and Related Topics

Max. Marks: 100

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Time: 3 hrs

- Discuss the role of Newer Antifungal drugs in Ophthalmology.
- II Enumerate various drug delivery routes which can be used in a case of post-operative endophthalmitis.
- III Write clinical features of PDR and how you will manage a patient of PDR.
- IV Name various dyes used in eye. What is the significance of investigative dyes in Ophthalmology.
- V Define LASER. How lasers are helpful in posterior segment eye diseases.
- VI Discuss various mydriatics and cycloplegics drugs along with their mechanism of action.
- VII Enumerate various filteration procedures. How antimetabolites affect success rate of surgical management of Glaucoma.
- VIII What are the age changes seen at fovea. How will a diagnosed case of wet ARMD managed.
- IX What is conventional phacoemulsification. Also write about the modern variations in emulsification of cataractous lens.

Define and enumerate causes of entropion. Discuss treatment of cicatritial entropion. х SUE Profest or & Head DrNBada Singh Jamwal DLO, MS ENT etti -Reg. No. 1816 ्र 🗷 Hospi Professor mmu drot. Dept. of ENT and Head & Neck Surger Department of Ophthalmonies SCOMS, Sidhra, Jamirt J ÷ ASCOMS & Hospital. Sidhin Jaminh

Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	154	5.	Examination Duration	3 Hrs
3.	Course title	Recent Advances in Ophthalmology	6.	Theory marks	100

MS (Ophthalmology) Paper-IV Recent Advances in Ophthalmology

Max. Marks: 100

Time: 3 hrs

- What are the causes of Dry eye. Discuss changing trends in diagnosis and management of Dry eye.
- How will you diagnose and manage a case of Keratoconus in 2009.
- III Write briefly imaging techniques for anterior segment of eye.
- What is Plus disease of ROP. Discuss role of LIO in Retinopathy of prematurity.
- V What is aetiopathogenesis of wet ARMD. Write about the recent advances in medical management of CNVM.
- VI Enumerate causes of Blindness in India. What steps have been taken at National level to eradicate it.
- VII Compare merits and demerits of cold phaco and conventional phaco. VIII What is LASIK. Discuss its demerits.
- IX What is accommodation group doing for a patient of cataract.
- X Draw conclusive comparison between Laser Iridotomy and Surgical Peripheral Iridectomy.

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Department of Ophthalinows & ASCOMS & Hospital. Sidhia faminu

Singh Jamwal DLO, MS ENT No. 1816 Professor Dept. of ENT and Head & Neck Surgery ASCOMS, Sidhra, Jammu

'Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)
2.	Subject Code	151
		152
		153
		154
3.	Practical Marks	400

Practical & Viva voce examination (Total = 400 marks) Format of Practicals Marks Type of case 1 Long Case 70 2 Short Cases (20 each) 40 2 Fundus Cases (20 each) 40 Spotting-(10 each) Any 5 of them. 50 Fundus Photograph FFA e USG(A&B Scan) X-rays Perimetry CT/MRI OCT Corneal Topography . 4 • HRT/GDx 50 Surgical Instruments/steps Dark Room examination/Refraction 50 100 Oral (Grand Viva) Gep Sin \mathbf{c}_{ij} d (esso ? in gen me OMS L HUSPILA Dr. Baderh Singh Jamwal D Jammu DLO, MS ENT Reg. No. 1816 Professor Dept. of ENT and Head & Neck Surgery TOT & HOL Department of Ophthalanator ASCOMS, Sidhra, January ASCOMS & Hospital Gidhen Tamm

Subject: MS Ophthalmology

RECOMMENDED READING BOOKS: Core books Parson's Diseases of the Eye × Sihota & TandonClinical Ophthalmology ≽ Kanski.J.J **Reference Books Ophthalmology** > Yanoff Duker Retina ≻ Stephen, J. Ryan Systems of Ophthalmology > Duke Elder Principles and Practices of Ophthalmology ъ Peyman, Sander & Goldberg Diagnosis and Therapy of Glaucoma × Becker Shaffer Glaucoma > Chandler & Grant Refraction > Duke Elder Practical Orthoptics in treatment of Squint > Keith Lyall Mastering Phacoemulsification > Paul. S.Koch × Anatomy and Physiology of the Eye A.K.Khurana Glaucoma ۶ Shields Cataract Surgery and its complications Jaffe Stallard's Eye Surgery ъ Stallards Automated Static Perimetry × Anderson and Patela Cornea × Smolin Journals American Journal of Ophthalmology × British Journal of Ophthalmology Archives in Ophthalmology Ophthalmology Indian Journal of Ophthalmology × International Ophthalmology Clinics Mehta Rep Sink ં**૦**૧ ે ritery am Singh Jamwal OMS & HOSP 3 Dr. På DLO, MS ENT jammu Reg. No. 1816 Professor Dept. of ENT and Head & Neck Surgery FOL & HUE ASCOMS, Sidhra, Jammu Department of Ophthalmining ASCOMS & Hospital. Sidhra Jammu

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Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	151	5.	Examination Duration	3 Hrs
3.	Course title	Basic Ophthalmolog	3y 6.	Theory marks	100

NOTE FOR THE EXAM SETTERS:

- i) Paper I: Basic Ophthalmology
- ii) Paper shall be three hours duration.
- iii) Paper shall carry maximum 100 marks.
- iv) Paper shall contain ten questions. All the questions shall be compulsory having no choice.
- v) All questions shall carry 10 marks each.

Dr Kuddeep Singh Mehte Hofessor & Head onession of Surgery atm Hospital De. jammu ł C

on & HEI Department of Ophthalmanus ASCOMS & Hospital Sidhra Tamma

Y Singh Jamwal DLO, MS ENT Reg. No. 1816 Professor

Dept. of ENT and Head & Neck Surgery ASCOMS, Sidhra, Jammu
MD/MS OPHTHALMOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	152	5.	Examination Duration	3 Hrs
3.	Course title	Clinical Ophthalmology		These services	100

NOTE FOR THE EXAM SETTERS: i) Paper - II: Basic Ophthalmology ii) Paper shall be three hours duration. iii) Paper shall carry maximum 100 marks. Paper shall contain ten questions. All the questions shall be compulsory having no choice. iv) All questions shall carry 10 marks each. v) ingh Mehta (e 🕬 SOF & Hest Dr Ku t of Surgary VIS & Hospital Der Jammu gh Jamwal Dr. DLO, MS ENT eg. No. 1816 Professor Dept. of ENT and Head & Neck Surgery JUL & HUT ASCOMS, Sidhra, Jammu Department of Ophinamous ASCOMS & Hospital. Sidhes Jammi

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MD/MS OPHTHALMOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

Subject; MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsor
2.	Subject Code	153	5.	Examination Duration	3 Hrs
3.	Course title	Principle & Practices of Surgery and Related Topics	6.	Theory marks	100

NOTE FOR THE EXAM SETTERS: Paper - III: Principle & Practices of Surgery and Related Topics i) ii) Paper shall be three hours duration. Paper shall carry maximum 100 marks. iii) Paper shall contain ten questions. All the questions shall be compulsory having no choice. iv) All questions shall carry 10 marks each. v) Dr Kuldcop Siagh Mahta Profes Surg Singh Jamwal No & Hospital Depa DLO, MS ENT ASC Reg. No. 1816 jaminu 2 Professor Depl. of ENT and Head & Neck Surgery ··· & HUr ASCOMS, Sidhra, Jammu Ocpartment of Ophinalmolog ASCOMS & Hospital, Sidhin Ismmir

MD/MS OPHTHALMOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

Subject: MS Ophthalmology

1.	Course No.	MD/MS (Ophtho)	4.	Category	Compulsory
2.	Subject Code	154	5.	Examination Duration	3 Hrs
3.	Course title	Recent advances in Ophthalmology	6.	Theory marks	100

NOTE FOR THE EXAM SETTERS:

- i) Paper IV: Recent advances in Ophthalmology
- ii) Paper shall be three hours duration.
- iii) Paper shall carry maximum 100 marks.

iv) Paper shall contain ten questions. All the questions shall be compulsory having no choice.

v) All questions shall carry 10 marks each.

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ASCOMS & Hospital

Dr. Padar ingh Jamwal DLO, MS ENT ĺN eg. No. 1816 Dept. of ENT and Head & Neck Surgery Professor ASCOMS, Sidhra, Jammu

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN OTORHINOLARYGOLOGY

Preamble:

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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:

Practice his specialty ethically keeping in mind the requirement of the patient, community and people at large.

Demonstrate sufficient understanding of basic sciences related to his specialty and be able to integrate such knowledge in his Clinical practice.

- Diagnose and manage majority of conditions in his specialty (clinically and with the 3. help of relevant investigations)
- Plan and advise measures for the promotive, preventive, curative and rehabilitative 4. aspects of health and diseases in the specialty of ENT.
- Should be able to demonstrate his cognitive skills in the field of ENT and its 5. ancillary branches during the formative and summative evaluation processes.
- Play the assigned role in the implementation of National Health Programs 6.
- 7. Demonstrate competence in basic concepts of research methodology and writing thesis and research papers.

Develop good learning, communication and teaching skills. 8.

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- 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, humber 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 therapentic 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

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 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.

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- 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 car, 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 QRL 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.
- o Basic knowledge of anaesthesia as related to ENT.

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 Examination of diseases of children (Paediatric ORL) in connection with throat and larynx. Neurological and vascular disturbances. Congenital and neonatal stridor.

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o Pathology of various diseases of the larynx and throat, tracheo bronchial tree and their causative organisma

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- 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
- Nitow ledge of the rotation and the rotation
- Other methods of managing Hearing loss
- Implantable hearing aids cochlear implants
- Phonosurgery

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- 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

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- 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.
 - o Examination of the ear, nose and throat oral cavity examination
 - o 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

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- Airway management including basic life support skills, Cardiopulmonary ۶ 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 \geq
- 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

Svllabus

Course contents:

- 1. Anatomy and Physiology of Ear, Nose and Throat, Trachea and esophagus.
- 2. The generation and reception of speech
 - Radiographic anatomy of the ear, nose, throat and imaging.

Bacteriology in relation to Otorhinolaryngology

Allergy and rhinitis

Haematology in relation to Otolaryngology

- 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,

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Evoked response audiometry.

Ear:

- 1. The physical and functional examination of the ear
- The functional and physical examination of the vestibular system.
- Tinnitus 3.
- 4. Affections of external ear
- 5. Repair of deformities of the external ear

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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 pams

18. Trans-ethmoidal hypophysectomy

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19. Functional endoscopic sinus surgery (FESS)

Threat:

- Methods of examination of the mouth and pharynx 1.
- Diseases of the mouth 2
- Diseases of the salivary glands 3.
- Pharyngeal lesions associated with general diseases 4
- Diseases of the tonsils and adenoids (excluding neoplasms) 5.
- Tumors of the pharynx 6.
- 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
 - Head injuries and I.C. Haemorrhage
 - 4. Pituitary gland, anatomy, physiology hypo and hyper pituitarism, new growths
 - Intracranial venous sinuses and their affections 5.
 - Osteology: skull, mandible cervical and thoracic vertebral sternum 5.
 - Cervical fascia, facial spaces in neck, retro-pharyngeal and parapharyngeal 6. 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

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Drugs used in ENT:

- 1. Antibiotics Antihistaminic
- 2. Nasal vasoconstrictors
- 3. Local anaesthetics
- Corticosteroids 4

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- 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
- S Recording of nystagmus by ENG and its interpretation
- 1. Traumatic lesions of the inner ear
- 2. Inflammatory lesions of the vestibular and auditory nerve
- 3. Vascular lesions of the inner ear
- Electronystagmography
- Skull base/Neurologic surgery

Nose:

Ear:

- 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

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- 2. Anatomy of mediastinum
- 3." Pleura, phural 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 subspecialities for a total period not
 - exceeding 06 months.
 - 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.

- 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

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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 elinical 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.

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 OtolaryngologyPaper II:Principles and Practices of OtolaryngologyPaper 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

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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'sSurgery of the Ear

Essentials of Functional Sinus Surgery by <u>Heinz Stammberger MD</u>

· Color Atlas of Head & Neck Surgery by Jatin P Shah

Handbook of Clinical Audiologyby Jack Katz

Stell& Maran's Textbook of Head and Neck Surgery and Oncology

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

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Name of the Department/Unit

Name of the PG Student

Period of Training : FROM......TO......TO.....

1 2 3 4 5 6 7 8 9 1. Journal based / recent advances learning	marks	Rema	han tory	ore The	Mo Sati	γīγ	acti	tisfa	Sa	tory	Not sfac	Sati	TICULARS	PAR	Sr. No.
1. Journal based / recent advances learning		_	9	789	7	6	5	4		3	2	. 1			
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										:"			ased / recent learning	Journal ba advances	1.
3. Self directed learning and teaching					F					_			ased ory or Skill rning	Patient ba /Laborato based lear	2.
4. Departmental and interdepartmental learning activity 5. External and Outreach Activities / CMEs 6. Thesis / Research work										•			ted learning ing	Self direct and teach	3.
5. External and Outreach Activities / CMEs 6. Thesis / Research work					·								ental and ortmental activity	Departme interdepa learning a	4.
6. Thesis / Research work	•.							ک _ی :		373S.	24 1934 141-13 1	297 2011 - 1	and Outreach	External a Activities	5.
	<u>.</u>			nger 	- 64 -							· ··	lesearch work	Thesis / R	6.
7, LOS BOOK Maintenance					 								Maintenance	Log Book	7.

Publications

Remarks

Yes/ No

*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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MS OTO-RHINOLARYNGOLOGY EXAMINTION TO BE HELD IN MAY/JUNE クロチョクロック リンクタータータンズ

Subject: MS Oto-laryngology

1.	Course	MS (Oto-Laryngology	4.	Category	Compulsory
2.	Subject Code	161	5.	Examination Duration	3 hours
3.	Course title	Basic Sciences related Otolaryngology	6.	Theory marks	100

SALLARO 2

PAPER-1 (BASIC SCIENCES REALTED OTO- LARYNGOLOGY)

- 1. Anatomy, embryogenesis and physiology of Ear Nose and Throat, palate ,larynx, lungs, tongue, salivary gland , head and neck , skull base trachea and Esophagus.
- 2. 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
- 3. The generation and reception of speech.
- 4. 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
- 5. 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

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- 6. Radiographic Anatomy of the ear, nose, throat and Imaging.
- 7. Facial nerve stimulation test.
- 8. Evoked response Audiometer.

9. Vestibular tests like caloric testing (water and Air) Fukuda's test.

- 10. Audiometric test like pure tone Audiometric, Impedance Audiometer, free field Audiometry, specialized test of hearing including SISI, tone decay ABLB, speech discrimination score etc.
- 11. Cranial nerves.
- 12. Pituitary gland, Anatomy, physiology
- 13. Osteology: skull, Mandible, cervical and thoracic vertebral system.
- 14. Cervical fascia, facial Spaces in neck.
- 15. Anatomy and Physiology of thyroid gland.
- 16. Large blood vessels in neck, thoracic duct , development of major cervical and thoracic blood vessels.
- 17. Functional Anatomy of cerebellum, and brain stem.
- 18. Anatomy of mediasternum.
- 19. Pleura, Pleural cavity, Broncho-pulmonary segments and their clinical importance.
- 20. Applied anatomy of the skull bones, accessory sinuses, external, middle and innerear, nose, PNS, nasopharynx, meninges, brain, pharynx, larynx, trachea and bronchi, lungs, pleura, oesophagus and the mediastinum.

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2023, 2024 + 2025

Subject: MS Oto-laryngology

1.	Course	MS (Oto-Laryngology	4.	Category	Compulsory
2.	Subject Code	162	5.	Examination Duration	3 hours
3.	Course title	Principals and practices of Oto-larynogolgy	6.	Theory marks	100

Syllabus

PAPER-2 (PRINCIPALS OF OTO-LARYNGOLOGY)

- Head and Neck 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.
- 2. 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
- 3. Surgical pathology of Otolaryngology and Head Neck region.
- 4. Anaesthesia in ENT.
- 5. Diseases of children (Pediatric ORL) in connection with throat and larynx.
- 6. 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.
- 8. 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.

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10. Bacteriology in relation to Otorhinolaryngology.

11. Allergy and rhinitis.

12. Tinnitus.

13. Affections of external ear.

14. Acute inflammation of the middle ear cleft.

15. Non- suppurative otitis media.

16. Chronic suppurative otitis media.

17. Management of chronic suppurative otitis media.

18. Management of chronic suppurative otitis media

19. Complications of infections of middle ear.

20. Tumors of the middle ear cleft and temporal bone

21. Diseases of the otic capsule-otosclerosis

22. Diseases of the otic capsule-other diseases

23. The deaf child

24. Acoustic neuroma

25. Ototoxicity

26. Presbycusis

27. Diagnosis and management of sudden and fluctuant sensorineural hearing loss

28. Meniere's disease

29. Neurologic aspects of vertigo

30. Facial paralysis

31. Rehabilitation of adults with acquired Hearing loss-Hearing aids

32. The cochlear implants

33. Nystagmus

34. Otoacoustic emissions

35. Conditions of the external nose

36. The nasal septum

37. Foreign bodies in the nose, rhinolith

38. Epistaxis

39. Acute chronic inflammations of the nasal cavities

40. Vasomotor rhinitis-allergic and non-allergic

41. Nasal polyposis

42. Abnormalities of smell

43. Acute sinusitis

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ASCO. 45 & Hospital Sidhra Jammu 44. Chronic sinusitis

45. Nasal Allergy/Fungal allergic sinusitis

46. Complications of acute and chronic sinusitis

47. Tumors of nose and sinuses

48. Facial pains

49. Trans-ethmoidal hypophysectomy

50. Functional endoscopic sinus surgery (FESS)

51. Diseases of the salivary gland.

52. Pharyneal lesions associated with general diseases.

53. Diseases of the tonsils and adenoids (Excluding neoplasms)

54. Tumors of the pharynx.

55. Hypopharyngeal diverticulum (Pharyngeal Pouch)

56. Laryngeal disorders in singers and other voice users

57. Neurological affections of larynx and pharynx

58. Intubation of the larynx, laryngotomy and tracheostomy

59. Cervical node dissection

60. Micro laryngeal surgery/thγroplasty

61. Traumatic lesions of the inner ear

62. Inflammatory lesions of the vestibular and auditory nerve

63. Vascular lesions of the inner ear

64. Electronystagmography

65. Skull base/Neurologic surgery

66. Cosmetic surgery of the nose

67. Non-healing granuloma of the nose

68. Surgery of the pterygopalatine fossa

69. LASER Surgery

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MS OTO-RHINOLARYNGOLOGY EXAMINTION TO BE HELD IN MAY/JUNE <u>2023</u>しよう hiert: MS Oto-larvngology 4 9025

Subject: MS Oto-laryngology

1.	Course	MS (Oto-Laryngology)	4.	Category	Compulsory
2.	Subject Code	163	5.	Examination	3 hours
				Duration	-
3.	Course title	General Surgical Principals and Head and Neck	6.	Theory marks	100

Syllabus

PAPER-3 (GENERAL SURGICAL PRINCIPALS AND HEAD AND NECK)

1. General Surgery, Head and Neck oncology, and Medicine as applicable to the ENT disorders/diseases.

2. Surgery of congenital deformities of nose, ear (Pinna) and trachea/esophagus etc.

- 3. Radiology, Imaging computed tomography and magnetic resonance imaging, (MRI) and intervention radiology and angiography as related to ENT.
- 4. General Pathologic aspects such as wound healing and also pathology and Pathogenesis of ENT diseases, Pharmacology, molecular biology, genetics, cytology, hematology, and immunology as applicable to otolaryngology.
- 5. General Principles of faciomaxillary traumatology and neck injury.

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- 6. Plastic Surgery as applicable to Otolaryngology.
- 7. Pharmacology of drugs used in ENT.
- 8. Electrolyte, fluid balance/ shock condition.
- 9. Congenital conditions of middle ear cleft.
- 10. Traumatic conductive deafness.
- 11. Congenital of diseases of the nose

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	12.	Routine blood , urine testing.
قدر	13.	Congenital diseases of the larynx.
		 14. Skin grafts in Otolaryngology and reconstructive methods including regional and distant flaps for repair of defects after excision of tumors or trauma. 15. Raised intracranial tension-causes, diagnosis, management with
		particular reference to otitis hydrocephalus Head injuries and I.C.
		Haemorrhage Pituitary gland, hypo - and hyper - pituitarism , new
		growths Intracranial venous sinuses and their affections
		16. Goitre, diseases of thyroid and carcinoma of thyroid.
		17. Antibiotics Antihistaminic 18. Nasal vasoconstrictors
		19. Local anaesthetics 20. Corticosteroids 21. Cyto-toxic agents
		22. Antibiotics 23. Radioactive isotopes 24. Antifungal agents
		25. Vasopressive and other agents used in shock like states.
		26. 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
		27. Agents used in shock like states
		28. Facial plastic surgery.

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Subject: MS Oto-laryngology

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2023, 2024 4 2025

1.	Course	MS (Oto- Laryngology)	4.	Category	Compulsory
2.	Subject Code	164	5.	Examination	3 hours
				Duration	
3.	Course title	Recent Advances in Oto- larynogolgy and Head and Neck Surgery	6.	Theory marks	100

PAPER-4 (RECENT ADVANCES IN OTO- LARYNOGOLGY AND HEAD AND NECK SURGERY)

- 1. Recent developments in the diagnosis, pathogenesis and treatment of the ENT diseases.
- 2. Rhinoplasty, endoscopic sinus surgery, and anterior cranial fossa surgery, lateral Skull base surgery
- 3. LASERS and fibre optics.
- 4. Implantable hearing aids , cochlear implants.
- 5. Phonosurgery.
- 6. Etiology and Managements of sleep apnoea/snoring.
- 7. Hypophysectomy and optic nerve decompressions.
- 8. Immunotherapy and modalities of the gene therapy.
- 9. Newer techniques for Radiotherapy including, use of gamma knife for treatmentof Intracranial tumors and other malignancy.
- 10. Chemotherapy of cancer.
- 11. Robotics in ENT.

Dr Kult Sey Singh Mehta The receiper & Head nt of Surgery the attospital ne. minu

epartment of ENI. ASCOMS & Hospital sidhra Jammu

Subject: MS Oto-laryngology

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2023, 2024 + 2025

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S.No	Subject Code	Course Title	M	arks
			Theory	Practical
1.	161	Basic Science related Otolaryngology	100	
2.	162	Principal and Practice of Otolaryngology	100	400
3.	163	General Surgical Principal and Head and Neck Surgery	100	
4.	164	Recent Advances in Otolaryngology and Head and Neck	100	:
			400	<u> </u>
	Total	80)	

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Department of ENI. ASCO AS & Hospital Nidhra Jammu

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2023,2024,2025

Subject: MS Oto-laryngology

1.	Course	MS (Oto-laryngology)
2.	Subject Code	161
		162
		163
		164
3.	Practical Marks	400
1		

Practical Marks:-

- 1. Long Case 150
- 2. Short Case 75
- 3. Short Case 75
- 4. Viva-Voice 100
- <u>Total 400</u>

RECOMMENDED READING

BOOKS:

Reading:Books (latest edition)

- 1. Scott Brown's Otorhinolaryngology and Head and Neck Surgery.
- 2. Cumming Otolaryngology Head and Neck Surgery.
- 3. Otolaryngolgoy, Otology & Neurotalogy by Paprella & Micheal.
- 4. Glasscock- shambaugh's Surgery of the Ear.
- 5. Essentials of functional Sinus Surgery by Heinz Stammberger MD.
- 6. Color atlas of the Head and Neck Surgery by Jatin P Shah.
- 7. Handbook of the clinical Audiology Jack Katz.

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8. Stell & Maran's Textbook of Head and Neck Surgery and oncology.

Journals

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

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Department of Eres ASCOMS & Hospital sidhra Jammu

Subject: MS Oto-laryngology

1.	Course No.	MS(Oto-laryngology)	4.	Category	Compulsory
2.	Subject Code	161	5.	Examination Duration	3 Hrs
3.	Course Title	Basic Science related Oto- larynology	6.	Theory Marks	100
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MODEL QUESTION PAPER

Paper-I Basic Science related Oto-lar	ynology
Attempt all Questions	
Attempt an Questions	
Max.Marks:100	Time:3 hrs
1. (a). Discuss physiology of olfaction.	
(b). Describe anatomy of facial nerve.	
a () Destaudia major	
2. (a). Pectoralis major.	
(B). Relike S space.	
(c). External carolid altery.	
3. (a). Frontal sinus: Surgical anatomy.	
(b). Semicircular canals.	· · · ·
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Subject: MS Oto-laryngology

4.	Course No.	MS (Oto-laryngology)	4.	Category	Compulsory
5.	Subject Code	162	5.	Examination Duration	3 Hrs
6.	Course Title	Principals and Practical of Otolarynology	6.	Theory Marks	100

MODEL QUESTION PAPER

Paper-II Principals and Practical of Otolarynology Attempt All Questions Time:3 hrs Max.marks:100 Time:3 hrs 1. Discuss clinical features and management of hypopharyngeal malignancy. Discuss the management of MENIERE'S DISEASE. 3. Write note on: (a). Wegener's Granulomatosis.

- (b). Brachytherapy.
- (c). Branchial fistulae.

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Subject: MS Oto-laryngology

1.	Course No.	MS (Oto-laryngology)	4.	Category	Compulsory
2.	Subject Code	163	5.	Examination Duration	3 Hrs
4.	Course Title	General surgical Principles and Head and Neck	6.	Theory Marks	100

MODEL QUESTION PAPER

Paper-III General surgical Principles and Head and Neck

Attempt All Questions

Max.Marks:100

1. Discuss the etiopathology, signs., symptoms and management of carcinoma of tongue,

- 2. Write notes on the following:
 - (a). Surgical procedure of Scelerosis.
 - (b). complication of radical neck dissection.
 - (c). submandibular gland sailolith.
- 3. Write notes on the following:
 - (a). Rhinocerebral Mucormycosis.
 - (b). Inverted papilloma.
 - (c). Achlasia cardia.
 - (d). Management of post operative mastoid cavity problems.

Kuldeep Singh Mehta Professor & Head Department of Surgery

ASCOMS & Hospital

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Time:3hrs

Department of EN1. ASCO 45 & Hospital Sidhra Jammu

Subject: MS Oto-laryngology

1.	Course No.	MS(Oto-laryngology)	4.	Category	Compulsory
2.	Subject Code	164	5.	Examination Duration	3 Hrs
3.	Course Title	Recent advances in otolaryngology and Head and Neck	6.	Theory Marks	100

MODEL QUESTION PAPER

	Paper- IV Recent advances in otolaryngology and Head and Neck
Atten	apt All Questions
Ma	x.Marks:100 Time:3 hrs
. 1.	Write notes on the following:
	(a). olfactometry and gustometry.
	(b). Office based laryngeal surgery.
	(c). Minimal access thyroid surgery.
2.	Write notes on the following:
	(a). Complication of endoscopic sinus surgery and how to prevent the
	complication.
	(b). Cranio-facial resection -steps of surgery, indication and contraindication.
3.	Write notes on the following:
	(a). Parotid fistula.
	(b). Brachial cyst.
	(c). Image guided sinus surgery.
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	Department of ENT
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Subject: MS Oto-laryngology

1.	Course No.	MS(Oto-laryngology)	4.	Category	Compulsory
2.	Subject Code	161	5.	Examination Duration	3 Hrs
3.	Course Title	Basic Science related Oto- larynology	6.	Theory Marks	100

NOTE FOR THE PAPER SETTERS

- I. Paper I: Basic Science related Oto-larynology
- II. Paper shall be of three hours duration.
- III. Paper shall carry maximum 100 marks
- IV. All the questions shall be compulsory, having no choice.

40. ትና Department of ENI. ------ASCO NS & Hospital Kuldeep Singh Mehta Professor & Head Deliverment of S. 5 2500MS 32 Monator Sidhra Jammu)af -²⁶³

Subject: MS Oto-laryngology

1.	Course No.	MS(Oto-laryngology)	4.	Category	Compulsory
2.	Subject Code	162	5.	Examination Duration	3 Hrs
3.	Course Title	Principals and Practical of Otolarynology	6.	Theory Marks	100

NOTE FOR THE PAPER SETTERS

- Paper II: Principals and Practical of Otolarynology. I.
- Paper shall be of three hours duration. II.
- Paper shall carry maximum 100 marks. Ш.
- All the questions shall be compulsory, having no choice. IV.

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Dr Kulleny Singh Mehta Protessor & Head Department of Surgery OMS & Hospital

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Subject: MS Oto-laryngology

1.	Course No.	MS(Oto-laryngology)	4.	Category	Compulsory
2.	Subject Code	163	5.	Examination Duration	3 Hrs
3.	Course Tit le	General surgical Principles and Head and Neck	6.	Theory Marks	100

NOTE FOR THE PAPER SETTERS

- I. Paper III: General surgical Principles and Head and Neck.
- II. Paper shall be of three hours duration.
- III. Paper shall carry maximum 100 marks.
- IV. All the questions shall be compulsory, having no choice.

Prof. & H & D. Department of ENI. ASCOMS & Hospital Sidhra Jammu

Singh Mehta Ser & Head E D t of Surgery Hospital -mi Janimu

1.	Course No.	MS(Oto-laryngology)	4.	Category	Compulsory
2.	Subject Code	164	5.	Examination Duration	3 Hrs
3.	Course Title	Recent advances in otolaryngology and Head and Neck	6.	Theory Marks	100

NOTE FOR THE PAPER SETTERS

- I. Paper IV: Recent advances in otolaryngology and Head and Neck
- II. Paper shall be of three hours duration.
- III. Paper shall carry maximum 100 marks.
- IV. All the questions shall be compulsory, having no choice.

Department of ENI. SCO IS & HOSPILA Anta Jammu

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NATIONAL MEDICAL COMMISSION Postgraduate Medical Education Board

DELINES FOR COMPETENCY BASE

PROGRAMME FOR MD IN

POSTGRADUATE TRAINING

MICROBIOLOGY

D 11011/1/22/AC/Guidelines/21

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Date: 07-11-2022

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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 meeting discoverences are reemerging microbes, drug resistance and widening the stange, a microbiologist needs to derelop clinical expertise in addition to technical expertise and be available more at the bedside to develop partnership with clinician in diagnosts and management of infectious disease cases. To fulfill these expectations, the program of AD Microbiology needs to shift focus to clinical aspects of microbiology, where a student is balanced in the clinical setting and is able to contribute in the clinical management along whet diagnosis, prevention and control of infectious disease.

This document provides guidelines to standardize Microbiology teaching at the postraduate level throughout the country and fulfill the expectations as a microbiologist. The new currentlum 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 material from and in special clinical situations and population.
- 5. Demonstrate competence in developing guideline for antipolic usage, including formulation of antibiotic policy in hospital.
- 6. Demonstrate communication skills required for safe & effective laberatory practice
- Demonstrate skills in conducting collaborative research in the field of Clinical Microbiology and allied sciences which has significant bearing on human heath 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 clinicalmicrobiological 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
- Croba Resistance (AMR) 2. Laboratory skills in d
- e Microbiology 3. Infection Prevention and Control Skills
- Teaching a carning Skills 4.
- Research Skills 5.
- , Ethics and Communication skills 6.

stgraduate student should develop and demonstrate competence in The components as follows: the above

1. Clinical Microbiology including Antimicrobial Resistance (AMR)

- 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.

Should be able to formulate and critique diagnostic algorithms and patient care ijі, 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 postanalytical laboratory skills to ensure quality offset results.
- ii. Should be able to perform tests pertaining to basic, diagnostic, clinical and apple a Microbiology.

3. Infection Prevention and Control



Should be able to demonstrate knowledge, skills & attitude required a detect, prevent and control health care associated infections of all types. Should be able to set up and manage Central Sterile Services Department (ESSD) 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 second from the second fro
- iii. Should follow guidelines on ethical conduct in research
- iv. Should acquire proficiency and demonstrate ability to associostatistics, data management.

y. Should be able to critically appraise a scientific article and have knowledge of evidence-based practice.

Should acquire expertise in writing proposals for research grants and now the various sources of research funding.

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

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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 abar non-value nosis of different bacteria, viruses, parasites and fungi.
- iii. Explainers importance of normal flora microbes, including Microbasme in health and diserse
- iv. Explain the factors influencing and significance of microbial environment in health are setup.
- v. Describe the epidemiology of common infectious diseases, host-parasite relationship and their significance.
- 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.

- 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 laborator after vil Cal
- xvii. Describe the provipes & 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, art. in diagnosis & research in Microbiology.
- xix. Explain the importance and methods of testing microbiology of air, water and dod in patient care both in community/ hospital setting.
- 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

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.

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- 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 immunemodulation.
- 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, acidemiology, national, international guidelines in the situations/ scenaro given below:
- Infections of various organs and systems of the human body Microbiological basis of infective syndromes of various organs and systems of man 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 recurrent ager tanks

Following organisms (bacteria, fungi, virus and parasites) must be covered under clinical/systemic nucrobiology and the list must be updated to include newly identified microbes from time to the

Bacteria.

- 1. positive cocci of medical importance including Staphylococcus, Micropoccus, *Competitional anaerobic cocci* etc.
- 2. Them 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.

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, Trichosperon Sector Van Sus Charamyces etc.
- 2. Mycelial fungi in medical importance including intertophytes, Aspergillus, Zygomyceter Reeudallescheria, Fusarium, Piedra, other dematinceous hyphomycetes and other by alohyphomycetes etc.
- 3. Dimeranc fungi including Histoplasma, Blastomyces, Coccidioides, Paraceccidioides, Specethrix, Talaromyces marneffei etc.
- 4. Fungi causing Mycetoma, Chromoblatomycosis, Occulomycosis Otomycosis, Deohyphomycosis etc
- 5 Sythium 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:

 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
- Unclassified viruses
- 7. Viriods
- 8. Any newly emerging virus

Parasite:

- 1. Protozoan parasites of ansatural importance including Secanoeba, Free living amoebae, Giardia, Trishomonas, Leishmania, Trypanosoma, Plassophium, Toxoplasma, Sarcocystil, Syptosporidium, Cyclospora Isospora, Babesia, Balantaina, etc.
- Cestoda belonging importance including those of medical 2. Helmin obothrium, Taenia, Echinococcus, Hymenolepis, Dipylidium, M eps etc.), matoda (Schistosomes, Fasciola, Fasciolopsis, Gastrodiscoides, Parisonimus, morchis, Opisthorchis etc.) and Nematoda (Ascaris lumbrecoides, stoma adue denale, Enterobius vermicularis, Trichuris trichiura, Filariasis etc.) **Mi**nosporidium 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

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.

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- 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 a fine in Cassase Outbreak in hospital and outbreak/epidet pandemic in community.
- viii. Information schoology (computers) in microbiology.
- ix. Automation in Microbiology.
- x. Monoular techniques in the laboratory diagnosis of infectious diseases.
- xi. Analysis of microbiological data and research methodology.
- xii. Animal and human ethics involved in microbiological work.
- xiii. Vaboratory safety and management.

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 structure should be able to the source the following and/or interpret the results independently or as a part of a team.
- > Laboratory skills:
 - Ollect, transport and store appropriate specimens for modbiological 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).
- o 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, Vincand Parasites) based Laboratory skills:

- Direct microscopic methods for demonstration of infectious agents:
- a. Wet mount examination for looking for cells and organoms (bacteria, fungi,

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 pathagener.

e. Identification pathogen

Colony characters – various characters to be noted in afferent media.

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 fermetative, sugar fermentation, other special tests helping to identify up tobecies 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.
 - 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 choic the samples to secollected for diagnosis
- iv. Suggest opport in choice of antimicrobial agent to be messribed with reasons.

> Infection Prevention and Control Skills-

- and hygiene skills
- in Donning and doffing of PPE
- Transmission based precautions in patient care



- . Segregation and disposal of biomedical waste in laboratory and hospital
- . 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

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*:

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
 - Nephelometry/ turbidometry method for quantitative CRP/ASO/RA test i.
 - 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* : (opti omm

- Demonstration of microbes by Electron microscope
- a culture & identification of growth of viruses
- munological test
 - iii. Quantiferon
 - iv. Flowcytometry

Molecular -

- i. Genome Sequencing methods
- ii. Molecular typing.

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

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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 let side teaching, case-based learning, simulationbased teaching, self-directed learning, integrated learning, meedewartmental meetings and any other collaborative activity with the allied departments. Methods with account to the applied aspects of the subtractive 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 Carious below mentioned teaching-learning methods can vary used on the subject careful relevants, competencies, work load and overall working schedule in the concernensubject.

- A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures performed ar 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.

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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 Green Schenths

A broad topic of significance should be selected, and each part shall be dealed 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 emassive review of the topic. A 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 indepth 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, Pherobiology/ Infection control units/phooratory Medicine etc.
- Medical Education Unit (MEU) or Department of Medical Education (DOW

Clinica maractical 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.

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Table 1. Following is the suggested plan of Rotation for Postgraduate students Postings to Diagnostic Laboratories/Hospital/ Community-

Sr	Schedule of Rotation		Duration	Suggested Specific Learning Objectives
no				
1	Microbiology la	boratory	Distributed	• As per the specific objectives in each
	 i. Different of Bacter ii. Media preparati iii. Mycoba iv. Semiory Wycolog Virology 	t sections riology on teriology /Immuno	in various section depending upon training departmental needs	section, a student is expected to acquire skills from basic to the most recent ones in diagnostic microbiology.
	viii. Molecula	ar lab		
	ix. Hospital Control BMW manager	Infection including nent		
2	Sample Collecti	on area	Two weeks	• To learn pre-analytical parameters & procedures at sample collection area.

and the

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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. Block Bank	Two weeks	 Basic knowledge of clinical pathology as anythed to Microbiology) Inflammation anterepair Intercellular substance and reaction Pathological changes in take body in bacterial, viral, mycotic astroparasitic infections Clinical Pathology skills: Peripheral smear examination CBC interpretation Urine examination Pathological investigations and their significance in infectious disease diagnosis.

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۲٦	· · · · · · · · · · · · · · · · · · ·		case, management of drug resistance.
t-η,,η ι	· ·		Description of the second seco
			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
ļ		2	Molecular diagnosis
			National tuberculosis Elimination
			Program
		Aic	
	1	eur	Treament regimens in susceptible and
1			drug resistant for cases
 			The second of the second in
7	District Lossifial postings	Three	• Identify types of intections seen in
	(mand usy) 3rd or 4th	months*	community
	semester for 3 months		ai a
			• Identify lacuna in KAP in community
			that promote development of integrions
		÷.	
	2		• Choice of antimicrobials and treatment
			plan for infections in community
			plan for infections in community
1			 Infection control in community
			• Should contribute to strengthen the
Ì			
Į			services of the district health system, the
1			diagnostic laboratory services.
			Participate in public health programs &
			research activities
i		· · · · · · · · · · · · · ·	

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9 Critical care units- Three weeks • All above in a critical setting along with	8	Clinical locations – i. Medicine & allied (General Medicine, Respiratory Disease, Skin & Venereal Disease) ii. Pediatrics iii. Surgery & allied General Surgery Orthopedic) iv. Obstetrict and Granscology	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 dagnosis Interpret the advaratory results and correlate them clinically Learn common treatment plan, particularly choice of antimicrobials. Acquire reasoning and critical funkting
i. Medical ICU (in morning • Availability and choice of specialized	9	Critical care units- i. Medical ICU	Three weeks (in morning	 required in decision making when dealing with an infectious disease case Infection control practices All above in a critical setting along with Availability and choice of specialized

	ii Surgioal ICII	T	T · ·	
1	n. Surgicar ICO			management of a critical patient with
	iii. Neonatal/Pediatri			ID.
	c ICU			Significance and adherence to antibiotic
			1 .	policy and antibiotic stewardship
				program Infection control in ICU
10	Institutional Super	One week	•	To study infections seen in special
	specialty wing if			To study intections seen in special
	specially and it			situations along with their management
	available Dialysis,			& prevention approach
	Oncology, Cardiology	(morning		
	etc	half day)		_
	Total duration of	odic	a	C
	posting outside			
	microbiology			*7 .
	laborator			3
	N			
*Pos	ting under "District Reside	ency Programn	ne"	S.
Depe	nd upon the objectives	to be achieved	l, feasib	ility and availability of resources, the

rotations 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_ nost, 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 minaring encircle by laboratory services in Microbiology. He/she should deal with after higher y investigations in Microbiology.

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

All postgandiate students pursuing MD/MS in broad specialties in an Medical Collegestatitutions shall undergo a compulsory rotation of three months in District Hospitals District Health System as a part of the course curriculum, as per the Postgaaduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in he 3rd or 4th of 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 a eady angoing in the department. It is additional research project that may Rd 🖘 the desis work. For instance, if a The in an area different from preferable that this project clinical research project is taken up as thesis work, the additional project may deal with L be reinforced. community/field poratory work. Diversity of knowledge and skills can there

teaching & learning skills I. Trainingi

DylE should train PG students in education methodologies and assessment chniques. MEU tudents shall conduct UG classes in various courses and a faculty shall obs ye and The P eedback on the teaching skills of the student. provid

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:

Help maintain a record of the work done during training. a)

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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 transfer whect and record their reflections in logbook particularly of the critical incidents. Components of good teaching practices these be assessed in all academic activit@conducted by the PG student and at least two sessions dedicated for assessment certeaching skills must be conducted every year of the PG program. The teaching faculty shall effer 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 back 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.

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Buring 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 assisted/performed with assistance skills should the student be permitted to perform the skill independently.

ASSESSMENT

I. **IORMATIVE ASSESSMENT**, ie., assessment to improve learning

Formation 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

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in clinical setting and recorded along with feedback (preferably by ID specialist if available iclinician).

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/ seminardiscussion

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

Attendance at Sciencif concernings, CME programmes

The student is to be assessed periodically as per categories listed in the postgraduate student appraisal form (Annexure I1).

II. SMMATIVE 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:

i. 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 numera decision knowledge, skill and competence at the end of the training, or the training 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 here at the end of 3rd academic year.

These hall 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 %_

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 untreactive states that test ability to perform bacteriology, virology, parasitology and evaluation and antimicrobial susceptibility report,.

Oral/Vivanoce 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 students overall ability to apply knowledge of the subject to hospital/community/research areas forming on practical examiner and affective domain skills.

Table 2. Suggested Day wis	e distribution of	practical exercises:
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Ex.	Day -1	Ex.	Day-2
No		No	
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

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		· · · · · · · · · · · · · · · · · · ·
ology/mycology/parasitology/HAI_		
/AMR/out break /national project		
based etc of infectious diseases to		
the PG for workup and evaluation	1	
with respect to case history, basic		
physical examination, required		
investigations, interpretation of		
diagnostic test results, and		
therapeutic management decisions	1 ·	
including prescription of		
antibiotics,, along with	2	
practices)	Ca	
NIC		
Long Floridse- Bacteriology	2	Long Exercise -
(Mined culture given with a	cont	
choical history representing any		Bacteriology conclusion
specimen collected from		U.
Appective systemic infection)		Ó
	1 -	
Short Exercise – Bacteriology	3	Short Exercise - Bacteriology conclusion
(Identification of a pure culture)	cont	
Serology Exercise (In a clinical	4	Serology cont_if required
case choice of test & technique	eent	Solology colit. In required
with interpretation of test regults)	CONT	
Virology techniques (In a distant	E	Winds and if an in 1
vnotogy techniques (in a clinical	2	v notogy cont. Il required
case, cnoice of test & technique	cont	
with interpretation of test results.		
Viral serology/ Molecular	;	
	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) Long Hereise- Bacteriology (Mirel culture given with a Chaical history representing any specimen collected from respective systemic infection) Short Exercise – Bacteriology (Identification of a pure culture) Serology Exercise (In a clinical case, choice of test & technique with interpretation of test results) Virology techniques (In a clinical case, choice of test & technique with interpretation of test results. Viral serology/ Molecular	ology/mycology/parasitology/HAI/AMR/out break /national projectbased etc of infectious diseases tothe PG for workup and evaluationwith respect to case history, basicphysical examination, requiredinvestigations, interpretation ofdiagnostic test results, andtherapeutic management decisionsincluding prescription ofantibiotics, along with IGpractices)Long Fractise- Bacteriology(Minet culture given with achaical history representing anyspecimen collected fromhopective systemic infection)Short Exercise - BacteriologySerology Exercise (In a clinical case, choice of test & technique with interpretation of test results)Virology techniques (In a clinical case, choice of test & technique with interpretation of test results.Viral serology/ Molecular

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depending techniques upon availability) Mycology (Identification of fungi 6 6 Mycology cont. if required in a clinical case) cont Parasitology (In a clinical case, 7 Pedagogy (10-15minutes) 9 choice of test & technique with interpretation of test results Stool examination, Examination of Peripheral blood smear etc) Bog book, Dissertation Viva, Grand-Viva MALINE SC Slides 8 luding (Slic microscopic histopatholog for & discussion identifica 24

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Recommended Reading

Books (latest edition)

- 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, Dramos C Medica Parastology, American Society for Microbiology.
- 5. Mackie & Martney Practical Medical Microbiology by J.G. Collectors. Fraser
- Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases: by John E. Besnett, 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
- 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

PROF & Microbic (19)
- 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

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

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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 (CLSL FU2.51.65
- 4. Detect and report varioual drug resistance by identification of the commonly isolated drug resistant drains (MRSA, VRSA, VRE, CRE, MBL, AMF Cretc) 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 for based on organism identification and susceptibility test.
- 7. Applain 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 old fing loar antimetrobal resistance data and its use in deciding direct emphrarantimicrobial 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. **Du**honstrate knowledge about recent published guidelines that recommend antimerobial reatment 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

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2.1	Practical skills that are appropriate for the level of training										
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Subject Expert Group members for preparation of REVISED Guidelines for competency based postgraduate training programme for MD in Microbiology

- Dr Suman Singh Professor, Department of Microbiology Pramukhswami Medical College, Bhaikaka University. Karamsad,388325
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 Associate Professor of Microbiology Medical Superintendent Jorhat Medical College & hospital Jorhat, Assam
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Dr. K. Anuradha Member
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 Department of Microbiology
 Mysore Medical College & Research Institute
 Mysore

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

S.No.	Subject code	Course Title	Marks	
<i>ı</i>	 		Theory	Practical
1	181	General Microbiology & Immunology	100	
2	182	Clinical / systemic Microbiology CM I	100	400
3	183	Clinical / systemic Microbiology CM II	100	
4	184	Recent Advances & Applied Microbiology	100	
	· · · <u></u>		400	
		Total Marks		800

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

1	Course No.	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	181	5	Examination Duration	3Hrs
3	Course Title	General Microbiology & Immunology	6	Theory Marks	100

SYLLABUS

<u> Paper – I</u>

General Microbiology & Immunology

General Microbiology (GM)

- 1. History & Development in Microbiology
- 2. Classification, morphology & growth requirements of microbes.
- 3. Microbiome in health & Disease
- 4. Epidemiology, Source of infection, mode of infection and host parasite relationship.
- 5. Microscopes and Microscopic techniques.
- 6. Processing of samples for isolation identification and preservation of microbes in laboratory.
- 7. Microbes and their virulence and pathogencity mechanism.
- 8. Biosafety in Microbiology lab.
- 9. Sterilization and Disinfection.
- 10. Bacterial genetics and application of molecular techniques in lab diagnosis of infections.
- 11. Epidemiological markers used in surveillance, patient screening, organism typing and sequencing.
- 12. NABL in Diagnostic Microbiology.
- 13. Diagnostic measures and Control strategies for emergency infectious diseases.
- 14. Principles and ethics in animals and human involved in diagnosis and research.
- 15. Role of informative technology (LIS, NET) artificial intelligence, nanotechnology, bio sensors, bio informatics in diagnosis and research in microbiology.
- 16. Methods of environmental Surveillance for Microbial contamination & processing of air water and food in hospital and community setting.
- 17. Antimicrobial agents, mechanism of action & drug resistance.

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Immunclogy

- 1. Structure and function of the Immune System and Immune cells.
- 2. Active and Passive Immunity; Antigens, Antibodies, Humoral & Cell mediated Immunity and Cytokines.
- 3. Complement System and its role in Immunology.
- 4. Hypersensitivity; auto Immune and Immune deficiency states including Lab Diagnosis.
- 5. Types of Ag & Ab reactions & demonstration of these in the laboratory for diagnosis & research.
- 6. Transplantation & tumour Immunity.
- 7. Significance of Immune potentiation & Immune modulation.
- 8. Advances in Prophylaxis Active and Passive, Immunotherapy & reverse Vaccinology.
- 9. Explain the role of animals in Immunology.

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

1	Course No.	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	181	5	Examination Duration	3Hrs
3	Course Title	General Microbiology &	6	Theory Marks	100
	:	Immunology			

SUBJECT: MD MICROBIOLOGY

Note for the Exam Setters :

- i. Paper l
- ii. Paper shall be of three hour duration
- iii. Paper shall carry maximum 100 marks
- iv. Paper shall contain ten questions of 10 marks each
- v. All the questions shall be compulsory, having no choice.

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024,

SUBJECT: MD MICROBIOLOGY

1.	Course No.	MD/MS MICPO		1	
2	Subject Code		4	Category	Compulsory
	Subject Code	181	5	Examination	3Hrs
				Duration	
3 	Course Title	General Microbiology & Immunology	6	Theory Marks	100

MODEL QUESTION PAPER

Paper – I

General Microbiology & Immunology

Max. Marks :100

Time :3hrs

- 1. Classification of Disinfectants and their testing.
- 2. Describe in details, Various mechanisms of action of Antimicrobial Drugs.
- 3. Discuss Mutations, types and causes.
- 4. Describe the Biological effects of Complement.
- 5. Discuss the Immune-modulators and their therapeutic uses.
- 6. Describe the Lymphocyte effector subsets and discuss their functions.
- 7. Elaborate on the various techniques for typing Bacterial Strains.
- 8. Discuss Bacterial Metabolism and enumerate the method for measuring Bacterial growth.
- 9. Enumerate the Vectors & Cloning Hosts used commonly in Recombinant DNA technology.
- 10. What are the Immune responses involved in the Rejection of Transplants. Discuss the therapeutic interventions to minimize the rejection.

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

1	Course No.	MD/MS MICRO	4	Category	Compulson
2	Subject Code	182	5	Examination	3Hrs
3	Course Title	Clinical / systemic Microbiology CM (6	Theory Marks	100

SUBJECT: MD MICROBIOLOGY

SYLLABUS

<u>Paper – II</u>

Clinical / systemic Microbiology CM-1

 Microbial Infections of Various organs and system of the body. Infective syndromes pertaining to CVS & Blood, Respiratory Tract, Urinary Tract, Central Nervous System, Reproductive Tract, Gastro intestinal Tract, Hepato biliary System, Skin & Soft tissue, Musculoskeletal system, Eye, Ear and Nose etc. Including the etiological agents transmission, Clinical manifestations, Management, Epidemiology & National/ International guidelines.

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

1	Course No.	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	182	5	Examination Duration	3Hrs
3	Course Title	Clinical / systemic Microbiology CM I	6	Theory Marks	100

Note for the Exam Setters :

- i. Paper II
- ii. Paper shall be of three hour duration
- iii. Paper shall carry maximum 100 marks
- iv. Paper shall contain ten questions of 10 marks each
- v. All the questions shall be compulsory, having no choice
- vi. Clinical scenario questions regarding infectious aetiological agents effecting various organs & systems with a distribution of 50% bacterial, 30% viral, 20% parasitic, fungal & mycobacterial.

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

1	Course No.	MD/MS MICRO			
2	Subject	192		Category	Compulsory
	Code	102	5	Examination	3Hrs
3	Course Title	Clinical / systemic Microbiology CM I	6	Theory Marks	100
	- · · · · · · · · · · · · · · · · · · ·		i		

MODEL QUESTION PAPER

<u>Paper –II</u>

Clinical / systemic Microbiology CM I

Max. Marks :100

Time :3hrs

- An 18 year old female, presented with pain left flank, fever with chills & rigors. Urine analysis
 revealed >30 WBCs/HPF, 4-6 RBCs /HPF & 4+ bacteria. What is your provisional diagnosis and
 tests to be undertaken to confirm the diagnosis.
- 2. A 6 year old child complaining of Sore throat & fever attends the OPD. How will you proceed with your clinical & laboratory work up .
- A 30 year man, complained of nausea & pain right upper abdomen. Examination revealed fever & tenderness in the right hypochondrium. USG examination revealed a hepatitic abscess. How will you proceed further in this case.
- A seven year old child presented to OPD with swollen, tender ankle & Knee joints for the last seven days. The gait was abnormal on examination a murmur was heard over the mitral valve area. ECG showed prolongation of P-R interval. Past history revealed an episode of Sore throat 3 weeks back.

What is the differential diagnosis & what is the diagnostic criteria for coming to a conclusion. What are the preventive measure to be undertaken here.

- 5. A young female presented with high grade fever with chilis & rigors. The fever rises every 3rd day. How will you proceed with the examination & Investigation of this case.
- 6. A 25 year old male with history of multiple sex partners is admitted with complaints of unexplained loss of weight , fever, diarrhea & generalized lymphadenopathy. What is the

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probable diagnosis. Discuss the pathogenesis and lab diagnosis of the disease.

- 7. A 28 year old male, was admitted in the hospital with complaints of low- grade fever, loss of weight chronic cough with expectoration for past 6 months. Sputum microscopic examination reveals, long, slender beaded acid fast bacilli. What is your provisional diagnosis. Discuss the lab diagnosis in detail and mention briefly about drug resistance that can occur in this infection.
- 8. A 40 year old male presents with loss of appetite, malaise & jaundice of 2 months duration. Past history reveals a blood transfusion undertaken 6 months earlier. On examination there is icterus, hepatomegaly & tenderness in the right hypochondrial region. How will you proceed to investigate this case & counsel to prevent the transmission of this infection.
- 9. A child presents with rashes starts behind the ears & then spreads over the body. On
 examination bluish white spots were seen in buccal mucosa. What is the clinical diagnosis.
 Discuss the prevention of this disease.
- 10. A CSF tap is done on a 23 year old male, a known case of leukemia, is brought to the emergency with headache, fever, sensory & memory loss and loss of vision. Sample of CSF on direct examination using Nigrosin reveals Capsulated yeast buds. What is the provisional diagnosis and how will you confirm it.

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

1	Course No.	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	183	5	Examination Duration	.3Hrs
3	Course title	Clinical / systemic Microbiology CM II	6	Theory Marks	100

<u>SYLIABUS</u>

<u>PAPER – III</u> Clinical / systemic Microbiology 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:

 \Box Infectious diseases as per the source/risk. e.g. Blood borne, sexually transmitted infections congenital, vector borne etc.

Opportunistic Infections in special and high risk host. eg Pregnancy, neonates, immunocompromised etc.

🗇 Infections in special situations/ scenario. eg. Travel related, Emerging/ Remerging Infections 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, Clostridium etc* and other spore bearing anacrobic bacilli etc.

4. Gram negative bacilli of medical importance including Enterobacteriaceae, Vibrios, Aeromonas. Haemophilus, Bordetella, Brucella, Pseudomonas and other non-fermenters, and other anaerobic gram negative bacilli etc.

n.O.D Microbiology

5 Alelicobacter, Campylobacter, Calymmatobacterium, Streptobacillus, Spirillum and Aiscellaneous 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.

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.

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- 3, Qneogenic 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* etc.), Trematoda (*Schistosomes, Fasciola, Fasciolopsis, Gastrodiscoides* etc.) and Nematoda (*Ascaris lumbrecoides, Ancylostoma duodenale, Enterobius vermicularis, Trichuris trichiura* etc.)

3. Rhinosporidium seeberi

4. Entomology: common arthropods and other vectors viz. mosquito, sand fly, ticks, mite, cyclops, louse etc.

5. Neglected tropical parasitic diseases

6. Any newly emerging parasite

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

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1	Course No.	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	183	5	Examination Duration	3Hrs
3	Course title	Clinical / systemic Microbiology CM II	6	Theory Marks	100

Note for the Exam Setters :

- i. Paper III
- ii. Paper shall be of three hour duration
- iii. Paper shall carry maximum 100 marks
- iv. Paper shall contain ten questions of 10 marks each
- v. All the questions shall be compulsory, having no choice
- vi. Infectious agents to be included as per source, spread ;
 opportunistic infections; high risk groups with a distribution of
 50% bacterial, 30% viral, 20% parasitic, fungal &
 mycobacterial.

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025 SUBJECT: MD MICROBIOLOGY

1	Course No.	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	183	5	Examination Duration	3Hrs
3	Course title	Clinical / systemic Microbiology CM II	6	Theory Marks	.100

MODEL QUESTION PAPER

PAPER – III Clinical / systemic Microbiology CM II

Max. Marks: 100

Time allowed : 3 Hours

- 1) Enumerate the Zoonotic viral infections. Discuss in detail the morphology, pathogenesis, laboratory diagnosis and prophylaxis of Rabies.
- 2) List the bacteria causing Meningitis. Describe in detail pathogenesis, clinical features, complications and lab diagnosis of Meningococcal Meningitis.
- Enumerate the commonly encountered Aspergillus species. Write in detail about the disease spectrum and tab diagnosis of infections caused by them. Add a note on role of biomarkers in diagnosis and management of invasive aspergillosis.
- 4) What are Arboviruses? List the Arboviruses reported in India along with their vectors. Describe the epidemiology of Japanese encephalitis with respect to India and add a note on its prophylaxis.
- 5) Enumerate haemoparasites. Discuss in detail about the conventional and newer laboratory methods for diagnosis of Malaria. Add a note on advances in the field of Malarial vaccines.
- 6) Enumerate Hepatotropic viruses. Write in detail about the laboratory diagnosis and prophylaxis of Hepatitis B virus.
- Enumerate bacteria causing sexually transmitted diseases. Describe Neisseria gonorrheae in detail. Add a note on its drug resistance.
- Discuss mechanism of resistance, phenotypic and genotypic detection of MRSA with their clinical implications.
- 9) Write in detail about Laboratory diagnosis of TB as per National TB Elimination Program.
- 10) Describe HACEK organisms and their importance in hospital.

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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

1	Course No.	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	184	5	Examination	3Hrs
				Duration	
3	Course title	Recent Advances &	6	Theory Marks	100
		Applied Microbiology		 	-

<u>SYLLABUS</u>

PAPER - IV SUBJECT: Recent Advances & Applied Microbiology

i. **Prophylaxis** - Basic Principles and applications of general, immune as well as chemoprophylaxis of infections in various clinical situations / scenarios.

ii. Vaccinology: types of vaccines, principles, methods of preparation of vaccines and their administration.

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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MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

1	Course	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	184	5	Examination Duration	3Hrs
3	Course title	Recent Advances & Applied Microbiology	6	Theory Marks	100

Note for the Exam Setters :

- j. Paper IV
- ii. Paper shall be of three hour duration
- iii. Paper shall carry maximum 100 marks
- iv. Paper shall contain ten questions of 10 marks each
- v. All the questions shall be compulsory, having no choice.

8 M.O.D of Microbiology COMS

MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025 SUBJECT: MD MICROBIOLOGY

1	Course No.	MD/MS MICRO	4	Category	Compulsory
2	Subject Code	184	5	Examination Duration	3Hrs
3	Course title	Recent Advances & Applied Microbiology	6	Theory Marks	100

MODEL QUESTION PAPER

PAPER - IV

SUBJECT: Recent Advances & Applied Microbiology

Max. Marks: 100

Time : 3 Hours

- Enumerate species of Entercoccus commonly associated with human infections. Describe briefly mechanism of resistance in vancomycin resistant enterococci (VRE) and its detection as per CLSI guidelines.
- 2. Enumerate the emerging and re-emerging viral infections. Write in detail about the laboratory diagnosis and strategies for containment of SARS-CoV-2.
- 3. Describe various components of antibiotic stewardship programme. Describe in brief the implementation of such a programme.
- 4. What are Extended spectrum beta Lactamases (ESBL)? Describe methods used to detect ESBL in a bacteria.
- 5. Discuss Next generation sequencing. Describe its application in microbiology.
- 6. Write the principle, techniques and application of real time PCR.
- 7. Describe genetic engineering and its applications.
- 8. Describe the pathogenicity, complications and laboratory diagnosis of Plasmodium falciparum. Add a note on Malaria vaccine.
- 9. Define and categorize biomedical waste. Discuss recent advances in the treatment and final disposal of biomedical waste.
- 10. Discuss the principle and role of MALDI-TOF-MS in rapid detection of microbial pathogens.

Microbiology ASCOMS

MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

1	Course No.	MD/MS MICRO
2	Subject code	181
2	300,000 00	182
		183
		184
3	Practical Marks	400

Practical Marks	<u>Marks</u>
1. Clinical Microbiology Exercise	40
2. Long Exercise- Bacteriology	40
3. Short Exercise- Bacteriology	-30
4. Serology Exercise	20
5. Virology Technique	40
6. Mycology	30
7. Parasitology	30
8. Slides spotting	20
9. Pedagogy (10-15 minutes)	30
10. Log Book	20
11. Dissertation Viva	20
12. Grand Viva	80
· - · ·	400

Grand Total

face PROF & H.O.D Deptt. of Microbiology ASCOMS

MD/MS MICROBIOLOGY EXAMINATION TO BE HELD IN MAY/JUNE 2023, 2024, 2025

SUBJECT: MD MICROBIOLOGY

Recommended Reading

<u>S.NO.</u>	Name of Book	Author	<u>Publisher</u>
1.	Principles of Bacteriology, Virology & Immunity.	Topley and Wilson	Wiley- Blackwell
2.	Medical Mycology	Jagdish Chander	Jay Pee Brothers
3.	Harrison's Infections Diseases	Anthony Fassci and Dennis Kasper	McGraw Hill
4.	Practical Medical Microbiology	Mackie and Mccartrey	Elsevier
5.	Koneman's Colour Atlas and Textbook of Diagnostic Microbiology	Gary W. Procop Koneman Church, Hall	Lippincott Williams and Wilkins
6.	Bailey and Scott's Diagnostic microbiology	Patricia M. Tille	Elsevier
7.	Essentials Immunology	Ivan Roitt	Wiley-Blackwell
8.	Parasitology	K.D. Chatterjee	CBS Publishers
9.	Essentials of Hospital Infection Control	Apurba S Sastry Deepashree R	JayPee Brothers
10.	Text book of Medical Parasitology	C.K. Jayaram Paniker	JayPee Brothers
11.	Essentials of Microbiology	VS Randhawa	CBS Publishers & Distributors PVT LTD
12.	Microbiology & Immunology	LIppincot	Spring house Publisher CO, U.S

Journals

- 03 International Journals
- 02- National Journals

0.0 DIT. of Microbiology ASCOMS and

NATIONAL MEDICAL COMMISSION Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/24

Date: 16-11-2022

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GUIDELINES FOR COMPETENCY-BASED POSTGRADUATE TRAINING FOR MD IN BIOCHEMISTRY

Pressible

A competency is the capability to apply or use a set of related knowledge, skills, and abilities req. red 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 attinudger if required to get and shills, and attinudger if required to get and shill advance the cause of science through teaching, research & training along with constant, get of his/her knowledge and skills as a lifelong self-directed learner.

The studen, after undergoing training in MD Biochemistry, should be able to temonstrate his/her knowledge of the basic concepts and recent advances in the subject, and whetined set of stills including expertise in various laboratory techniques applicable to metabo ; and nuterular aspects of medicine, planning and executing research projects, writing research papers/ articles demonstrating the acquired training in research methodology 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 teachinglearning 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,





confective and preventive actions, hospital and laboratory information system network, and the set 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.

SUBJECT POSE CEARNING BLECTIVES

Goal:

The goal of the ranning program in MD Biochemistry is to enable a studen 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 to rskills as detailed berow and demonstrate his ability to apply the same in a given healthcare scop.

cquisition of Knowledge

The stadent should be able to explain the molecular, physical, and physiological logic 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



3.

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 thality outrol along with quality assurance and providing reliable heatness import services. The student and be able to provide consultation to clinicians and also contribute to community healthcare overseducting screening tests.

e. Professionalism, Ethics, Communication skills

The student should be able to develop and sustain work ethics and empathetic behavior with student and colleagues. He/she should be able to demonstrate professional integrity, heresty, and there ethical standards and be able to display appropriate attitude and communication skills to interact with colleagues, teachers, students, laboratory personnel, and other heatmeare 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
 contribute to the teaching-learning processes and healthcare management.
- Licentify learning needs and set the learning objectives for his/her self-directed learning
 and apply the needful learning in subjects like Genetics, Nutrition & Directors, Immonochemistry, 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 implementative academic year 1019-20.
- Explain, compreter use analyze the basics of Cellular the Molecular Biochemistry, functional mechanisms of the biomolecules and their logistics on the human body in normal health and their deviations in the disease conditions. He/she she ld be able to integrate his/her cognition and skills to facilitate medical education for undergraduate, and allied health sciences students and for patient management.
- Momonstrate administrative, decision-making, group activity, teamwork and Indership skills in (a) setting up a department in the medical institution (b)
- 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.



- 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 statement effects the application of the biochemical mechanisms in the perception, diagnosis, and treatment of a disease.
- 2. Describe and biomolecules and their importance in sustaining life inclusses.
- 3. Explain the concept of intermediary metabolism, energy transactions, ind metabolic and molecular homeostasis in the sustenance of life.
- 4. Explain the characteristics, components, and functional significance of afferent metabolic pathways, their specific intermediates, their inter-conversions, penway-specific, organ-specific, and interrelated regulation of metabolic pathways, and oply that in explaining the biochemical logic in the functioning of the body in heatth 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.





- H 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.
- 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 months of care based learning (CBL) and problem-based learning (PBL), are an end of conduct CBLs/PBLs, part discussions, small group discussions, teminars, 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. Excite t knowledge of professional ethics and integrity in his/her day-to-tay conduct and services rendered.
- 18 Woply the updated knowledge to suggest and implement judicious use of pinical taboratory investigations.
- The Demonstrate knowledge on the use of laboratory gadgets and instruments and instruments are 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.

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B. Affective domain (Attitudes including Communication and Professionalism)

- 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 selfassessment, feedback from the peers, stakeholders and adapting to relevant learning.
- 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. Easere that the related technical staff is apprised of the above and is duly trained while dealing with the patients.
- Apply chical provides and display proper etiquette in dealing with patients, returnes, any other health personnel.
- 7. Democratic appropriate attitude and ethical behavior in exchanging needback with peers machers, clinicians, patients, and their relatives.
- Display ethical behavior, and personal and professional integrity in his/her conduct and perfices.
- 9. Demonstrate the ability to maintain confidentiality in declaring the laboratory oults 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.

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.

- Develop a differential diagnosis, wherever applicable, based on the results obtained after performing the requisite tests.
- 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 contributive with the standard operating procedures of various methods and techniques used in a clinical biochemistry laboratory.
- 7. Performenzymatic assays and conduct experiments to study enzyme kinetics affirming the ability to discuss, interpret and document the related data.
- 8. Terform routine investigations in hematology and microbiology, as and when equired.
- 9. Demonstrate presentation skills at academic meetings and scientific paper while skills.

Prepare research protocols and conduct relevant experimental studies.

11. Analyze and solve clinical and experimental problems.

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 teachinglearning 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:
 - o Blood glucose, glycated hemoglobin, the performance of glucose
 - tolerance test and gateose antille ge test,
 - The obtin, albumin. and A:G ratio,
 - Electrolytes, arterial blood gas analysis,

Cholesterol, triglycerides, free fatty acids, low-decore lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), phospholipids, Lp(a), and calculated parameters under lipid profile,

- o Amylase, lipase,
- o Urea, creatinine, uric acid, urinary microalbumin,
- Parameters of liver function tests (bilirubin, hepato-biliary engines 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),
- o Vitamin D, B₁₂, and folate,
- o 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,



- 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 inclusivate activities under total quanty management (TQM) of the Laboratore

Methods of standardization & calibration.

Methods of quality control, quality assurance, CAPA & assessment Demonstrate ability to prepare and interpret a Levy-Jennings chart and provinterassay 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


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): **CIC**

- 1. Separation of the inheral blood leukocytes using refevent solation technique,
- 2. Subcellular fractionation/marker enzymes for organicity to demonstrate fractionation and purity of the fraction,
- 3. Ultracentrifugation,
- 4. Isolation of plasmids,
- Basic techniques and essentials in cell culture and establishing different cert culture
- facilities,

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.

SYLLABUS

The course coulents 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

lonization 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),
- · Harionation, purification, structural analysis and characterization of protings,
- The tein folding and its associated disorders,

Protein denaturation,

D^Protein degradation – lysosomal and proteosomal,

Plasma proteins.

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,

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- Prospecificities classification, properties, composition, and biomedical importance of various phospecificity.
- 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 THE BIOMHDICAL IMPORTANCE

• Diffusion, osmores, diabols, surface tension, viscoury colloids, crystalloids, and suspensoids.

CELL BIOLOGY

- Structural organization and functions of a biological cell and different subcellular organilles along with their marker enzymes,
- Molecular organization, functions, and structure-function relationship the cell membrane,
- Solute transport across biological membranes with related disorders,

Example I 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

 and it

Find, decirolyte, and acid-base balance, mechanism of regulation and associated discaders.

ANALYTICAL TECHNIQUES AND INSTRUMENTATION

- Colorinetry,
- Spectrophotometry,
- Atomic absorption spectrophotometry,
- Flame photometry,
- Fluorometry,
- Turbidimetry and nephelometry,
- Gravimetry,
- electrodes, gas-sensing electrodes, Electrochemistry (pH n-selective ^ÔMM, enzyme electrodi
- Chemical sensors (biosensors),
- Osmo<u>me</u>ti
- Chemiluminescence,
- Water quality testing (TDS, pH, fluoride) for autoanalyzer,
- Rectrophoresis (principle, types, applications; isoelectric focusing, lary Rectrophoresis; 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.

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 c pyrights

BASICS OF MEDICAL EDUCATION IN ASSESSMENT OF BIOCHEMISTRY

- Group dynamics,
- Traciples of adult learning, the taxonomy of learning,
- Curriculum planning,
- Educational objectives,

Developing a lesson plan (appropriate to the objective and teaching learning method),

TEACHING

- 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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AND

NING

- · Preparation of blueprint and setting of question paper,
- Microteaching,
- Reflection writing.

Paper II

Excrements, Bioenergetics, Biological oxidation, Intermediary metabolism and inborn errors of metabolism, Nutrition, Vitamins and Minerals, Detoxification and metabolism of versionics, Free radicals and anti-oxidant defense systems

ENZY MES

- Properties, classification, mechanism of action, coenzymes and cofactors, proenzymes, ibczymes, manozymes, catalytic antibodies.
- Factors affecting the rate of entirale-ostal used fraction
- Kinetics of enzyme a realistic of Audition of enzyme a
- isoenzymesting is forms, role in metabolic regulation.
- Enzyme influition,
- Principles of enzyme assays,
- Applications of enzymes: diagnostic, therapeutic and commercial uses of enzymes.
- Enzymes as targets for drug development.

BIOENTRGETICS

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.

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 ivergierma, hereiveemia and their clinical significance,
- Glucose tolerance test and its interpretation,
- Diabetes stiellitus classification, pathogenesis, metabolic departmements and complications, diagnostic criteria and laboratory investigations, principles of treatment (including diet and lifestyle modification),
- Whitern errors and disorders of carbohydrate metabolism.

ΨŲ.

Metailolism of Lipids:

- Digestion and absorption and associated disorders,
- Metabolism of fatty acids, regulation and related disorders,
- Metabolism of elcosanoids 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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Informerrous 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

Metabolismof publies and pyrimidines and their associated directler

Metabolism of highin:

• Metabolism of haem and associated disorders.

Interdenant and intraorgan interrelationships and integration of metabolic pathways:

• Metabolic adaptation in starvation, diabetes mellitus, obesity, and during exercise

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 subjition, obesity, protein energy malnutrition, under-nutrition and bioratory 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 his ase as consets.
- Oxygen toxicity.
- Oxidative stress markers in blood, urine, and other biological flord

Paper III: 4

Molecula Fiology, Molecular and genetic aspects of cancer, Immunity, and Environmental Biochemistry

MOLEOULAR 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

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

Translation:

- iomm Basic structure of prokaryotic and eukaryotic ribosomes.
- Process of protein synthesis (translation) in prokaryotes and eukaryotes.
- -translational modifications.
- potein sorting, protein targeting, protein folding and related disorders.
- inhibitors of translation in prokaryotes and eukaryotes, and their clinical significance.

Regardion 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.
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MOLECULAR AND GENETIC ASPECTS OF CANCER

- Biochemical characteristics of a cancer cell
- Biochemistry of carcinor species
- Carcinogens
- Role of oppositions and tumor suppressor genes
- Generations and adaptations in cancer
- Commis To markers, cancer risk assessment, and community screening
- Subemical basis of cancer chemotherapy and drug resistance
- ini-cancer therapy.

MARKOLOGY

- - 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

- · 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

Effect: of environmental pollutants on the body

Paper IV

nedical (

Basic principles and particles of clinical biochemistry, Biochemistabanalytes, Assessment of organ system functions, and Recent advances in biochemistry

BASIC PRINCIPLES AND PRACTICE OF CLINICAL BIOCHEMISTR

- Units of measurement, reagents, clinical laboratory supplies, basic separation techniques, laboratory calculations, specimen collection, transport and processing, safety in the laboratory.
- Excluding 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, preanalytical, 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

- Carbohydrates
- Lipids, lipoproteins and apolipoproteins and other cardiovascular risk markers
- Electrolytes
- Blood gases and pH
- Hermones
- Carciolamines, serotonin, and other neurotransmitters
- Version, morerals, trace and toxic elements
- Reserved bili and bili rubin
- Auptoria
- Bone markers
- Tumour markers.

Body fluid analys

Stone analysis

Medical Commission Therapeutic using monitoring

Clinical texicology

Pharmasogenomics

Pedianae 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 ٠

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- Other disorders of hemanopoietic 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, panereatic 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 diagraphican treamine of endorinal disorders
 - meeption, reproduction, and contrace iii
 - Endocrinology on ng, newborn screening, and inborn errors of metabo
 - Antenata

Cardiovascular system:

- Atherosclerosis pathogenesis, risk factors, prevention and treatment
- Biochemistry of cardiac failure, acute coronary syndrome, cardiomyopath and
- Indiac 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
- 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
- management in acute and incorator inding Pathophysiology, brich mist and
 - to- buy y and pancreatic disorders. zarceix b

Shadada syste

octure, metabolism, associated disorders and markers

mineral homeostasis.

Ner ctern:

Teurotransmitters 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.

B. Psychomotor Domain

Se course contents are mentioned under Subject/domain-specific competencies.

TEACHING AND LEARNING METHODS

General principles

Accuse tion 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 period of the standing 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 maintaine logbook for recording the training they have undergone, and details of the procedures alone during laboratory and clinical postings in real-time.

Teaching Learning methods

This final include a judicious mix of demonstrations, symposia, journal clubs, mical 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.

All postgraduate trainees will be required to attend these lectures. Lectures can cover topics

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

Teche analogs 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 carine (ppraise) of original research papers published in peer reviewed indexederations of presenter(s) shall be used and by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once every 1-2 weeks is suggested. Important varies should be selected as per subject requirements and allotted for in the third study by a postgraduate student. A teacher should be allocated for each seminar as faculty in derator to help the student prepare the topic well. It should aim at comprehensive evidence based revieweef 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),

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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 art.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main department and other Jepartment/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 la oncerned specialty. Postings would be rotated between various units/demacheeds and details to be included the specialty-based Guidelines. Suggested departments and duration of rotational postings:

- Contral Medicine 1 month (includes Endocrinology, Peo cs, and ICU posting)
 - Endocrinology [Focus: Clinical correlation and important investigations related to diabetes mellitus and other diseases, dietary advice, int-ofcare 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:

Principles of teaching-learning-assessment and other important aspects of Medical Education].

G.h. Pusting 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 Host tal District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Ameradment) Regulations (2020). Such rotation shall take place in the 3^{rd} or 4^{th} or 5^{th} 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 shoulding a sedenced learning objective of recommended that the departments draw up objectives and guidelines for every posting offered a 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 be a posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, other the guidance of an assigned faculty.

Oppartunities to present and discuss infectious disease cases through barside 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.

In addition to the thesis project, every postgraduate trainee shall participate in at least one addit onal 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 circular research project is taken up as thesis work, the additional project may deal with comparison bedd laboratory work. Diversity of knowledge and skills can thereby be that exercised.

I. Training in teaching skills

MEL DOSGE should train PG students in education methodologies and assessment techs pres. 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 arecord of variants activities by the student like (1) Overall participation & performance, (2) and itiance, (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

for 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 part cularly 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 protocession completion. If the course.

Other aspects

- The postgranate trainees must participate in the teaching and raining program of undergranate students and interns attending the department.
- Trainee shall attend accredited scientific meetings (CME, symposia, and enferences) at least once a year.
- Department shall encourage e-learning activities.
- The postgraduate trainees should undergo training in Basic Cardiac Life Support (ALS)
- 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

The assessment for postgraduate student in Biochemistry will be of two types; Fermative 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 under both meory 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.

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 investig done in the clinical laboratory

aboratory 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

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tions

- 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.
- Science

: 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 victear that topic to the evaluators or he/she may be evaluated turing pre-practical briefing or undergraduate students.
- Interdepartmental case or seminar : once in 3 months of 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 these graduates.

NETCOM

: 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 (nonclinical/clinical) postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, ie., assessment at the end of training to evaluate whether the student has acquired sufficient knowledge and skills to be awarded MD

Esercial pre-requisites for appearing for examination include:

- 1. Legislask of work done during the training period including rotational postings, dependenced presentations, and reports of the internal assessment conducted during the setting 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 pell or University Review committee assess the work sent for publication) COLOR COLOR (1990)

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 if 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 adamination.

The pargraduate examination shall be in three parts:

I. 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



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 MLD/ 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, Bioingers Ordetten, Intermediary metabolism and inborn errors of metabolism, Nutrition, Vitamins and Minerals, Detoxification and metabolism of venobiotics, Free radicals, and anti-oxidan defense systems

Paper III

Molecular biology, Molecular and genetic aspects of cancer, Immunology, and Environmental Biochemistry

Paper IV:

Batic principles and practice of clinical biochemistry, Biochemical analy Assessment of organ system functions, and Recent advances in biochemistry

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 **COLUCIE** The ability of the student to justify the methodology, and findings with interpretation, should be evaluated.
- 2. Miero reaching

Fig essentials of classroom teaching skills should be evaluated. Grand viva voce

Recommended Reading:

Broks (latest edition)

- 1. Lehninger Principles of Blochemistry, 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.
- Textbook of Biochemistry with Clinical Correlations, Thomas M. Devlin, John Wiley & Sons.
- 5. Kuby Immunology, Judy Owen, Jenni Punt, Sharon Stranford, W. H. Freeman.
- Principles and Techniques of Biochemistry and Molecular Biology.
 Wilson/Walker; Cambridge University Press

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- 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.
- 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.

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Journals

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

Annexure 1

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	Student	appr	aisal	form	for N	ÎD in	Bio	cher	nisti	ъV – 2-	NMAR
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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)										
13	Conduct of research and other scholarly activity assigned (e.g Posters publications	W	e		Ga		C	0,	う,	3	
1.4	etc): Documentation of additistition of consistence									Ĭ	S.
1.5	Performance in work eased assessments										0
16	Self-directed Learning								· -	· · · ·	
2	Work related. to training										
2 1	Practical skills that are appropriate for the level of training										
22	Respect for processes and procedures in the work space										
2.3	Ability to WOTX with other members of the team			ļ							
2.4	Participation and compliance with the guality										

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Current Ò

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

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Subject : MD Biochemistry

1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	191	5.	Examination Duration	3 Hrs
· 3.	Course title	Basic Biomolecules, Biophysics, Biostatistics, Analytical Techniques, Instrumentation for Diagnostics	6.	Theory marks	100

SYLLABUS

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

lonization of water, the concept of acid and base, weak acids and bases, pH, pK, Henderson-Hasselbalch equation, buffer and buffering capacity.

Proteins:

 \square Classification, structure, properties and functions of amino acids and peptides, biologically important peptides,

Classification, biological significance and structural organization of proteins,

d Structure-function relationship of proteins (haemoglobin, myoglobin, collagen and immunoglobulins),

E Fractionation, purification, structural analysis and characterization of proteins,

Protein folding and its associated disorders,

Protein denaturation,

S Protein degradation - lysosomal and proteosomal,

Plasma proteins.

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,

E Fatty acids - nomenclature, classification, properties, reactions including essential fatty acids, polyunsaturated fatty acids and trans fatty acids,

O Mono, di- and triacylglycerols,

🗄 Trans fats,

Cholesterol - structure, properties and biomedical importance,



Subject : MD Biochemistry

1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	191	5.	Examination Duration	3 Hrs
3.	Course title	Basic Biomolecules, Biophysics, Biostatistics, Analytical Techniques, Instrumentation for Diagnostics	б.	Theory marks	100

Phospholipids - classification, properties, composition, and biomedical importance of various phospholipids,

Glycolipids - classification, properties, composition, and biomedical importance,

E 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,
- E. Solute transport across biological membranes with related disorders,
- Cell fractionation and separation of organelles,
- E Disorders related to cell membrane and subcellular organelles,
- Intracellular traffic and sorting of proteins,
- E 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.

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Subject : MD Blochemistry

1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	191	5.	Examination Duration	3 Hrs
3.	Course title	Basic Biomolecules, Biophysics, Biostatistics, Analytical Techniques, Instrumentation for Diagnostics	6.	Theory marks	100

FLUID, ELECTROLYTE, AND ACID-BASE BALANCE

Fluid, electrolyte, and acid-base balance, mechanism of regulation and associated disorders. ANALYTICAL TECHNIQUES AND INSTRUMENTATION

- Colorimetry,
- Spectrophotometry,
- □ Atomic absorption spectrophotometry,
- E Flame photometry,
- E Fluorometry,
- Turbidimetry and nephelometry,
- Gravimetry,

Electrochemistry (pH electrodes, ion-selective electrodes, gas-sensing electrodes, enzyme electrodes),

Chemical sensors (biosensors),

U Osmometry,

Chemiluminescence,

U Water quality testing (TDS, pH, fluoride) for autoanalyzer,

 \sqcap 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.),

E Radioisotope-based-techniques and their applications (permissions, precautions, management of radioactive waste),

Automation,

E Point-of-care testing.

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Subject : MD Blochemistry

1.	Course No.	MD Blochemistry	-	Catalan	
2,	Subject Code	101		Category	Compulsory
		191	5.	Examination Duration	3 Hrs
3.	Course title	Basic Biomolecules, Biophysics, Biostatistics, Analytical Techniques, Instrumentation for Diagnostics	6.	Theory marks	100

BIOSTATISTICS AND RESEARCH METHODOLOGY

□ Basic concepts of biostatistics as applied to health science,

E Statistical tests: t-test, analysis of variance, chi-square test, non-parametric tests, correlation and regression.

- E Statistical methods of validation of diagnostic tests,
- Types of study designs and sampling methodologies,
- O Meta-analysis and systematic reviews,
- C 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.
- E 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),
- I Principles of self-directed learning and giving feedback,
- G 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,
- . Preparation of blueprint and setting of question paper,
- Microteaching.
- Reflection writing.

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Subject : MD Blochemistry

1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	192	5.	Examination Duration	3 Hrs
3.	Course title	Enzymes , Bioenergetics, Nutrition, Metabolism, Detoxification	6.	Theory marks	100

SYLLABUS

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

 \Box 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,
- in Isoenzymes and isoforms, role in metabolic regulation,
- Enzyme inhibition,
- Principles of enzyme assays,
- D Applications of enzymes: diagnostic, therapeutic and commercial uses of enzymes,
- □ Enzymes as targets for drug development.

BIOENERGETICS

- I 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

U Components, complexes and functioning of the respiratory chain including inhibitors,

D Process and regulation of oxidative phosphorylation including uncouplers.

D Mechanisms of ATP synthesis and regulation,

□ Mitochondrial transport systems and shuttles,

Mitochondrial diseases.

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Subject : MD Biochemistry

1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	192	5.	Examination Duration	3 Hrs
3.	Course title	Enzymes , Bloenergetics, Nutrition, Metabolism, Detoxification	6.	Theory marks	100

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,

C 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,

D Metabolism of fatty acids, regulation and related disorders,

D 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,

□ Inborn errors of lipid metabolism.

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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE, 2025

Subject : MD Biochemistry

1.	Course No.	MD Blochemistry	4.	Category	Compulsory
2.	Subject Code	192	5.	Examination Duration	3 Hrs
3.	Course title	Enzymes , Bloenergetics, Nutrition, Metabolism, Detoxification	6.	Theory marks	100

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,

I Metabolism of individual amino acids and associated disorders,

□ One carbon metabolism,

Biogenic amines,

□ Inborn errors of amino acid metabolism.

Metabolism of nucleotides:

I 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:

I Metabolic adaptation in starvation, diabetes mellitus, obesity, and during exercise.

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.

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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE, 2025

Subject : MD Biochemistry

1.	Course No.	MD Biochemistry	4,	Category	Compulsory
Ź.	Subject Code	192	5.	Examination Duration	3 Hrs
3.	Course title	Enzymes , Bioenergetics, Nutrition, Metabolism, Detoxification	6.	Theory marks	100

VITAMINS AND MINERALS

 \square 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.

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D Oxidative stress markers in blood, urine, and other biological fluids.



Subject : MD Biochemistry

1.	Course No.	MD Blochemistry	4.	Category	Compulsory
2.	Subject Code	193	5.	Examination Duration	3 Hrs
3.	Course title	Molecular Biology, Genetics and Immunology	6.	Theory marks	100

SYLLABUS

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

elements.

□ Process of transcription in prokaryotes and eukaryotes.

□ Post-transcriptional modifications.

- □ Inhibitors of transcription.
- \Box RNA editing and stability.

Genetic code, gene polymorphism, and mutation:

- \Box Characteristics of the genetic code.
- □ Molecular basis of the degeneracy of the genetic code (Wobble hypothesis).
- □ Mutation and gene polymorphism.
- D Mutagens- examples of physical, chemical, and biological mutagens.
- \Box Types of mutations.
- □ Mutation in health and disease.

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Subject : MD Biochemistry

1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	193	5.	Examination Duration	3 Hrs
3.	Course title	Molecular Biology, Genetics and Immunology	6.	Theory marks	100

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, 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.



1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	193	5.	Examination Duration	3 Hrs
3.	Course title	Molecular Biology, Genetics and Immunology	6.	Theory marks	100

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
- I Major histocompatibility complex, antigen processing, and presentation
- Antigen-antibody interaction, immune effector mechanisms
- Complement system
- 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

Effect of Environmental pollutants on the body

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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE, 2025 Subject : MD Biochemistry

1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	194	5.	Examination Duration	3 Hrs
3.	Course title	Clinical Biochemistry, Assessment of organ system functions, Recent advances	6.	Theory marks	100

SYLLABUS

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
- Carbohydrates
- Lipids, lipoproteins and apolipoproteins and other cardiovascular risk markers
- C 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

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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE, 2025 Subject : MD Biochemistry

1.	Course No.	MD Biochemistry	4.	Category	Compulsory
2.	Subject Code	194	5.	Examination Duration	3 Hrs
3.	Course title	Clinical Biochemistry , Assessment of organ system functions, Recent advances	6.	Theory marks	100

ASSESSMENT OF ORGAN SYSTEM FUNCTIONS

Hematopoletic 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 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

- I 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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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE, 2025 Subject : MD Biochemistry

1.	Course No.	MD Blochemistry	4.	Category	Compulsory
2.	Subject Code	194	5.	Examination Duration	3 Hrs
3.	Course title	Clinical Blochemistry , Assessment of organ system functions, Recent advances	6.	Theory marks	100

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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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE, 2025 Subject : MD Biochemistry

1.	Course No. *	MD Blochemistry	4.	Category	Compulsory
2.	Subject Code	194	5.	Examination Duration	3 Hrs
3.	Course title	Clinical Biochemistry, Assessment of organ system functions, Recent advances	6.	Theory marks	100

5.NO	Subject Code	Course Title	M	larks
			Theory	Practical
1.	191	Basic Biomolecules, Biophysics, Biostatistics, Analytical Techniques, Instrumentation for Diagnostics	100	
2.	192	Enzymes , Bioenergetics, Nutrition, Metabolism, Detoxification	100	400
3.	193	Molecular Biology, Genetics and Immunology	100	
1.	194	Clinical Biochemistry , Assessment of organ system functions, Recent advances	100	
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	T	otal Marks	8	00



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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE 2025

Subject: MD BIOCHEMISTRY

1.	Course No.	MD BIOCHEMISTRY	4.	Category	Compulsory
2.	Subject Code	191	. 5.	Examination Duration	3 Hrs
3.	Course title	Basic Bio molecules , Biophysics, Biostatistics, Analytical Techniques and Instrumentation for Diagnostics	6.	Theory marks	100

NOTE FOR THE EXAM SETTERS:

Paper - 1 Basic Bio molecules, Biophysics, Biostatistics, Analytical techniques and Instrumentation for Diagnostics

i. Paper shall be of three hours duration.

ii. Paper shall carry maximum 100 marks.

iii. Paper shall contain ten questions. All the questions are compulsory.

iv. Marks against each question are shown.



Subject: MD BIOCHEMISTRY

					Compulsory
		MD BIOCHEMISTRY	4.	Category	Company
1.	Course No.	102	5.	Examination	3 Hrs
2.	Subject Code	192		Duration	·
3,	Course title	Enzymes, Bioenergetics,	6.	Theory marks	100
	1	Detoxification ,	 _1		

NOTE FOR THE EXAM SETTERS:

Paper -II Enzymes, Bioenergetics, Nutrition, Metabolism, Detoxification

i. Paper shall be of three hours duration.

ii. Paper shall carry maximum 100 marks.

iii. Paper shall contain ten questions. All the questions are compulsory.

iv. Marks against each question are shown.

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Subject: MD BIOCHEMISTRY

1.	Course No.	MD BIOCHEMISTRY	4.	Category	Compulsory
2.	Subject Code	193	5.	Examination Duration	3 Hrs
3.	Course title	Molecular Biology, Genetics and immunology	6,	Theory marks	100

NOTE FOR THE EXAM SETTERS:

Paper - III Molecular Biology, Genetics and immunology

i. Paper shall be of three hours duration.

ii. Paper shall carry maximum 100 marks.

iii. Paper shall contain ten questions. All the questions are compulsory.

iv. Marks against each question are shown.

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Subject: MD BIOCHEMISTRY

1.	Course No.	MD BIOCHEMISTRY	4.	Category	Compulsory
2.	Subject Code	194	5.	Examination	3 Hrs
				Duration	•
3.	. Course title	Clinical Biochemistry	6.	Theory marks	100
		and Assessment of			
		organ system function,			
	· · · · · · · · · · · · · · · · · · ·	Recent advances			

NOTE FOR THE EXAM SETTERS:

Paper – IV Clinical Biochemistry, Assessment of organ system function, Recent advances

i. Paper shall be of three hours duration.

ii. Paper shall carry maximum 100 marks.

iii. Paper shall contain ten questions. All the questions are compulsory.

iv. Marks against each question are shown.

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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE 2025 Subject: MD BIOCHEMISTRY

<u>.</u>	Course No.	MDBIOCHEMISTRY	4.	Category	Compulsory
2.	Subject Code	191	5.	Examination Duration	3 Hrs
3.	Course title	Basic Bio Molecules Biophysics Biostatistics, Analytical Techniques and Instrumentation for Diagnostics	6.	Theory marks	100

MODEL QUESTION PAPER

THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY [MD 1022] OCTOBER 2022 Sub. Code: 2043

M.D. DEGREE EXAMINATION PAPER -I

O.P. Code: 202043

Time: Three Hours

Maximum Marks: 100

BIOCHEMISTRY

1. Essay Questions: $(2 \times 15 = 30)$

1. Explain the steps in validating an Analytical method of a manufacturer before introducing it into your laboratory.

2. Discuss in detail the principle and applications of High Performance Liquid chromatography.

II. Short notes: $(10 \times 5 = 50)$

I. Westgard Multi QC rules and their interpretation.

2. Timed Urine Collection and Urine preservatives.

3. Reagent Grade water.

4. Electro endosmosis.

5. Turnaround time in laboratory.

6. Chemiluminescence.

7. Disposal of Biomedical waste in a Laboratory.

8. Gibbs Donnan Equilibrium.

9. Delayed Enhanced Lanthanum Fluoride Immunoassay – Principle and Applications.

10. Laboratory Information System.

III. Reasoning Out: $(4 \times 5 = 20)$

1. Patient preparation and manner of specimen collection can significantly affect the result of Serum Calcium measurement.

2. Water is a unique solvent.

- 3. Internal standards should be used in liquid scintillation counters. Why?
- 4. In SDS PAGE the movement of protein does not depend on the charge of protein.

Proposed for the University of Jammu.

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MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE 2025 Subject: MD BIOCHEMISTRY

, i	Course No	MD BIOCHEMISTRY	4.	Category	Compulsory
2.	Subject Code	192	5.	Examination Duration	3 Hrs
<u>3</u> .	Course title	Enzymes , Bioenergetics , Nutrition, Metabolism, Detoxification	6.	Theory marks	100
<u>.</u>	THE TA	MODEL QUESTION PA WIL NADU DR.M.G.R. M	PER IEDIC	AL UNIVERSI	TY
	[MD	1022] OCTOBER 2022 Su	ıb. Co	de: 2044	
M	.D. DEGREE EXAN	AINATION		BIOC	HEMISTRY
Р / <i>Q</i> .	APER -II P. Code: 202044	Time: Three H	ours	Maximum	n Marks: 100
 I. Essay Questions: (2 x 15 = 30) 1. What are the methods of separating cellular organelles? Describe the technique and mention the marker of each. 2. What is recombinant DNA technology, detail the steps with its applications? II. Short notes: (10 x 5 = 50) 1. Bio chemical changes in cancer cells. 2. Post Translational Modifications. 3. Point Mutation. 4. Gap junctions. 5. Glucose transporters. 6. Replication fork. 7. Endoplasmic reticulum. 8. Automated DNA sequencing 9. Membrane protein. 10. Differential centrifugation. III. Reasoning Out: (4 x 5 = 20) 			tions?		
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Proposed for the University of Jammu.

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Subject: MD BIOCHEMISTRY

<u>1.</u> 2.	Course No. Subject Code	MD BIOCHEMISTRY 193	4. 5.	Category Examination Duration Theory marks	Compulsory 3 Hrs 100
3.	Course title	Molecular Biology, Genetics and Immunology	0.		

THE TAMIL N	MODEL QUESTION PAPER IADU DR. M.G.R. MEDICAI	L UNIVERSITY
[MD 1022]	OCTOBER 2022 Sub. Code:	2045
M.D. DEGREE EXAMINA	TION	BIOCHEMISTRY
PAPER -III Q.P. Code: 202045	Time: Three Hours	Maximum Marks: 100
I. Essay Questions: (2 x 15 1. Define isoenzymes. Discu	= 30) iss in detail about various isoen:	zymes with its clinical
applications. 2. Detail the steps of heme s	ynthesis and its associated diso	orders.
 II. Short notes: (10 x 5 = 5 1. Functions of Vitamin A. 2. Functions and deficiency 3. Anti oxidants. 4. Regulation of Ketogenes 5. Lipid storage disorders. 6. Galactosemia. 7. Inhibitors and uncouplen 8. Mega vitamin therapy. 9. Km value. 10. Gout. III. Reasoning Out: (4 x 1. Some individual even a 2. What is the first line of 3. Erythrocyte derives en 4. Hyperbaric O2 therapy 	 manifestation of Selenium. sis. rs of oxidative phosphorylation 5 = 20) after consuming large quantity of defense body adopts in ammore regy mainly from which pathway is given for acute carbon mone 	of food are lean. nia detoxification. ay. Why? oxide poisoning.
	in of longer	\sim
Proposed for the Univer	and are the	64



MD BIOCHEMISTRY EXAMINATION TO BE HELD IN MAY/JUNE 2025 Subject: MD BIOCHEMISTRY

Compulsory Category MD BIOCHEMISTRY 4. 3 Hrs Course No. Examination 5. 1. 194 Subject Code Duration 2. 100 Theory marks 6. **Clinical Biochemistry** Course title 3. and assessment of organ system function, recent advances

MODEL QUESTION PAPER

THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY [MD 1022] OCTOBER 2022 Sub. Code: 2046

M.D. DEGREE EXAMINATION

PAPER -IV

Q.P. Code: 202046

Maximum Marks: 100 Time: Three Hours

65

BIOCHEMISTRY

1. Essay Questions: (2 x 15 = 30)

1. Describe the Neonatal screening for inborn Errors of Metabolism (IEM). 2. Discuss briefly the various Renal Function tests and explain their significance.

11. Short notes: (10 x 5 = 50)

1. C.S.F. analysis.

2. Biomarkers of Sepsis and their significance.

3. Sick Euthyroid syndrome and its lab findings.

- 4. Hypokalemia Algorithm to Biochemical Evaluation.
- 5. Lab diagnosis of Pheochromocytoma.
- 6. Delta Bilirubin and its significance.
- 7. Biochemical Markers in Covid 19.
- 8. Prediabetes.
- 9. Multiple Myeloma.
- 10. Newer cardiac markers.

III. Reasoning Out: $(4 \times 5 = 20)$

1. Large for date babies are commonly seen in Gestational Diabetes Mellitus. 2. Renal Tubular Acidosis is associated with Normal Anion Gap Metabolic Acidosis.

- 3. There is a peak incidence of Acute Myocardial Infarction in early morning.
- 4. Lactic Acidosis is seen in patients on treatment with Biguanides.

Proposed for the University of Jammu

Subject: MD Biochemistry

Course No.	MD DIOCHEMISTIC
Subject Code	191
	192
	193
	194
Practical Marks	400
	Subject Code Practical Marks

Practical Marks:-

1)	Long Case	100 marks
1) 1	Enzymes Kinetics / Flectrophoresis	100 marks
2) 2)	Chart Case study	50 marks
3)	Short Case study	50 marks
4}	Standard curve/paper chromatographing	100marks
C 1	Grand Viva	********

Grano viva 51

RECOMMENDED READING (latest edition)

1 Jut

BOOKS:

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.

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Subject: MD BIOCHEMISTRY

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.

Journais

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



