

PG Curriculum MD Anaesthesia Index

1. Goals
2. Objectives
3. Syllabus
4. Teaching Program
5. Postings
6. Thesis
7. Assessment
8. Job Responsibilities
9. Suggested Books
10. Model Test Paper

Curriculum MD Anaesthesia

The infrastructure and faculty of the department of Anaesthesia will be as per MCI regulation

1. Goals

The goal of MD course in Anaesthesia is to produce a knowledgeable and skillful anaesthesiologist who:

- ❖ Is competent to anaesthetize all categories of patients from ASA-I to V with medical problems for every type of elective and emergency surgery.
- ❖ Should be able to diagnose and treat acute and chronic pain conditions.
- ❖ Should be competent to manage critically ill patients in emergency and ICU requiring routine to advanced monitoring, mechanical ventilation and other interventions.
- ❖ Should be aware of the recent advances and developments in medical sciences as related to anaesthesia, analgesia and critical care.
- ❖ Should be oriented to principles of research methodology; and
- ❖ Is competent to teach acquired skills to medical and paramedical professionals.

2. Objectives

Department of anaesthesia makes sure that the candidate develops in all fronts i.e. cognitive, affective and psychomotor domain as it is important for anaesthesiologist to work as member/ team leader in various clinical and critical situations in OR and outside OR. Candidate should be able to demonstrate following at the end of training.

- ❖ Demonstrate familiarity with diagnostic skills and laboratory procedures relevant to the diagnosis and evaluation of patients under Her / His care.
- ❖ Critically evaluate recent medical literature from journals, reference books: monographs update knowledge and adapt therapeutic procedures based on this appraisal.
- ❖ Manage administration of anaesthesia to patients of all grades of ASA risk grading and all types of surgical subspecialties both for elective and emergency procedures.
- ❖ Demonstrate aptitude and will to remain clear headed and act correctly when faced with critical incidence in the operating room and critical care units.
- ❖ Demonstrate the knowledge of ethics and medico legal aspects related to the practice of anaesthesiology and critical care.
- ❖ To work in a team and show leadership qualities in dealing with paramedics.

3. Syllabus

3.1 Theory

- ❖ Applied Anatomy and Physiology

- Applied Anatomy
 - ★ Candidates should be able to demonstrate a good understanding of human anatomy relevant to the practice of anaesthesia.
 - ★ This will include the knowledge of anatomy as demonstrated by endoscopic and imaging techniques.
- Applied Physiology
 - ★ Candidates are expected to be able to apply the basic knowledge of human physiology necessary to clinical practice of anaesthesia and intensive care medicine.
 - ★ While all branches of physiology are of importance, it is recognized that clinical relevance dictates the topics selected for the examination.
 - ★ Haematological
 - Anaemia
 - Polycythaemia
 - Immunity and allergy
 - Inflammation
 - Blood groups
 - Alternative oxygen carrying solutions
 - Coagulation, haemostasis and disorders
 - Abnormal haemoglobins -sickle cell disease –thalassaemia
 - ★ Muscle Function
 - Malignant hyperthermia
 - Disturbances in neuromuscular transmission
 - Myopathies and Muscle contractures.
 - ★ Cardiovascular Physiology
 - Abnormal electrocardiogram and arrhythmias
 - Cardiomyopathy and abnormal ventricular function
 - Heart failure
 - Shock
 - Ischaemic heart disease
 - Valvular defects
 - Common congenital heart defects
 - Hypertension
 - ★ Kidney and Body Fluids
 - Serum electrolyte disturbances
 - Disturbances of fluid balance, oedema and dehydration
 - Management of acid-base abnormalities
 - Assessment of renal function
 - Renal failure and its management
 - ★ Liver
 - Liver function tests
 - Hepatic failure
 - Jaundice , causes and pathophysiology
 - Disorders of respiratory mechanics, gas exchange and transport
 - ★ Respiration
 - Disorders of the pulmonary circulation
 - Respiratory failure and ventilatory support
 - Effects of high and low atmospheric pressure
 - ★ Nervous System
 - Consciousness and coma
 - Phases of sleep

- Depth of anaesthesia
- Consequences of spinal cord injury
- Monitoring of spinal cord function under general anaesthesia
- Mechanisms of pain; somatic, visceral, neuropathic
- Control of cerebral circulation, intracranial and intraocular pressures
- Disorders of the autonomic nervous system
- ★ Gastrointestinal Tract
 - Nausea and vomiting
 - Oesophageal reflux
 - Obstruction
 - Swallowing disorders
- ★ Metabolism and Body Temperature
 - Hormonal and metabolic response to surgery and other trauma
 - Hyperthermia and hypothermia
 - Starvation/obesity
- ★ Endocrinology
 - Endocrine diseases of significance in anaesthesia (Thyroid, parathyroid, pancreas, adrenal etc.)
- ★ Obstetrics and Paediatrics
 - Principles of neonatal physiology
 - Effects of prematurity
 - Development in infancy and childhood
 - Physiology of normal and abnormal pregnancy
- ❖ Applied Clinical Pharmacology
 - ★ For drugs used in anaesthesia and intensive care medicine, candidates will also be expected to be aware of new drugs which are undergoing evaluation and whose human application has been reported in the mainstream anaesthetic journals.
 - ★ There will be emphasis on the practical application of pharmacological and pharmacokinetic knowledge, and upon an appreciation of the hazards and limitation of individual techniques.
- General therapeutics:
 - ★ Pharmacological management of: Heart failure, coronary insufficiency and arrhythmias
 - ★ Hypertension, including hypertension in pregnancy
 - ★ Acute and chronic respiratory diseases
 - ★ Hepatic and renal failure
 - ★ Gastrointestinal disorders including modification of gastric contents
 - ★ Musculo-skeletal problems such as rheumatoid and osteoarthritis
 - ★ Myasthenia and muscle diseases
 - ★ Pituitary, adrenal and thyroid dysfunction
 - ★ Antipsychotic drugs
 - ★ Epilepsy and anticonvulsants
 - ★ Bacterial, fungal and viral infections
 - ★ Malignant disease
 - ★ Adverse reactions: Types of reactions
- Application of pharmacological principles for the management of :
 - ★ General anaesthesia: -
 - Premedication: anxiolytics, sedatives and antisialogogues.
 - Pro-kinetic and anti- emetic drugs.
 - H₂ and proton pump antagonists

- Inhalational anaesthesia
- Intravenous Anaesthesia, TIVA
- Control of alveolar tension during induction and recovery
- Control of anaesthetic depth and prevention of awareness
- Control of autonomic response to laryngoscopy
- Methods for achieving specified plasma concentrations.
- Bolus, infusion, and profiled administration
- Management of neuromuscular blockade and reversal
- ★ Regional anaesthesia: -
 - Choice of agent and technique.
 - Additives
 - Systemic effects. Avoidance of toxicity
- ★ Control of acute pain (including intraoperative analgesia and postoperative pain management) and chronic pain: -
 - Opioid and non-opioid drugs
 - Opioid infusions
 - Patient-controlled analgesia
 - Regional techniques
 - Inhalational techniques
 - Other drugs used to manage chronic pain - antidepressants, anticonvulsants, antiarrhythmics, etc.
 - Management of severe pain and associated symptoms in terminal care
 - Non-pharmacological methods (e.g. T.E.N.S., acupuncture)
- Application of pharmacological principles for the management of:
 - ★ Neurosurgery and management of head injuries:-
 - Management of cerebral ischaemia
 - Effect of drugs on cerebral blood flow
 - Control of intracranial pressure
 - Control of convulsions
 - ★ Cardiovascular Surgery :-
 - Inotropes and vasopressors
 - Vasodilators
 - Anticoagulant and thrombolytic therapies.
 - Management of coagulopathies
 - Pharmacological control of blood sugar
 - Pharmacological problems in cardiopulmonary bypass.
 - Cardioplegia
- Other Therapeutic Drug groups
 - ★ Management of malignant hyperthermia
 - ★ Pharmacological considerations in cardiopulmonary resuscitation, major trauma and exsanguinations
 - ★ Pharmacological control of severe infections
 - ★ Pharmacological treatment of severe asthma
 - ★ Effects of renal or hepatic impairment on drug disposition
- The Statistical Basis of Clinical Trial Management
 - ★ Candidates will be expected to understand the statistical fundamentals upon which most clinical research is based.
 - ★ They may be asked to suggest suitable approaches to test problems, or to comment on experimental results.

- ★ They will not be asked to perform detailed calculations or individual statistical tests.
- ★ Data collection and analysis: simple aspects of study design defining outcome measures and the uncertainty of measuring them
- ★ Application to clinical practice: distinguishing statistical from clinical significance understanding the limits of clinical trials the basics of systematic review and its pitfalls
- ★ Study design. Defining a clinical research question understanding bias controls, placebos, randomization, blinding exclusion criteria statistical issues, especially sample size ethical issues.
- Knowledge of Basic Computer Application including MS office
- ❖ Principles of Anaesthesia
 - General Anaesthesia
 - ★ Anaesthetic equipment
 - ★ Preoperative assessment and investigations
 - ★ Perioperative management of anaesthesia
 - ★ Anaesthesia for patients with coexisting disease including diabetes and cardiovascular disorders
 - ★ Regional anaesthesia
 - ★ Audit and quality control
 - ★ Ethics, relevant legislation and the duty of care, consent, and information given to patients before anaesthesia
 - ★ Anaesthesia for particular disciplines – general surgery and subspecialties, obstetric, ENT, dental/ maxillofacial, orthopaedic, trauma, ophthalmic, paediatric, day care, anaesthesia and sedation for remote procedures such as radiology, endoscopy
 - Regional Anaesthesia
 - ★ Basic sciences applied to regional anaesthesia: anatomy, physiology and pharmacology.
 - ★ Principles and practice of spinal and epidural anaesthesia, intravenous regional anaesthesia and nerve blocks.
 - ★ Recognition and management of adverse effects
 - ★ In addition, candidates will be assessed on their understanding of principles in the following areas:
- ❖ Anaesthesia for specialties
 - Obstetrics
 - ★ Physiological changes of pregnancy
 - ★ Anaesthesia in early pregnancy
 - ★ Antenatal assessment of the pregnant woman
 - ★ Medical diseases complicating pregnancy
 - ★ Pain relief in labour
 - ★ Anaesthesia for operative obstetrics
 - ★ Emergencies in obstetrics
 - ★ Neonatal resuscitation
 - ENT
 - ★ Preoperative assessment, particularly prediction of a difficult intubation.
 - ★ Management of patients of all ages to include patients with: -stridor - intubation difficulties -sleep apnoea -concomitant diseases
 - ★ Local techniques and surface analgesia.

- * Acute ENT emergencies (e.g. bleeding tonsils, croup, epiglottitis, foreign bodies)
- * Laryngoscopy and bronchoscopy
- * Knowledge of special tubes, gags and equipment for microlaryngoscopy, bronchoscopy, laser surgery (e.g. Venturi devices, ventilating bronchoscope and fibre-optic bronchoscopy).
- * Middle ear surgery including hypotensive techniques.
- * Neck surgery
- * Emergency airway management including tracheostomy.
- * Postoperative management.
- Dental/ Maxillofacial.
 - * Preoperative assessment
 - * Day case/inpatient requirements
 - * Resuscitation facilities
 - * Dental chair anaesthesia
 - * Sedative, anaesthetic and analgesic techniques for dental extractions.
 - * Assessment and management of the difficult airway including fibreoptic intubation
 - * Anaesthesia for maxillofacial surgery including the perioperative management of the fractured jaw and other major facial injuries.
 - * Postoperative management
- Orthopaedics
 - * Preoperative assessment with particular reference to the problems of children, the elderly and the patient with rheumatoid arthritis.
 - * Emergency anaesthesia for fractures
 - * Routine anaesthesia for joint replacement surgery, arthroscopy, fractured bones, dislocations and tendon repair
 - * Procedures under tourniquet.
 - * Anaesthesia for spinal surgery.
 - * Regional blocks.
 - * Perioperative analgesia
 - * Prevention, diagnosis and management of fat emboli, deep vein thrombosis and pulmonary emboli
- Trauma
 - * Management of head injury, spinal injury and multiple trauma with major blood loss
 - * Major incident management, triage and anaesthesia in situations outside the hospital transfer of the traumatized patient.
 - * Management of the burned patient
 - * Management of major vascular accidents
 - * Postoperative management
 - * Perioperative analgesia.
- Ophthalmic
 - * Preoperative assessment with particular reference to patients with underlying disease Strabismus, cataract and detached retina surgery
 - * Penetrating eye injury
 - * Control of intraocular pressure
 - * Anatomy relevant to local anaesthetic blocks
 - * Peribulbar and retrobulbar techniques of local anaesthesia
 - * Postoperative care
- Paediatric

- * Preoperative assessment and psychological preparation for surgery
- * Anaesthetic management of children for major elective and emergency surgery.
- * The anaesthetic implications of major congenital anomalies including congenital heart disease
- * Management of recovery.
- * Management of postoperative pain in children
- * Management of acute airway obstruction including croup and epiglottitis
- Anaesthesia for Day Care Surgery
 - * Selection criteria and preoperative evaluation
 - * Instructions to patients
 - * Regional and general anaesthesia
 - * Appropriate drugs
 - * Postoperative analgesia
 - * Recovery assessment and discharge criteria
- Anaesthesia in Remote Areas
 - * Diagnostic Imaging - Anaesthesia and Sedation
 - * Preanaesthetic preparation
 - * Techniques appropriate for adults and children for CT scanning MR imaging and angiography
 - * Post-investigation care
- Cardiac Anaesthesia
 - * Preoperative assessment and management of patients with cardiac disease.
 - * Anaesthesia for cardiovascular imaging.
 - * Pacemakers
 - * Non-invasive and invasive vascular and non-vascular monitoring appropriate to the cardiovascular system
 - * Anaesthesia for cardiac surgery.
 - * Principles of cardiopulmonary bypass and cardiac surgery
 - * Postoperative management
- Thoracic Anaesthesia
 - * Preoperative lung function tests
 - * Local and general anaesthesia for bronchoscopy to include techniques of ventilation.
 - * Familiarity with fiberoptic bronchoscopic techniques for airway management and diagnostic procedures
 - * Techniques of one-lung anaesthesia to include single and double lumen endobronchial tubes
 - * Principles of thoracic anaesthesia to include management of pneumothorax
 - * Principles of underwater seals on chest drains
 - * Tracheostomy and other techniques of emergency airway management
- Neurosurgical Anaesthesia
 - * Preoperative assessment and management of patients with neurological disease
 - * Anaesthesia for imaging relevant to the CNS
 - * Principles of anaesthesia for craniotomy, to include vascular disease, cerebral tumours and posterior fossa lesions
 - * Perioperative management of interventional neuroradiological procedures

- * Anaesthesia for spinal column surgery
- * Principles of immediate postoperative management.
- * Neurological monitoring.
- Neonatal and other specialized areas
 - * Preoperative assessment
 - * Recognition of common congenital anomalies requiring surgical correction at birth and their anaesthetic implications (including oesophageal atresia, diaphragmatic hernia, exomphalos, intestinal obstruction)
 - * Principles of anaesthetic management in the neonate undergoing major surgery
 - * Congenital pyloric stenosis
 - * Postoperative pain management
 - * Transport of the critically ill neonate
- Other specialised areas
 - * Transplantation, Principles and complications of immunosuppression
 - * Specific anaesthetic problems associated with renal transplantation
 - * Anaesthetic management of patients with transplanted organs
 - * Anaesthesia for: Electro-convulsive therapy (ECT)
 - * Radiotherapy
 - * Minimal access surgery
 - * Plastic surgery Burns
- ❖ Intensive Care Medicine
 - Intensive Care Unit, transport of the critically ill, nutrition and trauma
 - * Candidates should have a good understanding of the diagnosis and management of the critically ill patient and should be skilled in resuscitation to an advanced standard.
 - * An understanding of the particular problems associated with the critically ill child (excluding neonates) will be expected.
 - * All candidates should be familiar with the monitoring and life support equipment used in the treatment of critically ill patients.
 - * Candidates must be able to demonstrate their knowledge of practical invasive procedures, with an understanding of the principles and hazards involved. Interpretation of data from such procedures.
 - * An awareness of the importance of communication skills and interpersonal relationships will be expected.
 - Candidate should be familiar with following:
 - * Infection, sepsis, and endotoxaemia
 - * Multiple Organ Dysfunction Syndrome
 - * Nosocomial infections
 - * Assessment and management of oxygen delivery
 - * Antibiotics and immunotherapy
 - * Reperfusion injury and antioxidants
 - * Shock
 - * DVT and Pulmonary embolism
 - * Investigation and management of cardiac failure
 - * Investigation and management of arrhythmias
 - * Airway management and care
 - * Ventilators modes and care of patient on ventilation
 - * Management of acute and chronic respiratory failure

- * Cerebrovascular Accidents
- * Acute polyneuropathy
- * Traumatic and non-traumatic coma
- * Status epilepticus
- * Brain stem death
- * Renal, Electrolyte and Metabolic Disorders to include Diagnosis, prevention and management of acute renal failure
- * Fluid, electrolyte and acid-base disorders
- * Body temperature
- * Haematological disorders
- * Coagulopathies
- * Immunocompromised patients
- * Gastrointestinal Disorders
- * Acute liver failure - diagnosis and management
- * Acute pancreatitis
- * Gut ischaemia, gastrointestinal ulceration and bleeding
- Nutrition
 - Requirements for enteral and parenteral nutrition
- Analgesia, Anxiolysis and Sedation
- Trauma
 - * Management of multiple injuries
 - * Near-drowning
 - * Burns and smoke inhalation
 - * Management of Acute Poisoning
 - * Organ Donation
 - * Scoring Systems
 - * Audit Ethics
- ❖ Pain Management
 - A detailed knowledge of the control of acute pain in the context of postoperative and post-traumatic conditions will be expected, as will an understanding of the principles of chronic pain management in the pain clinic setting.
 - Anatomy, physiology, pharmacology and basic psychology relevant to pain management
 - Assessment and measurement of acute pain - including special problems with children, the elderly, and patients who are unconscious or in intensive care
 - Assessment of patients with chronic pain and pain in patients with cancer
 - Use of medication for pain management; conventional analgesics and adjuvant analgesics; side effects; problems of drug dependency and addiction
 - The role of and indications for neural blockade: peripheral nerve, plexus, epidural and subarachnoid blocks, techniques of sympathetic blockade, neurolytic agents and procedures, implanted catheters and pumps for drug delivery
 - Stimulation produced analgesia including transcutaneous techniques and acupuncture
 - Other treatment modalities; physical therapy, surgery, psychological approaches, rehabilitation approaches, pain management programmes
 - Pain relief and palliation in terminal illness

3.2 Practical

Candidate should be able to perform following skills at the end of tenure.

- ❖ Perform preanaesthetic check up of patients taking detailed history, through physical examination, examining the reports of relevant laboratory tests.
- ❖ Categorise patients according to ASA (American Society of Anesthesiologists) physical status risk grading.
- ❖ Recognise anaesthetic problems in high risk patients and select further investigations and referral for expert opinion for dealing with specific problems.
- ❖ Advise preanaesthetic medication and preparation, including advice for with holding food and fluids.
- ❖ Obtain patient/ guardian consent for anaesthesia.
- ❖ Conduct complete check for oxygen supply, other gases supply.
- ❖ Conduct complete check of anaesthesia machine for its proper functioning, including oxygen' fail safe alarms/ devices, detect leaks in the flow meter assembly and anaesthesia circuits/ delivery systems, malfunctioning of vaporisers.
- ❖ Disconnect and reassemble correctly various anaesthetic circuits.
- ❖ Ensure anaesthesia ancillary equipment in good order and availability of emergency kit/ drug tray.
- ❖ Administer anaesthetic and undertake complete peri-operative management for surgical procedures.
 - General surgery
 - Obstetric and Gynaecological surgeries.
 - Ophthalmic-Extra/intraocular surgeries.
 - Ear, Nose and Throat surgeries.
 - Orthopaedic procedures.
 - Paediatric surgery.
 - Other surgical subspecialities
- ❖ Administer anaesthesia to patients for emergency surgery, recognise peri-operative complication and institute therapy.
- ❖ Anticipate problems encountered during anaesthesia and undertake preventive measures.
- ❖ Perform the following procedures related to general anaesthetic independently Endotracheal intubation, nasal and oral under difficult situations e.g. awake intubation, under local anaesthesia without the use of muscle relaxants,
- ❖ To obtund response to laryngoscopy.
- ❖ Prevent rise in intraocular Pressure/Intracranial pressure.
- ❖ Prevent hypoxia during one lung ventilation. .
- ❖ Assist/ Perform
 - Blind nasal intubation.
 - Intubation with double lumen tube.
 - laryngoscopy and bronchoscopy using malleable fiberoptic Laryngoscope/ Bronchoscope
- ❖ Maintain airway by using Laryngeal mask airway.
- ❖ Maintain airway by using mask ventilation.
- ❖ Undertake the regional anaesthesia techniques

- ❖ Assist/ Perform
 - Recognize chronic pain syndromes and manage them.
 - Maintain nutrition of critically ill patients by parenteral nutrition
 - Central venous cannulations.
 - Cricothyroidotomy and Jet Ventilation.
- ❖ Carry out cardiopulmonary cerebral resuscitation.
- ❖ Knowledge and understanding of sophisticated equipments and measurements.
- ❖ An emphasis on clinical applications of clinical measurement, such as indications, practical techniques and interpretation of acquired data.
- ❖ Candidates will be expected to understand the sources of error and the limitations of individual measurements.
- ❖ Assessment of respiratory function including Pulmonary function tests
- ❖ Assessment of cardiac function, including EKG and echocardiography
- ❖ The electroencephalograph (EEG), BIS, Entropy and evoked potentials
- ❖ The electromyograph (EMG) and measurement of nerve conduction
- ❖ Principles and practice of in vitro blood-gas measurements.
- ❖ Interpretation of biochemical data
- ❖ Plan anaesthetic management taking into account patients condition, surgical requirements and options available.
- ❖ Manage fluid and electrolyte administration in peri-operative period.
- ❖ Maintain acid-base balance in perioperative period.
- ❖ Understand the indications, contraindications and complications of general anaesthesia.
- ❖ Understand the indications, contraindications and complications of subarachnoid and epidural blocks.
- ❖ Recognise 'Difficult Intubation' situations and manage them.
- ❖ Understand special requirements of Endoscopic / Minimal invasive surgery and meet them.
- ❖ Understand the special requirements of anaesthesia for laser surgery on the airway.
- ❖ Interpretation and errors of dynamic pressure measurements including systemic, pulmonary arterial and venous pressures, intracranial, intrathoracic and intra- abdominal pressures
- ❖ Methods of measurement of cardiac output and derived indices; limitations and interpretation.
- ❖ Principles of imaging techniques including CT, MRI and ultrasound
- ❖ Interpretation and errors of capnography, oximetry and ventilatory gas analysis.

4. Teaching Program

4.1. General Principles

Acquisition of practical competencies being the keystone of postgraduate medical education, postgraduate training is skills oriented.

Learning in postgraduate program is essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

4.2 Teaching Sessions

In addition to OR table teaching, in the department there are daily hourly sessions of formal teaching per week. The departments teaching schedule is as follows:

- ❖ Journal club
- ❖ PG clinical case presentation and discussion
- ❖ PG clinical case presentation and discussion
- ❖ Morbidity and mortality meet, Intradepartmental meet (with all the staff, incharge, residents and faculty discuss any problems faced)/ Thesis meet alternating to discuss thesis being done by the PG residents, Interdepartmental meet which includes meet with other specialties in the hospital including surgical specialties and allied branches.
- ❖ Seminar on specific topics
- ❖ Central session (held in hospital auditorium regarding various topics like CPC, guest lectures, student seminars, grand round, sessions on basic sciences, biostatistics, research methodology, teaching methodology, health economics, medical ethics and legal issues).

Note:

- ❖ All sessions are attended by the faculty members. All PGs are supposed to attend the sessions except the ones posted in ICUs, recovery room and emergency.
- ❖ All the teaching sessions are assessed by the consultant moderator at the end of session.
- ❖ PG students should be actively involved in teaching of undergraduates, residents and paramedic staff.
- ❖ Attendance of the Residents at various sessions has to be at least 75%.

4.3 Teaching Schedule

In addition to OR table teaching, in the department there are daily hourly sessions of formal teaching per week. The departments teaching schedule is as follows:

- | | |
|--|--------------|
| 1. Journal club | Once a week |
| 2. PG clinical case presentation and discussion | Once a week |
| 3. PG clinical case presentation and discussion | Once a week |
| 4. Seminar on specific topics | Once a week |
| 5. Central session (held in hospital auditorium regarding various topics like CPC, guest lectures, student seminars, grand round, sessions on basic sciences, biostatistics, research methodology, teaching methodology, health economics, medical ethics and legal issues). | Once a week |
| 6. Departmental Morbidity and mortality meet | Once a month |
| 7. Intradepartmental meet (with all the staff, | Once a month |

incharge, residents and faculty to discuss any problems faced)/ Thesis meet alternating to discuss thesis being done by the PG residents.

- | | |
|--|--------------|
| 8. Hospital Morbidity and mortality meet | Once a month |
| 9. Interdepartmental meet which includes meet with other specialties in the hospital including surgical specialties and allied branches. | Once a month |

5. Postings

The postgraduate student rotates through all the clinical units and OTS in the department. In addition, following special rotations are also undertaken:

Clinical Posting: Postgraduate Student is posted in various operation theatres to have adequate exposure of following different procedures and operations:

- ❖ General surgery (including cardio-thoracic and neurosurgery)
- ❖ Plastic Surgery and Burns
- ❖ Orthopaedics and Trauma
- ❖ Gynaecology and Obstetrics
- ❖ Urology
- ❖ Ear Nose and Throat
- ❖ Eye
- ❖ Paediatrics and Neonatal
- ❖ Post Anaesthesia Care Unit
- ❖ Intensive care unit
- ❖ Casualty
- ❖ Pain clinics
- ❖ Out Door patient clinic

In addition the candidate is posted for emergency duties.

6. Thesis

Every candidate shall carry out work on an assigned research project under the guidance of a recognized Postgraduate Teacher; the project shall be written and submitted in the form of thesis.

- ❖ Every candidate shall submit thesis plan to the University within nine months from the date of admission.
- ❖ Thesis shall be submitted to the University six months before the commencement of theory examination i.e. for examination May/ June session, 30th November of the preceding year of examination and for November / December session 31st May of the year of examination.
- ❖ Identify a relevant research question: ii) conduct a critical review of literature (iii) Formulate a hypothesis (iv) Determine the most suitable study design (v) State the objectives of the study (vi) Prepare a study protocol (vii) Undertake a study according to the protocol (viii) Analyze and interpret research data, and draw conclusions (ix) write a research paper.

7. Assessment

All the PG residents are assessed daily for their academic activities and also periodically.

7.1. General Principles

- ❖ The assessment is valid, objective, and reliable.
- ❖ It covers cognitive, psychomotor and affective domains.
- ❖ Formative, continuing and summative (final) assessment is also conducted in theory as well as practicals/clinicals. In addition, thesis is also assessed separately.

7.2 Formative Assessment

The formative assessment is continuous as well as end-of-term. The former is to be based on the feedback from the senior residents and the consultants concerned. End-of-term assessment is held at the end of each semester (up to the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate.

7.3. Internal Assessment

The performance of the Postgraduate student during the training period should be monitored throughout the course and duly recorded in the log books as evidence of the ability and daily work of the student. Marks should be allotted out of 100 as followed.

Sr. No.	Items	Marks
1.	Personal Attributes	20
2.	Clinical Work	20
3.	Academic activities	20
4.	End of term theory examination	20
5.	End of term practical examination	20

1. Personal attributes:

- ❖ **Behavior and Emotional Stability:** Dependable, disciplined, dedicated, stable in emergency situations, shows positive approach.
- ❖ **Motivation and Initiative:** Takes on responsibility, innovative, enterprising, does not shirk duties or leave any work pending.
- ❖ **Honesty and Integrity:** Truthful, admits mistakes, does not cook up information, has ethical conduct, exhibits good moral values, loyal to the institution.
- ❖ **Interpersonal Skills and Leadership Quality:** Has compassionate attitude towards patients and attendants, gets on well with colleagues and paramedical staff, is respectful to seniors, has good communication skills.

2. Clinical Work:

- ❖ **Availability:** Punctual, available continuously on duty, responds promptly on calls and takes proper permission for leave.

- ❖ **Diligence:** Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management.
 - ❖ **Academic ability:** Intelligent, shows sound knowledge and skills, participates adequately in academic activities, and performs well in oral presentation and departmental tests.
 - ❖ **Clinical Performance:** Proficient in clinical presentations and case discussion during rounds and OPD work up. Preparing Documents of the case history/examination and progress notes in the file (daily notes, round discussion, investigations and management) Skill of performing bed side procedures and handling emergencies.
3. **Academic Activity:** Performance during presentation at Journal club/ Seminar/ Case discussion/Stat meeting and other academic sessions. Proficiency in skills as mentioned in job responsibilities.
 4. **End of term theory examination** conducted at end of 1st, 2nd year and after 2 years 9 months
 5. **End of term practical/oral examinations** after 2 years 9 months.

Marks for **personal attributes** and **clinical work** should be given annually by all the consultants under whom the resident was posted during the year. Average of the three years should be put as the final marks out of 20.

Marks for **academic activity** should be given by the all consultants who have attended the session presented by the resident.

The Internal assessment should be presented to the Board of examiners for due consideration at the time of Final Examinations.

7.4 Summative Assessment

- ❖ Ratio of marks in theory and practical will be equal.
- ❖ The pass percentage will be 50%
- ❖ Candidate will have to pass theory and practical examinations separately.

A. Theory Examination (Total = 400)

<u>Paper</u>	<u>TITLE</u>	<u>MARKS</u>
Paper-I	Basic Sciences as applied to Anaesthesiology	100
Paper-II	Clinical Sciences as applied to Anaesthesiology	100
Paper-III	Principles and practice of Anaesthesiology	100

Paper-IV Recent advances in Anaesthesiology including principles of Resuscitation and Intensive care Therapy. 100

B. Practical and viva voce Examination (Total=400)

Clinical/practical Cases

Long Case (1)	100
Short Cases (2)	100
Stations and Related Oral Viva	200

Four sets of stations. Each examiner to award marks out of 50 individually.

- ❖ Anaesthesia machine (knowledge of parts, Pre-anaesthesia checking, safety devices etc.) Identification and checking of Breathing Circuits, Ancillary anaesthesia instruments.
- ❖ Cardiopulmonary resuscitation
- ❖ Anaesthetic and Non-anaesthetic drugs
- ❖ Investigations interpretation: EKG, X-rays (Chest, neck etc.), ABG and others.

8. Job Responsibilities:

To administer anaesthesia under supervision for surgical patients.

- ❖ To assess the patients pre-operatively and advise appropriate investigations.
- ❖ To look after the patients in PACU.
- ❖ To provide pain relief for acute pain and chronic pain syndromes.
- ❖ To provide monitoring & ventilatory care for patients in ICUs.
- ❖ To provide anaesthesia services out side the operation theatres like Endoscopy and MRI etc.
- ❖ To provide resuscitation services out side the Operation Theatre.

9. Suggested Books:

9.1 Core Books

- ❖ *Wylie*:- A practice of Anaesthesia
- ❖ *Miller's Anesthesia* / ed. by R D Miller New York : Churchill Livingstone, 2004
- ❖ *Dorsch* :- Understanding Anaesthesia Equipment.
- ❖ *Stoelting*:-Anaesthesia & Co- Existing Disease.
- ❖ *Lee*:- A synopsis of Anaesthesia.
- ❖ Recent Advances in Anaesthesia and intensive care
- ❖ *Oh's Intensive Care Manual* / ed by A D Bersten, N Soni and T E Oh - 5th ed : Butterworth Heinemann, 2003

9.2 References Books:

- ❖ *Nunn's Applied Respiratory Physiology* / A B Lumb and J F Nunn - 6th ed - Oxford : Elsevier-Butterworth Heinemann, 2005
- ❖ *Pharmacology and Physiology in Anesthetic Practice* / R K Stoelting and S C Hillier – 4th ed - Philadelphia : Lippincott-Raven, 2006

- ❖ *Textbook of Medical Physiology* / A C Guyton & J E Hall - 11th ed - Philadelphia : Elsevier-Saunders, 2005
- ❖ *Review of Medical Physiology* / W F Ganong- 22nd ed : Lange Medical Books, 2005
- ❖ Collins,V.J:- Physiological & Pharmacological Bases of Anaesthesia
- ❖ *Cardiac Anaesthesia* by Kaplan JA .
- ❖ *Scientific foundation of Anaesthesia* by Scure
- ❖ *Intravenous Anaesthesia* by Dundee
- ❖ *Anaesthesia for the Infants* by Smith.
- ❖ *Clinical practice of Cardiac Anaesthesia* by Temple DK .
- ❖ *General Anaesthesia* by Frankis T.Gray
- ❖ *Anaesthesia Equipment* by Ward
- ❖ *Principles of Clinical Measurement* by M.K.Sykes
- ❖ *Physics for Anaesthetists* by James Duffin
- ❖ *Anaesthesia & Uncommon Disease* by Benumof JL.
- ❖ *Textbook of Trauma Anaesthesia & Critical Care* by Grande C.M.
- ❖ *Neural blockade : in clinical anaesthesia and management of pain* / M J Cousins and P O Bridenbaugh – 3rd ed - Philadelphia : Lippincott, 1998
- ❖ *Basic and Clinical Biostatistics* / B Dawson-Saunders and R G Trapp – 4th ed – New York : McGraw-Hill, 2004
- ❖ *Statistical methods for anaesthesia and intensive care* / P S Myles and T Gin - Oxford : Butterworth-Heinemann, 2001
- ❖ *Step by Step Anaesthesia in Obseterics and Gynaecology* / V Tiwari and PL Gautam

9.3 Journals:

- ❖ Anaesthesia – Analgesia
- ❖ Anaesthesia
- ❖ Anaesthesiology
- ❖ Indian Journal of Anaesthesia
- ❖ British Journal of Anaesthesia
- ❖ JOACP

10. Model Test Papers

MODEL QUESTION PAPER

MD (Anaesthesiology)

Paper-I

Basic Sciences as applied to Anaesthesiology

Max. Marks:100

Time: 3 hrs

- **Attempt ALL questions**
- **Answer each question & its parts in SEQUENTIAL ORDER**
- **ALL questions carry equal marks**
- **Illustrate your answer with SUITABLE DIAGRAMS**

I Draw a labeled diagram of anatomy of brachial plexus. What is the technique

of supraclavicular approach of blocking this plexus under the following headings: equipment needed, position of patient, anatomical surface landmark, technique, volume and doses of local anaesthetic agents used, and enumerate complications.

- II Draw Oxygen dissociation curve and enumerate factors affecting it.
- III Enumerate oxygen delivery devices. Describe Venturi principle diagrammatically.
- IV Define MAC (Minimum Alveolar Concentration) and its different levels. Enumerate various factors affecting MAC valve.
- V Outline the principles of Pulse Oximetry, enumerate its pitfalls and solutions with brief note on Masimo's technology.
- VI Short notes on the following drugs under the subheadings Physiochemical properties, Indications, Contraindications, Doses, Effects on CVS, Respiratory, CNS, Side effects/ Toxicity and Pharmacokinetics-Distribution, Metabolism, Excretion
 - 1. Propofol
 - 2. Ropivacaine
- VII Define volume of distribution? What is its clinical significance? Give one example?
- VIII What is the nerve supply of to the cricothyroid muscle? Enumerate the sensory innervation of larynx? Draw labeled outline diagram of vocal cord position in unilateral and bilateral recurrent laryngeal nerve palsy.
- IX Give classification of Mapleson's breathing circuits. Describe Bain's Coaxial system in detail including its functional analysis.
- X Tabulate anatomical differences between adult and infant airway. Enumerate the individual physical examination indices for airway assessment? Write brief on Upper Lip bite test and its relevance to Airway assessment? (< 10 lines)

MODEL QUESTION PAPER

MD (Anaesthesiology)

Paper-II

Clinical Sciences as applied to Anaesthesiology

*Max. Marks:100**Time: 3 hrs*

-
- ***Attempt ALL questions***
 - ***Answer each question & its parts in SEQUENTIAL ORDER***
 - ***ALL questions carry equal marks***
 - ***Illustrate your answer with SUITABLE DIAGRAMS***
-

- I Define autologous blood transfusion. Enumerate various methods. Describe intra-operative blood conservation.
- II Enumerate the methods to relieve post operative pain in an adult patient who has undergone right upper lobe lobectomy. Give details of thoracic epidural analgesia.
- III A 2 year 10 kg child of retinoblastoma is scheduled for MRI of skull under GA. How will you conduct the case? (Do not write about pre- anaesthetic work up; start with the PAC cleared child outside the MRI room).
- IV Describe outline of – Difficult Airway Algorithm.
- V Discuss causes, clinical features, EKG changes and management of hyperkalemia.
- VI Discuss pre-anaesthetic assessment and preparation of patient scheduled for laparoscopic adrenalectomy.
- VII Discuss the differentials and management of postoperative oxygen desaturation in postanesthesia care unit.
- VIII Write short note on “World Anaesthesia Day”
- IX Write short note on Anaesthetic considerations for globe (Eye) perforation.
- X Enumerate various complications of thyroid surgery. Write note on management of thyroid storm

MODEL QUESTION PAPER

MD (Anaesthesiology)

Paper-III

Principles and Practice of Anaesthesiology

Max. Marks:100

Time: 3 hrs

- ***Attempt ALL questions***
 - ***Answer each question & its parts in SEQUENTIAL ORDER***
 - ***ALL questions carry equal marks***
 - ***Illustrate your answer with SUITABLE DIAGRAMS***
-

- I A 50yr old male patient with history of well controlled hypertension with breathlessness on moderate exertion and inferior wall infarction 4 months back is posted for emergency Laparotomy. Outline pre-anaesthetic evaluation, risk stratification, preparation and anaesthetic management.
- II A 70yr old male patient with COPD is posted for emergency debridement of traumatic below knee wound, enumerate various anaesthetic techniques for the same and describe low dose spinal anaesthesia in detail.
- III Outline anaesthetic goals with respect to heart rate, rhythm, pre-load, after load for a patient with severe mitral stenosis posted for open cholecystectomy and describe management of cardiovascular collapse during induction.
- IV Describe Low flow anaesthesia – advantages, problems & limitations.
- V Describe Continuous Spinal Epidural Analgesia (CSEA) under the following headings:- equipment needed, position of patient, technique, volume and doses of local anaesthetic agents used, additives and complications.
- VI Enumerate methods of confirming correct posturing of Endotracheal Tube. Describe complications of malplaced ETT.
- VII Tabulate the beneficial effects of cessation of smoking preoperatively with their time course. Enumerate pulmonary function tests in patient scheduled for pneumonectomy .
- VIII Enumerate perioperative complications of one lung anaesthesia. Outline the management intraoperative desaturation in a patient undergoing lobectomy.
- IX Describe pre operative evaluation and preparation for a patient with neck contracture
- X Define cerebral perfusion pressure. Describe briefly perioperative management of cerebral vasospasm following aneurismal leak.

MODEL QUESTION PAPER

MD (Anaesthesiology)
Paper-IV

Recent Advances in Anaesthesiology including Principles of
Resuscitation and Intensive Care Therapy

Max. Marks:100

Time: 3 hrs

- ***Attempt ALL questions***
 - ***Answer each question & its parts in SEQUENTIAL ORDER***
 - ***ALL questions carry equal marks***
 - ***Illustrate your answer with SUITABLE DIAGRAMS***
-

- I Define & outline technique of Percutaneous dilatational tracheotomy Tabulate advantages and disadvantages as compared to traditional Tracheotomy.
- II Enumerate newer modes of mechanical ventilation. Tabulate differences between Volume preset and Pressure preset modes.
- III Describe briefly early goal directed therapy of sepsis. Describe role and current status of APC in sepsis.
- IV Describe resuscitation and anaesthetic management of patient who developed inversion of uterus after delivery and brought to emergency room in gasping state.
- V Define Intra- Cranial Pressure (ICP). Enumerate factors causing an increase in ICP and Enumerate ICP lowering drugs and non pharmacological measures to reduce ICP in post traumatic head injury.
- VI Define Cardioversion and Defibrillation. Enumerate indications for both. Tabulate differences between Biphasic and Monophasic defibrillation.
- VII Describe early resuscitation of 25 years female, who developed second degree burns on face, front upper trunk, upper limbs and upper airway after suicidal attempt.
- VIII Describe briefly preanaesthetic evaluation, preparation, anaesthetic management of a middle aged male scheduled for lobectomy following carcinoma lung. Enumerate postoperative complications.
- IX Enumerate different methods of blood conservation in patient under going bilateral total knee replacement surgery. Enumerate antifibrinolytic drugs and describe dosage schedule of one drug.
- X Discuss briefly role of PEEP with low tidal volume, Inverse Ratio Ventilation, Prone ventilation, Permissive hypercapnia and permissible hypoxemia in ARDS.