MD ANESTHESIOLOGY

THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI

MD ANESTHESIOLOGY

The curriculum shall train a candidate to manage anaesthesia in a competent, compassionate and caring manner.

Learning shall be self directed and essentially autonomous.

Exposure to all the sub-specialities shall be achieved

A combination of formative and summative assessments shall ensure completion of goals and training.

1. **GOALS:**

To produce competent and compassionate specialists who

a) shall recognize the health needs and ethically carry out the professional obligations towards the patient.

b) shall attain all the required competencies within all the sub-specialities in the speciality of anaesthesiology, enabling good practices at the secondary and tertiary levels of health care delivery.

c) Shall take effort to be aware and update knowledge about the latest advances and developments in the field.

d) Shall acquire the basic skills to teach medical and para-medical professionals.

e) Shall orient oneself to the principles of research methodology and epidemiology.

2. **OBJECTIVES:**(Ref: Bloom’s taxonomy of learning domains)

A. Knowledge to be gained from the syllabus
B. Skills to be learned from the practical training
C. Attitudes to be developed during the training period
The curriculum shall include
a) Anatomy, physiology and biochemistry relevant to anaesthesiology.
b) A thorough knowledge of the pharmacokinetics and pharmacodynamics of anaesthetic drugs.
c) Knowledge of cardiovascular, respiratory, neurological, hepatobiliary, renal and endocrine homeostasis and related drugs used in patients undergoing anaesthesia.
d) Physics and principles involved in the construction and functioning of anaesthesia machine and equipment used to provide anaesthesia and patient vital signs monitoring.
e) Knowledge of the commonly used techniques in General, Regional and Local anaesthesia
f) Understanding the concept of unconsciousness and its implications in anaesthesia.
g) Knowledge and management of acute and chronic intractable pain.
h) Knowledge of intensive care / therapy.
i) Knowledge of medical statistics
j) Knowledge and gain expertise in cardiopulmonary resuscitation.
k) Knowledge of medical ethics.
The course content should stimulate the thought processes of the candidate and encourage the candidate to acquire new information from books, journals, lectures, seminars and discussions. It should stimulate reflective thinking and problem solving by critical analysis of events during anaesthesia and interpretation of the data and logical reasoning.

3. COMPONENTS OF POST-GRADUATE CURRICULUM
THEORETICAL KNOWLEDGE, PRACTICAL AND CLINICAL SKILLS INCLUDING RESEARCH WORK AND THESIS
FIRST YEAR: BASIC TRAINING
Basic Sciences: Knowledge
Post-graduates should understand the principles involved in the measurement of relevant variables and the requirements of equipment and monitoring in anaesthesia. Knowledge is expected in the areas outlined below.

Physics and Clinical Measurement

- Principles of Measurement
  - SI units
  - Behaviour of fluids (gases and liquids)
  - Flow of fluids
  - Measurement of volumes, flows, and pressures
  - Measurement of temperature
  - Humidification
  - Oximetry
  - Analysis of gases
  - Capnography
  - Electrical safety
  - Fires and explosions

Equipment and Apparatus

- Equipment design and standards
- Gas supply in bulk and cylinders
- Anaesthesia delivery system, including pressure valves and regulators
- Vaporisers
- Breathing systems
- Devices to maintain the airway (laryngoscopes, endotracheal tubes, tracheostomy
- tubes, face masks, laryngeal masks, airways)
- Information systems

Data storage and retrieval

- Monitoring
  - Anaesthesia record – Manual and electronic record keeping
  - Minimum monitoring standards
  - Additional monitoring when appropriate (including central venous pressure, pulmonary artery pressure, cardiac output, cerebral function, temperature,
coagulation, blood loss, blood sugar)

**Preoperative Assessment / Pre-anaesthesia clinics**
- Appropriate history taking
- Physical examination including airway assessment, respiratory, cardiovascular and neurological examinations
- Referral to other specialists when necessary
- Establishment of a rapport with the patient to provide reassurance, disclosure of risk, information, and discussions on complementary medicine and informed consent
- Communication and consultation skills face-to-face, by phone and in writing
- Pulmonary function tests
- Measurement of cardiovascular function
- Interpretation of common radiology and imaging scans and investigations
- Other investigations as appropriate

**Conducting Anaesthesia**
- Applied cardiac and respiratory physiology
- Applied pharmacology and variability in drug response
- Selection and planning of the anaesthesia technique
- Decision-making relating to postponement or cancellation of surgery
- Routine inhalation and intravenous inductions
- Maintenance of anaesthesia
- Correct usage of anaesthesia delivery systems
- Application and interpretation of monitored variables and neuromuscular blockade
- Use of muscle relaxants
- Application of mechanical ventilation
- Management of the airway and intraoperative complications
- Common regional anaesthesia techniques (eg, epidural and spinal anaesthesia and Regional Nerve blocks)
- Maintenance of accurate records

**Postoperative Care**
• Safe recovery transport and handover in the post-anaesthesia recovery room
• Post-operative consultations
• Management of postoperative pain, fluid requirements, and nausea and vomiting

Communication skills
• Call for help in Cardio Pulmonary Resuscitation, PACU, in Emergencies
• Establishment of rapport with patients, attenders, relatives of patients

Especially in PACU, INTENSIVE CARE UNITS, RECOVERY UNITS to provide reassurance, disclosure of current condition & any procedural information.
• To obtain informed consent from patients or attenders /relatives
• Documentation of events correctly/properly for future verification, research activities.

Basic Sciences: Skills - Clinical skills
Post-graduates should provide safe anaesthesia care and pain management for uncomplicated patients undergoing non-major surgery.

Post-graduates should be competent in the following technical skills -
• Maintenance of an adequate airway
• Rapid sequence induction
• Basic and advanced Life Support for adult and paediatrics
• Aseptic techniques
• Venous access
• Arterial blood gas collection
• Arterial cannulation
• Central venous cannulation
• ECG recording and interpretation
• Lumbar puncture
• Blood culture collection
• Emergency management of a pneumothorax

Post-graduates should be familiar with the following clinical protocols in the delivery of safe anaesthesia care, and be able to respond accordingly for crisis management.
• Checking of the anaesthesia delivery system
• Airway assessment and anticipation of Difficult airway and its management which may
be acute and may be life threatening
• Inadequate airway; failed intubation, obstructed airway, oesophageal intubation,
endobronchial intubation, and unplanned extubation .
• Laryngospasm .
• Bronchospasm .
• Hypertension.
• Hypotension.
• Arrhythmias.
• Myocardial Ischaemia.
• Hypoxia .
• Hypercarbia.
• Hypoventilation.
• Hyperventilation.
• Hypothermia .
• Hyperthermia .
• Malignant hyperthermia.
• Anaphylaxis .
• Residual neuromuscular blockade.
• Inadequate neuraxial blockade .
• Seizures .
• Gas embolism.
• High ventilator peak inspiratory pressures.
• Pulmonary aspiration .
• Pneumothorax.
**Basic Sciences: Skills- Educational skills**
• Developing a study plan for the rest of the training period
• Reviewing study plans and correcting for deviations (eg, catching up on deficient
knowledge or experience)
• Reflecting on previous learning experiences with the aid of the Learning Portfolio
• Linking basic science teaching with clinical practice & Studying effectively
• Participating in small-group learning and educational activities
• Being aware of decision-making processes
• Managing time effectively for study, work and home/leisure
• Giving and receiving feedback
• Developing insight into personal limitations
• Using the Internet including e-mail
• Conducting and appraising literature searches
• Appraising journal articles including the application of statistics
• Carrying out oral presentations and professional communication.

**OBSTETRIC ANAESTHESIA AND ANALGESIA: KNOWLEDGE**

• Maternal physiology
• Process of labour and delivery
• Foetal and neonatal physiology
• Placental physiology
• Obstetric and post partum pharmacology
• Endocrine pharmacology
• Pharmacological considerations for newborn resuscitation
• Pharmacology of placental drug transfer
• Anatomy — airway, spine, pelvis, birth canal, gravid uterus, and nerve and blood
• supply in pregnancy
• Drugs used for fertility support and IVF
• Ecbolics and tocolytics
• Principles of in-vitro fertilisation
• Antenatal care
• Labour and delivery
• Maternal monitoring during labour
• Caesarean section; indications and levels of urgency
• Abortions and septic abortions
• Postpartum period
• High-risk Obstetrics - medical, obstetric or anaesthesia history
• Pre-existing disease in pregnancy
• Substance abuse during pregnancy
• Pre eclampsia and eclampsia, pathophysiology and management
• Obstetric complications, eg, breech, malpresentation, multiple pregnancy and
  abnormal placentation
• Obstetric interventions; indications and anticipation of anaesthesia and analgesia
• Amniotic fluid, air and pulmonary embolism, pathophysiology and management
• Obstetric haemorrhage- antepartum, peripartum and postpartum
• Foetal and Neonatal Considerations
• Foetal teratogenicity, carcinogenicity, and congenital abnormalities
• Foetal evaluation and monitoring
• Antepartum and intrapartum foetal compromise
• Foetal death in utero; pathophysiology and psychological issues
• Neonatal resuscitation
• Apgar score and neuro-adaptive scores, and their prognostic significance
• Neonatal surgery - Anaesthesia Management
• Pre-anaesthesia assessment of the pregnant patient and identification of high risk
  patients eg: Risk factors in anaesthesia such as Pre-existing diseases like cardiac
disease, hypertension, respiratory disease, diabetes, thyroid disease, intracranial
disease, bleeding disorders, renal disease and neuromuscular disease
• Adolescent or elderly primigravid pregnancy
• Morbid obesity
• Thromboembolic disease
• Anaesthesia for non-obstetric surgery in the pregnant patient
• Anaesthesia for elective obstetric procedures
• Anaesthesia for emergency obstetric procedures
• Anaesthesia for Caesarean section
• Pain management in obstetrics – Labour analgesia
• Complications of General Anaesthesia like Difficult airway management,
Pulmonary aspiration, Awareness during general anaesthesia
• Complications of Regional Analgesia and anaesthesia, eg, high block, local
• anaesthetic toxicity, neurological sequelae
• Management of inadequate or failed regional anaesthesia and analgesia
• Management of severe haemorrhage; surgical, antepartum and postpartum
• Maternal morbidity and mortality; incidence and legal and ethical issues
• Organisation of an obstetric anaesthesia and analgesia service
• Safe radiation practice during pregnancy

**Obstetric anaesthesia-Skills**
• Airway assessment in pregnancy
• Rapid sequence induction and Acid Aspiration prevention protocol
• Emergency airway management
• Implementing epidural, spinal, and combined spinal/epidural anaesthesia and analgesia,
• Management of local anaesthetic toxicity
• Management of high regional block
• Management of severe obstetric haemorrhage

Post-graduates should be familiar with clinical drills for crises management especially
• for airway emergencies
• Failure to intubate algorithm in obstetrics
• Advanced Life Support in the obstetric patient
• Resuscitation of the neonate
• Management of pulmonary aspiration during general anaesthesia

II. SECOND YEAR- ADVANCED TRAINING:
**Research and Scientific Enquiry: Knowledge**
  - Proposing a hypothesis
  - Information search and literature review
  - Research design, bias and appropriate methods of measurement
  - Data collection and storage
  - Good record keeping
  - Common statistical tests and application of statistics
  - Interpretation of results
  - Responsibilities of investigator to the ethics committee
  - Principles of writing a scientific paper
  - Principles of oral or poster presentation of a paper
Ethical principles

The process of obtaining funding and writing a basic grant application

Research and Scientific Enquiry: Clinical-Skills

Post-graduates should acquire skills in scientific learning as a medical specialist

- Conducting and appraising literature searches
- Appraising journal articles including the application of statistics
- Applying the principles of evidence-based medicine to clinical practice
- Carrying out oral presentations and professional communication
- Presenting quality assurance exercises or projects
- Developing facilitation skills, such as tutoring in small-group learning and conducting small-group meetings
- Preparing the thesis protocol with the help of Guide, obtaining approval from Ethics committee

Research and Scientific Enquiry: Attitudes

Post-graduates should develop an appreciation of and continue research and scientific enquiry

- Valuing rigorous educational and scientific processes
- Distinguishing between practice with a sound scientific basis and that which requires further objective assessment
- Committing to informed consent, confidentiality and all other ethical principles of research
- Committing to continuing professional development

ANAESTHESIA FOR HIGH-RISK ELECTIVE AND EMERGENCY SURGERY: KNOWLEDGE

- Preoperative evaluation and resuscitation
- Thromboembolism prophylaxis
- Perioperative and prophylactic antibiotics
- Management of coagulopathies
• Regional anaesthesia for abdominal, vascular, and imaging procedures including anatomy, and physiological and pharmacological aspects
• Informed consent and consent for incompetent patients
• Postoperative care, Management of postoperative pain, phantom-limb pain and pain from injury

**Anaesthesia for Trauma Surgery**
• Assessment and immediate care; primary and secondary survey, Trauma severity scores
• Emergency airway management
• Establishing intravenous access
• Priorities of resuscitation, investigations, and surgical procedures
• Physio-biochemical effects of trauma
• Managing facial, head and cervical spine injuries
• Glasgow Coma Scale and other scores of consciousness
• Pathophysiology of head injury including changes in cerebral blood flow, cerebral metabolism and intracranial pressure
• Pathophysiology and management of shock
• Pathophysiology of blood loss and massive blood transfusion
• Volume replacement
• Managing abdominal and chest injuries
• Management of burns procedures, including: – Understanding the pathophysiology of burns – Anaesthesia for debridement and skin grafting – Drills in burns resuscitation .
• Managing coagulopathies .
• Transport of ventilated or injured patients including portable ventilators and monitoring systems

**Co-existing Medical Conditions Relevant to Anaesthesia**
• Endocrine disorders including phaeochromocytoma, hyperthyroidism, hypothyroidism, and diabetes mellitus
Disorders of the cardiovascular system
Disorders of the respiratory system
Disorders of the nervous system
Disorders of the liver, biliary tract and gastrointestinal system
Renal disorders
Water, electrolyte and acid-base disturbances
Haematological disorders, including coagulopathies
Skin and musculoskeletal disorders, including rheumatoid arthritis and ankylosing spondylitis
Psychiatric disorders and substance abuse
Disorders associated with ageing
Obesity

ANAESTHESIA FOR HIGH-RISK ELECTIVE AND EMERGENCY SURGERY:

SKILLS:
Post-graduates should provide safe anaesthesia for
• Major abdominal surgery
• Laparoscopic surgery
• Trauma surgery – post-graduates should revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination (including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient’s status.

Post-graduates should become competent in the following technical skills--
• Securing an airway, arterial and central venous cannulation, and rapid sequence induction
• Cricothyroidotomy and percutaneous tracheostomy
• Cannulation of major vessels for volume resuscitation
• Awake fibreoptic intubation
• Thoracic and lumbar epidural and spinal anaesthesia
• Blood conservation strategies
• Regional nerve blocks for abdominal and lower limb surgery
• Chest drain insertion
• Immobilisation and care of cervical spine injuries
• Post-graduates should be familiar with clinical drills for crises management.
• Airway emergencies eg, “cannot intubate, cannot ventilate”, difficult airway, hypoxia
  and abnormal end-tidal CO2 levels
• Managing major intraoperative events in aneurysm and abdominal surgery
• Drill for the primary and secondary survey
• Drill for raised intracranial pressure
• Drill for tension pneumothorax
• Drill for managing severe haemorrhage
• Drill for managing cardiac arrest (ACLS Algorithm)
• Drill for managing malignant hyperthermia

**ENT, Eye, Dental, Maxillofacial, and Head and Neck Surgery: Knowledge**

- Cardiovascular, respiratory and neurological physiology
- Physiology of gases in closed body cavities
- Pharmacology of local anaesthetic agents
- Pharmacology of local vasoconstrictors
- Anatomy of the head and neck and abnormal facies
- Anatomy of the airway, nasal passages, larynx, pharynx and middle ear
- Effects of surgery and radiation on the airway
- Monitoring in anaesthesia
- Neurological monitoring
- Lasers-- types, uses in surgery, complications and precautions
- Airway devices and types of tracheal tubes, eg, Micro-laryngeal, Rae
- Equipment for difficult tracheal intubation
- Equipment for jet ventilation

**Anaesthesia for ENT surgery**

- Pre-operative airway assessment
- Tonsillectomy and adenoidectomy, including quinsy and postoperative bleeding
  - Microlaryngoscopy
  - Radical head and neck surgery
  - Laryngectomy and Pharyngolaryngectomy
  - Laser surgery.
- Nasal and sinus operations.
- Parotid tumor surgery.
- Myringoplasty.
- Middle ear surgery.
- Microsurgery of the ear.
- Managing partial airway obstruction including:
  - Epiglottitis
  - Foreign bodies
  - Laryngeal tumours
  - Oropharyngeal cysts and abscesses
  - Elective and emergency tracheostomy
- Paediatric problems, eg, relating to disease, airway, larynx and craniofacial disorders
- Post-operative care

**Anaesthesia for Dental surgery**
- Outpatient dental procedures- sedation and general anaesthesia
- Inpatient dental surgery
- Dental procedures on the mentally challenged
- Dental procedures on patients with bleeding disorders
- Oral surgery
- Fractured jaw
- Maxillary fractures according to the Le Fort classification
- Dental sepsis

**Anaesthesia for Eye surgery**
- Anatomy and physiology of extremes of age
- Anatomy of orbit and contents
- Physiology of intraocular pressure
- Ocular perfusion
- Eye reflexes (oculocardiac, oculorespiratory, oculoemetic)
- Anatomy of orbit, extraocular muscles, blood vessels, lacrimal apparatus
- Local anaesthetic agents for eye surgery
- Other drugs for eye surgery, eg, topical agents, vasoconstrictors, mydriatics, miotics,
  and agents to reduce intraocular pressure
· General anaesthesia for eye surgery including:
  · Examination under anaesthesia
  · Laser eye surgery
  · Intraocular surgery
  · Extraocular surgery
  · Retinal detachment
  · Plastic and orbital surgery
  · Emergency eye surgery and use of suxamethonium in penetrating eye injury
  · Monitoring
  · Postoperative care, management of nausea and vomiting
  · Principles of regional retrobulbar and peribulbar block and choosing between general and regional anaesthesia techniques
  · Sedation for eye procedures
  · Principles of anaesthesia for day-case
  · Paediatric considerations

**Anaesthesia for Maxillofacial, Thyroid, and Head and Neck Surgery**
  · Pre-operative airway assessment
  · Management of anaesthesia for major maxillofacial surgery, which may involve prolonged anaesthesia, major blood loss, hypothermia and multiple procedures
  · Management of anaesthesia for facial trauma: emergency and semi-elective, including fractured jaw and maxilla
  · Management of anaesthesia for cancer, plastic and cosmetic surgery on the face, head and neck, including surgery for cleft palate
  · Management of thyroid surgery, including
  · Anaesthesia for thyroid and parathyroid surgery
  · Stabilisation of thyroid and parathyroid disorders preoperatively
  · Post thyroidectomy bleeding
  · Managing a “thyroid storm”
  · Sedation for head and neck procedures
  · Post-operative care

**ENT, Eye, Dental, Maxillofacial, and Head and Neck Surgery: Skills**
· Tracheal intubation
· Nasal intubation
· Use of special tubes
· Placement and removal of packs
· Applying topical local anaesthesia to the airway
· Securing the difficult airway
· Recognising the high-risk airway
· Use of stylets and bougies
· Awake intubation
· Retrograde catheter technique
· Fibreoptic intubation
· Laryngeal mask airway intubation
· Failed intubation or ventilation drill
· Cricothyroidotomy and percutaneous tracheostomy
· Transtracheal ventilation
· Managing the airway in trauma and burns
· Upper airway obstruction drill
· Post extubation drill for difficult airway
· Spontaneous gaseous induction for airway obstruction
· Regional and local anaesthesia of the head and neck
· Management of postoperative nausea and vomiting in head and neck surgery
· Management of postoperative facial and airway swelling

**Paediatric Anaesthesia: Knowledge**
· Anatomy relevant to airway management and breathing
· The physiology of respiration, circulation, fluid balance and thermoregulation
· The pharmacology of anaesthetic agents, analgesics and common paediatric medications, especially the relationship of dose to the size/maturity of child
· The relevance of surface area of children of various ages

Stages of development of the normal child and their relevance to hospitalisation

General principles of perioperative management relevant to children, emphasising:
common childhood illnesses and their influence on anaesthesia and surgery
- fasting guidelines
- fluid and electrolyte replacement
- temperature control
- specialised equipment for children of different sizes
- perioperative monitoring
- dosage and administration of emergency drugs
- postoperative apnoea detection and management
- acute and persistent pain management

Relevant features of important childhood conditions: respiratory infections, asthma
- prematurity and its complications
- facial anomalies affecting the airway

Neonatal emergencies
- respiratory distress,
- tracheooesophageal fistula,
- congenital diaphragmatic hernia,
- necrotising enterocolitis,
- abdominal wall defects

Other childhood emergencies - inhaled/ingested foreign bodies, fractures, head injuries and burns /Scalds
- congenital cardiac disease; especially ASD, VSD, Tetralogy of Fallot
- cerebral palsy
- chronic diseases of childhood; especially cystic fibrosis, muscular dystrophy
- congenital syndromes - Down’s, Pierre-Robin, mucopolysaccharidoses
- malignancy and the treatment of malignancy
- renal failure

**Paediatric anaesthesia Knowledge-Clinical management**
Applying principles of paediatric anaesthesia for the following surgical subspecialties:
- Neurosurgery
- Ophthalmology
- Dental surgery
- Plastics and reconstructive surgery
- Thoraco-abdominal surgery
- Cardiac surgery and procedures
- Urology surgery and procedures/investigations
- Orthopaedic Surgery Otolaryngology
- General surgery
- Trauma and Burns

Applying principles of paediatric anaesthesia for diagnostic procedures
- Recognising and managing the sick child
- Recognising and managing reversal to transitional fetal circulation
- Managing fluid therapy in paediatric patients
- Managing specific childhood syndromes and disorders
- Applying principles of paediatric anaesthesia for procedures outside the operating theatre, including patient transport
- Caring for paediatric patients undergoing imaging investigations, which may require sedation or anaesthesia
- Recognising and managing paediatric emergencies including basic and advanced life support
- Understanding the organisation of a paediatric anaesthesia and analgesic service

**Paediatric Anaesthesia: Skills**
Post-graduates should demonstrate decision-making and clinical skills, and perform
- Paediatric advanced life support

Manage emergencies and conditions including
- Hypoxia
- Bronchospasm
- Apnoea
- Upper airway obstruction including upper airway infection
- Bradycardia and other arrhythmias
· Cardiac arrest
· Hypovolaemia
· Neurological compromise
· Epiglottitis and croup
· Inhaled foreign body
· Infantile airway obstruction
· Laryngospasm
· Masseter spasm
· Postoperative stridor
· Aspiration of gastric contents

Technical skills, such as airway management, vascular cannulation and regional anaesthesia should be demonstrated for paediatric patients

Interpersonal skills in dealing with paediatric patients and their parents

Intensive Care: Knowledge

Post-graduate should understand

Acute Circulatory Failure
· Classification, causes, pathogenesis and sequelae of shock
· Principles of management of all forms of shock
· Monitoring in the management of shock
· Causes of cardiorespiratory arrest and the effects on body systems
· Cardiopulmonary resuscitation and external defibrillators
· Cardiac dysrhythmias and their current therapies
· Valvular heart disease
· Endocarditis
· Pulmonary embolism
· Congestive cardiac failure
· Anaphylaxis
· Ischaemic Heart Disease and Myocardial Infarction

Factors involved in the balance of oxygen supply and demand to the heart

Aetiology of coronary artery disease and its effects

Signs and symptoms of ischaemic heart disease

Signs and symptoms of myocardial infarction
· Principles of the management of acute myocardial infarction including thrombolysis,
angioplasty and surgery
- Indications for a transvenous pacemaker
- Right heart catheterisation, angiography and echocardiography
- Long-term effects of acute myocardial infarction and late complications

Respiratory Failure
- Causes and pathogenesis of respiratory failure
- Oxygen therapy and mechanical ventilatory support (invasive and noninvasive)
- Respiratory disease processes & representative conditions
- Cardiogenic/non-cardiogenic pulmonary oedema/ARDS
- Airway obstruction
- Airway stenosis and tracheomalacia
- Bronchopleural fistula
- Pneumothorax
- Aspiration syndromes
- Fat embolism
- Pneumonia (community and nosocomial)
- Chronic airway limitation
- Asthma

Renal Failure
- Definitions of acute and chronic renal failure
- Causes and pathogenesis of renal failure
- Acute renal failure
- Principles of renal replacement therapy and their indications

Neurological Failure
- Definition and causes of coma
- Causes, pathogenesis and treatment of cerebral swelling and raised intracranial pressure
- Principles of cerebral function monitoring, especially intracranial pressure
- Principles of diagnosing brain stem death
- Representative conditions to be understood:
  - Acute vascular disorders of the central nervous system
  - Acute infective disorders of the central nervous system
  - Cerebral oedema
Brain stem death
- Seizures
- Hemiplegia, paraplegia, quadriplegia
- Guillain Barre syndrome
- Peripheral nerve and or muscle dysfunction associated with critical illness
- Myasthenia gravis
- Guillain Barre syndrome
- Peripheral nerve and or muscle dysfunction associated with critical illness
- Myasthenia gravis
- Hyperthermia, hypothermia
- Tetanus
- Delirium

**Severe Trauma**
- Effects of severe trauma on organs and organ systems
- Principles of EMST for the management of trauma and advantages of an organized team approach
- Technique of cricothyroidotomy/ tracheostomy/mini-tracheotomy
- Principles of the management of head injury and Glasgow Coma Scale
- Management of cervical spine injuries
- Principles of the safe transfer of injured children and adults and portable monitoring systems

**Sepsis**
- Definition, pathogenesis and pathophysiology of sepsis and related syndromes
- Risk factors for nosocomial infection
- Infection control measures in ICU and operating suites

**Supportive Care of Critically Ill Patients**
- Inotropic Therapy
- Recognise when to use inotropic or vasopressor therapy
- Choose an appropriate agent, dose, physiological endpoint, rate and route of administration
- Review the efficacy of inotropic therapy at regular intervals
- Provide appropriate nutritional support and General Care
- Appropriate plan for care of bowels, skin, mouth, eyes and maintenance of mobility and muscle strength
Intensive Care: Skills

- Cardiovascular Related
- Choosing and using inotropic agents, vasodilators, and vasoconstrictors
- Managing dysrhythmias
- Choosing and using antimicrobial agents in heart disease
- Assisting with intra-aortic balloon pumping
- Cardioversion
- Advanced life support
- Respiratory Related
- Oxygen therapy
- CPAP & Non-invasive ventilation
- Mechanical ventilation, including modes of ventilation
- Pleural drainage
- Percutaneous tracheostomy
- Fibreoptic bronchoscopy
- Renal Failure
- General care of continuous dialysis and haemofiltration techniques
- Neurological Failure
- Maintaining cerebral perfusion pressures and intracranial pressures
- Gastro-intestinal Hemorrhage management
- Assisting with placing a Sengstaken Blakemore tube

Diagnostic imaging and interventional procedures (radiology and cardiology):

Knowledge

- Preanaesthetic preparation
- Techniques appropriate for adults and children for CT scanning, MR imaging and interventional radiology, angiography and interventional cardiology
- Post-investigation care

Diagnostic imaging and interventional procedures (radiology and cardiology): Skills

- Pre-anaesthetic preparation
- Sedation and general anaesthetic techniques for:
- angiography and interventional procedures
- CT scanning, adults and children
- Magnetic resonance imaging
Problems due to magnetic field
Post-investigation care

Pain Medicine: Knowledge
- Neurobiology of Pain
- Overview of “Pain Pathways”
- Multi dimensional aspects of pain; role of physiological, psychological and environmental factors
- Pharmacology of Analgesic Agents
- Pharmacokinetic and pharmacodynamic principles, drug interactions, and side effects.

Knowledge of the pharmacology of:
- Opioids
- Paracetamol
- Non-steroidal anti-inflammatory agents (NSAIDs)
- Antidepressants (TCAs and SSRIs)
- Anticonvulsants
- Membrane-stabilising agents
- Alpha-2 agonists
- NMDA-receptor antagonists
- Local anaesthetics
- Anti-emetics
- Agents used to treat hypotension associated with neuraxial blockade
- Awareness of the role of the following in pain management
- Anti-migraine agents
- Steroidal anti-inflammatory agents
- Topical agents (NSAIDs, Capsaicin)
- Neurolytic agents
- Experimental agents for analgesia
- Knowledge of different routes of analgesic drug delivery, including factors governing choice of route, side effects relevant to particular route,
- Principles of additive and synergistic effects when agents are combined
- Oral
· Intramuscular
· Subcutaneous (including continuous infusion)
· Intravenous (including continuous infusion)
· Patient-controlled analgesia (PCA) via different routes (i.e., intravenous, subcutaneous, intranasal, epidural, intrathecal)

Other methods—topical, transdermal, rectal, transmucosal (intranasal, inhalational and sublingual / buccal), intra-cerebroventricular, intraarticular, infiltration under skin

**Psychological and Sociocultural Issues**
The importance of psychological (emotional and cognitive), social, and other factors in the presentation and management of pain with emphasis on:

· Factors involved in the wide variation in individual response to tissue injury
· The relationship between depression and persistent pain
· The role of anxiety and/or depression in acute pain
· Differentiation of active and passive coping strategies
· The role of illness behaviour
· The influence of the health care provider on the response to pain treatment
· The importance of an interdisciplinary approach to pain assessment and treatment including the potential role of other members of the pain team (particularly psychiatrist, clinical psychologist, physiotherapist, nursing staff, occupational therapist, social worker)

· The placebo effect and its implications for treatment of pain

**Pain Assessment and Measurement**
Assess pain and outcome of pain treatment using history, clinical examination and pain measurement tools.

Recognise the limitations of pain measurement techniques, particularly in some patient groups (e.g., persistent pain, children, those with cognitive impairment)

Understanding of – Neuroendocrine and metabolic responses to surgery stressors and
impact of analgesic techniques
- Consequences of poorly controlled pain
- Current evidence for and against pre-emptive analgesia and clinical implications
- Current evidence for the effect of analgesic technique on morbidity and mortality
- Importance of aggressive multimodal postoperative rehabilitation
- Relationship between acute and persistent pain including factors involved in progression from one to the other, and potential interventions to prevent such progression

Choose the most appropriate technique of acute pain management –
- Pharmacological techniques (opioid and non-opioid) via a variety of routes
- Regional techniques including central neuraxial, plexus and peripheral nerve blockade
- Non-pharmacological techniques

Formulate a pain management plan based upon –
- Patient preference, physical and mental status, and available expertise and technology
- Special requirements in specific patient groups (eg, the elderly, children, pregnant and postpartum patients, Obstructive sleep apnoea, concurrent hepatic or renal disease; non-English speaking, cognitive impairment
- Special requirements in patients with opioid-tolerance and/or a substance abuse disorder including an understanding of guidelines and regimens for analgesic drug use (equi-analgesic ] dosing for opioids; tolerance and dependence)
- Special requirements under specific clinical situations (eg, spinal injuries, burns, acute back pain, musculoskeletal pain, acute medical pain, acute cancer pain and patients in Intensive Care and the Emergency Department)
Include in a pain management plan
  - Appropriate evaluation of the patient’s pain
  - Informed consent, including disclosure of risk and appropriate documentation
  - Patient education about the selected technique and alternatives
Recognise common presentations of acute musculoskeletal pain (e.g., rib fracture, acute back pain) and other non-surgical acute pain syndromes (migraine, renal colic) including in the Emergency Department and Intensive Care Unit
  - Identify when to seek advice from, or refer to, a Pain Medicine Specialist

**Cancer Pain**
Undertake assessment of pain in patients with cancer based on –
  - Understanding of the multiple potential aetiologies of pain associated with cancer
  - Differentiation between somatic, visceral, and neuropathic pain
  - Evaluation of psychological, social, cultural and spiritual issues
  - Undertake treatment of cancer-related pain syndromes based on therapies available (including chemotherapy, radiotherapy, surgery, invasive and non-invasive analgesic techniques, and psychological approaches)
  - Understand guidelines and regimens for analgesic drug use including equianalgesic dosing for opioids; tolerance and dependence and their management in the patient with cancer
  - Identify when to seek advice from, or refer to, a Palliative Medicine Specialist

**Neuropathic Pain**
  - Understand diagnostic criteria, clinical features and management of specific neuropathic pain syndromes including –
    - Central pain (pain after stroke, thalamic pain, spinal cord injury pain, deafferentation pain, phantom limb pain)
Neuralgias (trigeminal neuralgia, postherpetic neuralgia, occipital neuralgia)
- Painful peripheral neuropathy (e.g., metabolic, toxic, ischaemic)
- Pain after nerve injury (e.g., neuroma)
- Post-surgical pain syndromes (e.g., post-thoracotomy, post-CABG pain, postmastectomy, postamputation)
- Complex regional pain syndrome types I and 2 (including the differentiation of sympathetically maintained from sympathetically independent pain)
- Recognise and understand the ways in which acute and persistent pain in children differ from pain in adults, including:
  - The effect of developmental stage on assessment and management of pain in children
  - The selection of pain assessment tools for children of different developmental stages
  - Principles of managing acute, procedural and persistent pain in children

**Pain in the Elderly:**
- The epidemiology of pain syndromes in the elderly
- Physiological changes associated with ageing and effects of these on pain and pain management (including changes in pharmacokinetics, pharmacodynamics, and pain biology)
- Effects of concurrent disease, and psychological, social and cognitive changes on assessment and management of pain
- Risks associated with polypharmacy in the elderly

**Pain Medicine: Skills-Clinical Evaluation**
- Post-graduates should demonstrate skills in the clinical evaluation of patients with acute and persistent pain by:
  - Obtaining a specific pain history – Onset, location, nature, duration, intensity, aggravating and relieving factors
· Physical, psychological and social consequences of the patient’s pain
· Current and past pain treatments and outcome
· Other relevant history (past patterns of drug use or misuse, family history, medical and surgical history)
· Treatment expectations
· Interpreting relevant investigations
· Formulating a management plan and evaluating outcome

Pain Medicine-Technical Skills
Post-graduates should become competent in-
· Central neuraxial blocks
· Regional techniques (including knowledge of anatomy, technique, indications, contraindications, complications and their management) including
  · Peripheral and plexus blocks of the upper and lower limb
  · Head and neck blocks
  · Truncal blocks including intercostal and paravertebral block

Trainees need to understand the anatomy, technique, indications, contraindications, complications and management of
· Stellate ganglion blockade
· Coeliac plexus blockade
· Lumbar sympathetic blockade
· Intrathecal drug delivery for cancer and persistent pain

III YEAR ADVANCED TRAINING
Anaesthesia and Perioperative Care (including Analgesia) for Patients with Cardiac and Vascular Disease for Non-cardiac Surgery: Knowledge
· Pathophysiology, investigation, diagnosis, anaesthesia implications, and management of:
  · Ischaemic heart disease
  · Congenital heart disease
  · Valvular heart disease
  · Hypertension
  · Cardiac arrhythmias
  · Other acquired diseases, eg, myxomas, cardiomyopathies
• Understanding the principles of anaesthesia and perioperative care for patients with:
  • Recent myocardial infarction
  • Ischaemic heart disease
  • Cardiac valvular lesions
  • Congenital heart disease, corrected and uncorrected
  • Hypertensive disease
  • Cardiac arrhythmias
  • Other acquired diseases, eg, myxomas, cardiomyopathies
  • Cerebrovascular disease
  • Peripheral vascular disease

**Anaesthesia for Cardiac Surgery** -- Understanding the anaesthesia, complications and perioperative care (including analgesia) of:
  • Coronary revascularisation with/without cardiopulmonary bypass
  • Valvular repair or replacement
  • Emergency cardiac surgery
  • Cardioversion
  • Procedures in the cardiac catheterisation laboratory
  • Electrophysiological procedures
  • Congenital heart disease surgery (paediatric and adult)
  • Procedures on the great vessels, eg, for aortic dissection
  • Heart or heart/lung transplantation

**Anaesthesia for Vascular Surgery** -- Understanding the anaesthesia, complications and perioperative care (including analgesia) of:
  • Surgery on the vessels supplying the head and neck
  • Surgery on the abdominal vessels
  • Surgery on the limb vessels
  • Minimally invasive procedures on the vessels (eg, intraluminal stenting)

Understanding the principles, role, and management of procedures, problems, or events associated with anaesthesia for cardiac and vascular surgery, including:
· Myocardial protection strategies
· Cerebral protection
· Spinal cord protection
· Blood coagulation and anticoagulation and its monitoring
· Perioperative arrhythmias
· Poor cardiac output states
· Temperature management (including deep hypothermic circulatory arrest)
· Cardiopulmonary bypass including weaning from bypass and ECMO
· Cross-clamping of the aorta

**Organ Transplantation** -- Anaesthesia for organ transplantation including:
· Legal and ethical considerations of organ harvesting and transplantation
· Brain death and the legal definition of death
· Physiological and pharmacological considerations

**Protocols and planning Anaesthesia for Patients with Pulmonary Disease Chronic respiratory disease, pathophysiology, diagnosis**
· Preoperative evaluation of patients with respiratory diseases
· Lung function tests

Thoracic trauma Anaesthesia and Perioperative Care (including Analgesia) for Thoracic Surgery
· Preoperative assessment for fitness for lung surgery and one-lung ventilation
· Thoracotomy and – Lung resection, including pneumonectomy and lung reduction surgery
· Mediastinal mass resection
· Oesophageal surgery
· Surgery on the thoracic aorta
· One-lung anaesthesia, including management of hypoxia and ventilation
· Differential lung ventilation
· Tracheal and bronchial surgery (including use of lasers and stents)
· Thoracoscopic procedures
· Bronchoscopy, including removal of foreign body
· Mediastinoscopy
· Lung or heart/lung transplantation
· Management of problems or critical events : –
Fluid management postpneumonectomy
Cardiac herniation postpneumonectomy
Bronchopleural fistula
Lung bullae and cysts
Tension pneumothorax
Superior vena cava obstruction
Empyema
Understanding the types and uses of endotracheal, double-lumen, and endobronchial tubes
and bronchial blockers
Understanding chest tube drainage systems and suction

**ANAESTHESIA AND PERIOPERATIVE CARE (INCLUDING ANALGESIA) FOR PATIENTS WITH CARDIAC AND VASCULAR DISEASE FOR NON-CARDIAC SURGERY: SKILLS – CLINICAL**

**Post-graduates should be Competent in the following**
- Fibreoptic bronchoscopy
- Placement and use of vascular monitoring lines (arterial, central venous, pulmonary artery, and femoral and neck vessels)
- Basic trans-oesophageal echo examinations (subject to local practices)
- Use of cardiac pacemakers
- Placement of endobronchial tubes and blockers
- Use of bougies and tube exchangers

**Post graduates should be able to perform**
- Interpretation of ECGs and ECG monitoring
- Interpretation of chest x-rays and common chest CT and MRI imaging films
- Assistance with cardiopulmonary bypass
- Placement and care of chest drains and appropriate use of suction

**Neuroanaesthesia: Knowledge**
- Neuro anatomy -- Central nervous system, Spinal cord and meninges
- Ventricular system and flow of CSF
- Blood supply to brain and spinal cord
- Cranial vault and spinal column
- Cerebral blood flow and Cerebral blood volume
- Cerebral metabolism
· Cerebrospinal fluid dynamics and physiology
· Intracranial pressure
· Blood-brain barrier
· Physiology and metabolism of normal and abnormal brain and spinal cord
· Physiological and metabolic effects of anaesthesia on brain and spinal cord
· Abnormal water and sodium homeostasis
· Temperature and CNS function
· Pharmacology relevant to neuroanaesthesia:
  · Sedatives
  · Hypnotics
  · Analgesics
  · Inhalation agents
  · Neuromuscular blocking drugs
  · Anticholinesterases
  · Neuroprotection
  · Diuretics
  · Hypotensive agents
  · Vasopressors
  · Corticosteroids
· Drug interactions with neuromuscular disorders
· Principles of clinical measurement and monitoring in neuroanaesthesia, including techniques and clinical importance.
· Haemodynamic and respiratory monitoring
· Cerebral blood flow
· Intracranial pressure (ICP) and cerebral perfusion pressure
· Cerebral metabolism
· Transcranial doppler ultrasonometry
· Electrophysiological monitoring, eg, electroencephalogram and evoked potentials
· Electrical safety standards
Interventions to minimise Cerebral Damage
· Principles of cerebral protection
- Haemodynamic stability
- Fluid and osmotic therapy
- Management of intracranial hypertension
- Sedation and ventilatory support

**Anaesthesia for Neurosurgery**
- Understanding the assessment, anaesthesia and perioperative care of patients for:
  - Intra cerebral vascular surgery
  - Extra cerebral vascular surgery
  - Supratentorial surgery
  - Posterior fossa surgery
  - Pituitary surgery
  - Epilepsy surgery
  - ‘Awake craniotomy'
  - Craniofacial and craniobasal surgery
  - Spinal surgery
  - Emergency spinal cord decompression
  - Paediatric neurosurgery

**Principles**, role and management of procedures, problems, or events associated with anaesthesia for neurosurgery: —
- Positioning for neurosurgery
- Use of inhalation or total intravenous general anaesthesia
- Induced hypotension
- Induced hypertension
- Hypothermia
- Sitting position
- Air embolism; precautions, diagnosis and management
- Injury of head, spinal column and neurological injuries
- Epilepsy and other neurological disorders
- Paediatric considerations

**Neuroanaesthesia: Skills**
- Pre-anaesthesia preparation for neuroanaesthesia
· Monitoring in neuroanaesthesia – setting up and calibration, placement of cannulae, interpretation of variables
· Post-anaesthesia care and post neurosurgical care
· Protocols and drills for
· Failed airway intubation
· Reducing raised ICP
· Suspected cervical spine injury
· Intraoperative air embolism
· Initial management of a head injury
· Positioning of patients

**ATTITUDES INCLUDING COMMUNICATION AND BEHAVIOUR FOR THE POSTGRADUATES:**
· To learn the attributes of a
· Medical expert
· Communicator
· Collaborator
· Manager
· Teacher
· Professional
· To practise good communication with colleagues, patients and others
· To work as a member of a team, but to assume responsibilities and/or delegate duties as a team leader when necessary
· To commit to, and believe in, a culture of safety and ethical, high quality care
· To accept that medical knowledge and skills are not the only requirements of specialist practice
· To be aware of medicolegal obligations relating to medical practice
· To have insight into one’s own limitations, abilities and areas of expertise
· To commit to continuing professional development

**TRAINING IN RESEARCH METHODOLOGY, MEDICAL ETHICS, BIO ETHICS AND MEDICOLEGAL ASPECTS**

Students should compulsorily attend the research Methodology workshop conducted by the University within first six months of the M.D course.
Students are encouraged to attend workshops/CME's on Bioethics conducted by the University and other reputed Institutions. Medical ethics, bioethics, moral and legal issues, medical audit are part and parcel of the curriculum and syllabus

**Professionalism and Ethics**

To commit to, and believe in the ethical and professional principles –

- The best care for the patient must be the principal driving force of practice
- *Patient autonomy*: patients’ ability to determine their treatment
- *Beneficence*: the principle of “doing good” to patients
- *Non-maleficence*: the principle of not doing harm to patients
- *Fidelity*: faithfulness to one’s duties and obligations. This principle underlies excellence in patient care, confidentiality, telling the truth, a commitment to continuing professional development and lifelong learning, and not neglecting patient care
- *Social justice*: the right of all patients to be fairly treated
- Duty to oneself in terms of personal health care, and maintenance of competence to practise
- *Accountability*: the anaesthetist is responsible for his/her actions
- Honour and integrity in all conduct, including the generation and use of resources
- Respect for others, work as a team and practise conflict resolution
- Appropriate response to clinical error

**Patient Considerations**

To commit to, and believe in, the rights of patients with respect to:

- Autonomy
- Confidentiality of the doctor-patient relationship
- Appropriate, excellent clinical care, including pre-operative assessment
- Informed consent
- Comprehension of the risks of anaesthesia techniques
- Appropriate care irrespective of race, culture, gender and socio-economic status
Research Considerations

- To value rigorous educational and scientific processes
- To commit to the ethical principles of research

5. TEACHING AND LEARNING METHODS:

- Introductory lectures
- Seminars, group discussions and symposia.
- Problem case discussion, before and after the conduct of the case
- Journal club presentation and discussion
- Presenting in Conferences and attendance in CME’s & Workshops
- Training in the Operation Theatres (both elective and emergency), Intensive Care Unit, Pre-anesthetic clinic, Pain Clinics, Peripheral areas like Radiology- including USG, CT MRI and interventional radiology, Endoscopy suite and Interventional cardiology lab.

6. STRUCTURED TRAINING PROGRAMME

Duration of the training 3 years

Orientation-

- To the hospital, wards, operation theatres and peripheral areas
- Anesthesiology as a subject
- Assigning Thesis guides

Objectives for 1st year

- Orientation- To the hospital, wards, operation theatres and peripheral areas and also to Anaesthesiology as a subject
- To observe and learn assessment and management of cases in ASA I and II in the specialities of General Surgery, Orthopaedics, Gynaecology and Recovery room. The level of supervision is slowly graded to facilitate independent management of general and spinal anaesthesia.
- They should attend the practical guidance workshop on research methodology and should have a knowledge about basic concepts of research, biostatistics etc.

Objectives for 2nd year

- General and regional anaesthesia (including epidural, nerve and plexus blocks) for ASA
III AND IV cases in the specialities of Paediatrics, ENT, Dental, ICU, Obstetrics, Eye, Urology, Pain, Peripheral areas and Trauma.

- Should learn BLS, ACLS, PALS and ATLS.
- The post-graduate should be able to analyse a journal article and data and able to present free papers in conferences and should attend continuous education programme & workshops.
- The post graduate should start working on the thesis/Dissertation and should complete the clinical work at the end of second year.

**Objectives for 3rd year**
- Post-graduates should be able to anaesthetise under supervision cardiac, neuro, paediatric and all major cases.
- They should be able to anaesthetise all other elective and emergency cases independently and manage acute pain and make decisions and know how to organize mass casualty.
- Simulation based training

**First year : Basic skills and orientation to broad speciality departments**
- General surgery : 2 months
- Orthopaedics surgery 2 months
- Pre assessment clinic 1 month
- ENT & Day care surgery 1month
- Medicine /Toxicology 2 month
- PACU/Recovery room/ casualty 1month
- Emergency Anaesthesia, Trauma 2 months
- Obstetric & Gynecology: 1 month

**2nd year multi speciality training**
- Neonatology/Paediatrics/ Cardiology/pulmonology 2 weeks
- Paediatric surgery OT 1 month
- Ophthalmic surgery 2 weeks
- Urology OT 1month
- Plastic surgery OT 1month
- Neuro surgery OT 1 month
- Cardio thoracic surgery OT 1month
- Cath lab – closed cardiac procedures 2 weeks
Radiology- USG, CT scan, MRI, IVP Radio oncology 2 weeks
Dental/ Oro Facial Maxillary surgery 1 month
ICU/IRCU/PACU/ 1 month
OBG OT (Laparoscopic surgery, Infertility &FP ) 1 month
Dissertation/Thesis department postings 2 months
During II year, the Students are encouraged to undergo special postings for learning new advanced techniques / procedure / skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

3 rd year
Dissertation/Thesis department postings 2 months
**Advanced training speciality postings**
Trauma/ Spine OT 1 month
Urosurgery OT 1 month
Plastic surgery OT 1 month
Transplant surgery OT 1 month
vascular OT / Endocrine/ Geriatrics 1 month
Neuro surgery OT 1 month
ENT (Endoscopic & Laser Surgery) OT 1 month
Pain Management 1 month
Critical care/ Organ transplant ICU 1 month
Advanced Orthopedics/General surgery (Key hole surgery) 1 month
Emergency Operation Theatre & Day care surgery postings on rotation

7. **Evaluation of the candidates in both theory and practical aspects will help the candidate in improvement of his/her knowledge, skills and attitude.**

8. **COMPETENCY ASSESSMENT:**

**OVERALL:**

a) Communication / commitment / Contribution / ()
Compassion towards patients and Innovation () 5 Marks
b) Implementation of newly learnt techniques/skills ()
a) Number of cases presented in Clinical Meetings/
Journal clubs/seminars - 5 marks
b) Number of Posters/Papers presented in Conferences/
Publications and Research Projects - 5 marks
c) No. of Medals / Certificates won in the conference /
Quiz competitions and other academic meetings with details. - 5 marks

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Total 20 Marks
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**PG CLINICAL COURSES**
VIVA including Competency Assessment - 80 Marks (60 + 20)
Log Book - 20 marks

**ASSESSMENT SCHEDULE IS AS FOLLOWS**

<table>
<thead>
<tr>
<th>Year of study</th>
<th>Period</th>
<th>Total</th>
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<tbody>
<tr>
<td>I year</td>
<td>Upto Dec</td>
<td>10 marks</td>
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<td>Upto June</td>
<td>10 marks</td>
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<td>20 Marks</td>
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<td>II year</td>
<td>Upto Dec</td>
<td>10 marks</td>
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<td>Upto June</td>
<td>10 marks</td>
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<td>20 Marks</td>
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</table>
III year Upto Oct 10 marks Upto Feb 10 marks 20 Marks
AVERAGE 20 Marks

9. Dissertation and University Journal of Medical Sciences:
As per the 49th SAB Resolution under Point No. 2 and in the 52nd SAB it was reiterated regarding the topic for dissertation
The topic for the dissertation should be registered and sent to the University after Ethics Committee approval before 31st of December of the first Post Graduate Year. Only one change of topic with proper justification from the Head of the Department is permitted before 31st March of the first Post Graduate Year. The change of dissertation title will not be permitted after 31st March of the First Post Graduate Year. This modification in regulation will be scrupulously followed from the academic year 2015-16 admission onwards.
As per MCI Clause 14 (4)(a), thesis shall be submitted at least 6 Months before the Theory and Clinical/Practical Examination.
The periodical evaluation of dissertation/log book should be done by the guide / HOD once in every six months. The HOD should ensure about the submission of dissertation within the stipulated time.
Regarding submission of articles to the University Journal of Medical Sciences for all the PG Degree/Diploma courses, it is mandatory that the students have to submit at least one research paper. Case Reports are not considered as Research Paper

10. THEORY EXAMINATIONS:
Theory examination will comprise 4 papers
Paper I - Applied Basic Sciences related to Anaesthesia including Physics in Anaesthesia, History of Anaesthesia
Paper II - Medicine Applied to Anaesthesiology
Paper III - Anaesthesiology
Paper IV - Anaesthesiology including Critical Care and Recent Advances in Anaesthesiology
All the four question Papers will have following pattern
I. Elaborate on 2 x 15 = 30
II. Write note on 10 x 7 = 70

11. PRACTICAL EXAMINATIONS:
- Morning session
  - Long case-1×70 Marks
  - Clinical case
    - 70 marks
    - 40 minutes case examination and 20 minutes for discussion
  - Short cases-2×40
Marks
10 minutes for each case examination and
20 minutes for each case discussion **80 marks**
**Total marks for morning session 150 marks (A)**

Afternoon session
**Ward rounds / Case Scenario -5 × 5 marks**
5 mins each case discussion
**25 marks (B)**

**OSCE 5 stations × 5 marks 25 marks (C)**

**VIVA - 15 mins for each station 4 stations 80 marks (D)**
1. Anaesthesia Machine including Vaporisers,
   Circuits, Equipments, Monitors
2. CPR mannequin, Difficult airway manniquin,
   Defibrillator, Ventilator
3. Drugs, IV fluids, Instruments and Procedures tray
4. Investigation charts, ECG, Xray, ABG, GRAPHs,
   Recent advances

**Log book 20 marks (E)**

**Aggregate Total (Clinical + Viva) 300**

Minimum required marks for pass (50%) (A+B+C+D+E)
**150**

**Thesis Approved/Not approved**

12. Log book
   • A detailed log book should be maintained for the entire duration of the course.
   It should contain the following details.
   • Procedures performed
   • Journal clubs/Clinical Meetings
   • Seminars/CME/Conferences
   • Important cases discussed/presented
   • The Post Graduates students shall maintain a record (Log) book of the work
     carried out by them and the training Programme undergone during the period
     of training.
   • Periodic review of Log book have to be done in the Department by guide/HOD
     once in every 6 months

13. **VIVA including Competency Assessment :**
   VIVA including Competency Assessment - 80 Marks (60 + 20)
   • Anaesthesia Machine, Gas cylinders, Equipments, Monitors
   • Drugs, IV fluids, Instruments, Procedure Tray
   • Investigation Charts, ECG, Xray, ABG, Capnograph, Ventilator Graphics, etc..
   • Resuscitation mannequin, Difficult airway mannequin, Defibrillator, Ventilator

14. **OSCE**
   Five stations – Five minutes each station 5X5 =25 marks ©
1. Equipments, monitors, circuits, Vaporiser
2. Flow volume loops/ABG/ Capnographs/ Ventilator graphs /
3. Physiology, History relevant to Anaesthesiology
4. Drug Pharmacology, invasive procedure, Nerve block
5. Communication skill assessment- high risk informed consent, Cancellation/ consent for tracheostomy due to difficult intubation, Delayed recovery, Breaking bad news, etc.

**15. REFERENCE BOOKS**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the book</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A synopsis of Anaesthesia</td>
<td>J. Alfred Lee</td>
</tr>
<tr>
<td>2.</td>
<td>Management of pain</td>
<td>J.J Bonica</td>
</tr>
<tr>
<td>3.</td>
<td>Anaesthesia for infants and children</td>
<td>R.M Smith</td>
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<tr>
<td>4.</td>
<td>A Practice of Anaesthesia</td>
<td>Wylic and Churchill</td>
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<tr>
<td>5.</td>
<td>Anaesthesia - Vol.I and II</td>
<td>Davidson</td>
</tr>
<tr>
<td>6.</td>
<td>Clinical Anaesthesia</td>
<td>Barash</td>
</tr>
<tr>
<td>7.</td>
<td>Critical Care</td>
<td>Joseph Civetta</td>
</tr>
<tr>
<td>8.</td>
<td>Anaesthesia and neurosurgery</td>
<td>Cottrell and Smith</td>
</tr>
<tr>
<td>9.</td>
<td>Cardiac anaesthesia</td>
<td>Kaplan</td>
</tr>
<tr>
<td>10.</td>
<td>Paediatric anaesthesia</td>
<td>Gregory</td>
</tr>
<tr>
<td>11.</td>
<td>Pharmacology &amp; Physiology in Anaesthetic practice</td>
<td>Robert K. Stoletig</td>
</tr>
<tr>
<td>12.</td>
<td>Anaesthesia for Co-existing diseases</td>
<td>Robert K. Stoletig</td>
</tr>
<tr>
<td>13.</td>
<td>Understanding Anaesthesia Equipment</td>
<td>Dorsch and Dorsch</td>
</tr>
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**Note : The editions are as applicable and the latest editions shall be the part of the syllabi.**

**16. JOURNALS**

1. Anaesthesiology
2. Anesthesia Analgesia
3. Anaesthesia
4. Anesthesia Intensive Care
5. Canadian Journal of Anaesthesia
6. British Journal of Anaesthesia
7. Indian Journal of Anaesthesia
DIPLOMA IN ANESTHESIOLOGY

The curriculum shall train a candidate to manage anaesthesia in a competent, compassionate and caring manner. Learning shall be self directed and essentially autonomous. Exposure to all the sub-specialities shall be achieved. A combination of formative and summative assessments shall ensure completion of goals and training.

1. GOALS:
To produce competent and compassionate specialists who
a) shall recognize the health needs and ethically carry out the professional obligations towards the patient.
b) shall attain all the required competencies within all the sub-specialities in the speciality of anaesthesiology, enabling good practices at the secondary and tertiary levels of health care delivery.
c) Shall take effort to be aware and update knowledge about the latest advances and developments in the field.
d) shall acquire the basic skills to teach medical and para-medical professionals.

2. OBJECTIVES: (Ref: Bloom’s taxonomy of learning domains)
A. Knowledge to be gained from the syllabus
B. Skills to be learned from the practical training
C. Attitudes to be developed during the training period

The curriculum shall include
a) Anatomy, physiology and biochemistry relevant to anaesthesiology.
b) A thorough knowledge of the pharmacokinetics and pharmacodynamics of anaesthetic drugs.

c) Knowledge of cardiovascular, respiratory, neurological, hepatobiliary, renal and endocrine homeostasis and related drugs used in patients undergoing anaesthesia.

d) Physics and principles involved in the construction and functioning of anaesthesia machine and equipment used to provide anaesthesia and patient vital signs monitoring.

e) Knowledge of the commonly used techniques in General, Regional and Local anaesthesia.

f) Understanding the concept of unconsciousness and its implications in anaesthesia.

g) Knowledge and management of acute and chronic intractable pain.

h) Knowledge of intensive care / therapy.

i) Knowledge of medical statistics.

j) Knowledge and gain expertise in cardiopulmonary resuscitation.

k) Knowledge of medical ethics.

The course content should stimulate the thought processes of the candidate and encourage the candidate to acquire new information from books, journals, lectures, seminars and discussions. It should stimulate reflective thinking and problem solving by critical analysis of events during anaesthesia and interpretation of the data and logical reasoning.

3. COMPONENTS OF POST-GRADUATE CURRICULUM

THEORETICAL KNOWLEDGE, PRACTICAL AND CLINICAL SKILLS
FIRST YEAR: BASIC TRAINING

Basic Sciences: Knowledge

Post-graduates should understand the principles involved in the measurement of relevant variables and the requirements of equipment and monitoring in anaesthesia. Knowledge is
expected in the areas outlined below.

Physics and Clinical Measurement Principles of Measurement
• SI units
• Behaviour of fluids (gases and liquids)
• Flow of fluids
• Measurement of volumes, flows, and pressures
• Measurement of temperature
• Humidification
• Oximetry
• Analysis of gases
• Capnography
• Electrical safety
• Fires and explosions

Equipment and Apparatus
• Equipment design and standards
• Gas supply in bulk and cylinders
• Anaesthesia delivery system, including pressure valves and regulators
• Vaporisers
• Breathing systems
• Devices to maintain the airway (laryngoscopes, endotracheal tubes, tracheostomy
• tubes, face masks, laryngeal masks, airways)
• Information systems
• Data storage and retrieval Monitoring
• Anaesthesia record
• Minimum monitoring standards
• Additional monitoring when appropriate (including central venous pressure, pulmonary artery pressure, cardiac output, cerebral function, temperature, coagulation, blood loss, blood sugar)

Preoperative Assessment / Pre-anaesthesia clinics
• Appropriate history taking
• Physical examination including airway assessment, respiratory, cardiovascular and
• neurological examinations
• Referral to other specialists when necessary
• Establishment of a rapport with the patient to provide reassurance, disclosure of risk, information, and discussions on complementary medicine and informed consent
• Communication and consultation skills face-to-face, by phone and in writing
• Pulmonary function tests
• Measurement of cardiovascular function
• Interpretation of common radiology and imaging scans and investigations
• Other investigations as appropriate

**Conducting Anaesthesia**

• Applied cardiac and respiratory physiology
• Applied pharmacology and variability in drug response
• Selection and planning of the anaesthesia technique
• Decision-making relating to postponement or cancellation of surgery
• Routine inhalation and intravenous inductions
• Maintenance of anaesthesia
• Correct usage of anaesthesia delivery systems
• Application and interpretation of monitored variables and neuromuscular blockade
• Use of muscle relaxants
• Application of mechanical ventilation
• Management of the airway and intraoperative complications
• Common regional anaesthesia techniques (eg, epidural and spinal anaesthesia and Regional Nerve blocks)
• Maintenance of accurate records

**Postoperative Care**

• Safe recovery transport and handover in the post-anaesthesia recovery room
• Post-operative consultations
• Management of postoperative pain, fluid requirements, and nausea and vomiting

**Communication skills**
• Call for help in Cardio Pulmonary Resuscitation, PACU, in Emergencies
• Establishment of rapport with patients, attenders, relatives of patients
  Especially in PACU, INTENSIVE CARE UNITS, RECOVERY UNITS to provide
  reassurance, disclosure of current condition & any procedural information.
• To obtain informed consent from patients or attenders /relatives
• Documentation of events correctly/properly for future verification, research
  activities.

**Basic Sciences : Skills- Clinical skills**
Post-graduates should provide safe anaesthesia care and pain management for
uncomplicated patients undergoing non-major surgery.
Post-graduates should be competent in the following technical skills -
• Maintenance of an adequate airway
• Rapid sequence induction
• Basic and advanced Life Support for adult and paediatrics
• Aseptic techniques
• Venous access
• Arterial blood gas collection
• Arterial cannulation
• Central venous cannulation
• ECG recording and interpretation
• Lumbar puncture
• Blood culture collection
• Emergency management of a pneumothorax
Post-graduates should be familiar with the following clinical protocols in the
delivery of safe
anaesthesia care, and be able to respond accordingly for crisis management.
• Checking of the anaesthesia delivery system
• Airway assessment and anticipation of Difficult airway and its management
  which may
  be acute and may be life threatening
• Inadequate airway; failed intubation, obstructed airway, oesophageal
  intubation,
  endobronchial intubation, and unplanned extubation.
• Laryngospasm.
• Bronchospasm.
• Hypertension.
• Hypotension.
• Arrhythmias.
• Myocardial Ischaemia.
• Hypoxia.
• Hypercarbia.
• Hypoventilation.
• Hyperventilation.
• Hypothermia.
• Hyperthermia.
• Malignant hyperthermia.
• Anaphylaxis.
• Residual neuromuscular blockade.
• Inadequate neuraxial blockade.
• Seizures.
• Gas embolism.
• High ventilator peak inspiratory pressures.
• Pulmonary aspiration.
• Pneumothorax.

Basic Sciences: Skills - Educational skills
• Developing a study plan for the rest of the training period
• Reviewing study plans and correcting for deviations (eg, catching up on deficient knowledge or experience)
• Reflecting on previous learning experiences with the aid of the Learning Portfolio
• Linking basic science teaching with clinical practice & Studying effectively
• Participating in small-group learning and educational activities
• Being aware of decision-making processes
• Managing time effectively for study, work and home/leisure
• Giving and receiving feedback
• Developing insight into personal limitations
• Using the Internet including e-mail
• Conducting and appraising literature searches
• Appraising journal articles including the application of statistics
• Carrying out oral presentations and professional communication.

OBSTETRIC ANAESTHESIA AND ANALGESIA: KNOWLEDGE
• Maternal physiology
• Process of labour and delivery
• Foetal and neonatal physiology
• Placental physiology
• Obstetric and post partum pharmacology
• Endocrine pharmacology
• Pharmacological considerations for newborn resuscitation
• Pharmacology of placental drug transfer
• Anatomy — airway, spine, pelvis, birth canal, gravid uterus, and nerve and blood supply in pregnancy
• Drugs used for fertility support and IVF (overview only)
• Ecbolics and tocolytics
• Principles of in-vitro fertilisation
• Antenatal care
• Labour and delivery
• Maternal monitoring during labour
• Caesarean section; indications and levels of urgency
• Abortions and septic abortions
• Postpartum period
• High-risk Obstetrics- medical, obstetric or anaesthesia history
• Pre-existing disease in pregnancy
• Substance abuse during pregnancy
• Pre eclampsia and eclampsia, pathophysiology and management
• Obstetric complications, eg, breech, malpresentation, multiple pregnancy and abnormal placentation
• Obstetric interventions; indications and anticipation of anaesthesia and analgesia
• Amniotic fluid, air and pulmonary embolism, pathophysiology and management
• Obstetric haemorrhage- antepartum, peripartum and postpartum
• Foetal and Neonatal Considerations
• Foetal teratogenicity, carcinogenicity, and congenital abnormalities
• Foetal evaluation and monitoring
• Antepartum and intrapartum foetal compromise
• Foetal death in utero; pathophysiology and psychological issues
• Neonatal resuscitation
• Apgar score and neuro-adaptive scores, and their prognostic significance
• Neonatal surgery - Anaesthesia Management (overview only)
• Pre-anaesthesia assessment of the pregnant patient and identification of high risk patients eg: Risk factors in anaesthesia such as Pre-existing diseases like cardiac disease, hypertension, respiratory disease, diabetes, thyroid disease, intracranial disease, bleeding disorders, renal disease and neuromuscular disease
• Adolescent or elderly primigravid pregnancy
• Morbid obesity
• Thromboembolic disease
• Anaesthesia for non-obstetric surgery in the pregnant patient
• Anaesthesia for elective obstetric procedures
• Anaesthesia for emergency obstetric procedures
• Anaesthesia for Caesarean section
• Pain management in obstetrics
• Complications of General Anaesthesia like Difficult airway management, Pulmonary aspiration, Awareness during general anaesthesia
• Complications of Regional Analgesia and anaesthesia, eg, high block, local anaesthetic toxicity, neurological sequelae
• Management of inadequate or failed regional anaesthesia and analgesia
• Management of severe haemorrhage; surgical, antepartum and postpartum
• Maternal morbidity and mortality; incidence and legal and ethical issues
• Organisation of an obstetric anaesthesia and analgesia service
• Safe radiation practice during pregnancy

**Obstetric anaesthesia-Skills**
• Airway assessment in pregnancy
• Rapid sequence induction and Acid Aspiration prevention protocol
• Emergency airway management
• Implementing epidural, spinal, and combined spinal/epidural anaesthesia & analgesia,
• Management of local anaesthetic toxicity
• Management of high regional block
• Management of severe obstetric haemorrhage

Post-graduates should be familiar with clinical drills for crises management especially
• for airway emergencies
• Failure to intubate algorithm in obstetrics
• Advanced Life Support in the obstetric patient
• Resuscitation of the neonate
• Management of pulmonary aspiration during general anaesthesia

**SECOND YEAR- ADVANCED TRAINING:**
**ANAESTHESIA FOR HIGH-RISK ELECTIVE AND EMERGENCY SURGERY:**
**KNOWLEDGE**
• Preoperative evaluation and resuscitation
• Thromboembolism prophylaxis
• Perioperative and prophylactic antibiotics
• Management of coagulopathies
• Regional anaesthesia for abdominal, vascular, and imaging procedures including anatomy, and physiological and pharmacological aspects
• Informed consent and consent for incompetent patients
• Postoperative care, Management of postoperative pain, phantom-limb pain and pain from injury

**Anaesthesia for Trauma Surgery**
• Assessment and immediate care; primary and secondary survey
• Trauma severity scores
• Emergency airway management
• Establishing intravenous access
• Priorities of resuscitation, investigations, and surgical procedures
• Physio-biochemical effects of trauma
• Managing facial, head and cervical spine injuries
• Glasgow Coma Scale and other scores of consciousness
• Pathophysiology of head injury including changes in cerebral blood flow, cerebral metabolism and intracranial pressure
• Pathophysiology and management of shock
• Pathophysiology of blood loss and massive blood transfusion
• Volume replacement
• Managing abdominal and chest injuries
• Management of burns procedures, including: – Understanding the pathophysiology of burns – Anaesthesia for debridement and skin grafting – Drills in burns resuscitation
• Managing coagulopathies
• Transport of ventilated or injured patients including portable ventilators and monitoring systems

Co-existing Medical Conditions Relevant to Anaesthesia
• Endocrine disorders including phaeochromocytoma, hyperthyroidism, hypothyroidism, and diabetes mellitus
• Disorders of the cardiovascular system
• Disorders of the respiratory system
• Disorders of the nervous system
• Disorders of the liver, biliary tract and gastrointestinal system
• Renal disorders
• Water, electrolyte and acid-base disturbances
• Haematological disorders, including coagulopathies
• Skin and musculoskeletal disorders, including rheumatoid arthritis and ankylosing
spondylitis

• Psychiatric disorders and substance abuse
• Disorders associated with ageing
• Obesity

**ANAESTHESIA FOR HIGH-RISK ELECTIVE AND EMERGENCY SURGERY: SKILLS:**

Post-graduates should provide safe anaesthesia for

• Major abdominal surgery
• Laparoscopic surgery
• Trauma surgery – post-graduates should revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination (including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient’s status.

• Post-graduates should become competent in the following technical skills –
  • Securing an airway, arterial and central venous cannulation, and rapid sequence induction
  • Cricothyroidotomy and percutaneous tracheostomy
  • Cannulation of major vessels for volume resuscitation
  • Awake fibreoptic intubation
  • Thoracic and lumbar epidural and spinal anaesthesia
  • Blood conservation strategies
  • Regional nerve blocks for abdominal and lower limb surgery
  • Chest drain insertion
  • Immobilisation and care of cervical spine injuries
  • Post-graduates should be familiar with clinical drills for crises management.
  • Airway emergencies eg, “cannot intubate, cannot ventilate”, difficult airway, hypoxia and abnormal end-tidal CO2 levels
• Managing major intraoperative events in aneurysm and abdominal surgery

**Anaesthesia for Trauma Surgery - skills**

• Drill for the primary and secondary survey
• Drill for raised intracranial pressure
• Drill for tension pneumothorax
• Drill for managing severe haemorrhage
• Drill for managing cardiac arrest (ACLS Algorithm)
• Drill for managing malignant hyperthermia

**ENT, Eye, Dental, Maxillofacial, and Head and Neck Surgery:**

**Knowledge**
- Cardiovascular, respiratory and neurological physiology
- Physiology of gases in closed body cavities
- Pharmacology of local anaesthetic agents
- Pharmacology of local vasoconstrictors
- Anatomy of the head and neck and abnormal facies
- Anatomy of the airway, nasal passages, larynx, pharynx and middle ear
- Effects of surgery and radiation on the airway
- Monitoring in anaesthesia
- Neurological monitoring
- Lasers-- types, uses in surgery, complications and precautions
- Airway devices and types of tracheal tubes, eg, Micro-laryngeal, Rae
- Equipment for difficult tracheal intubation
- Equipment for jet ventilation

**Anaesthesia for ENT surgery**
- Pre-operative airway assessment
- Tonsillectomy and adenoidectomy, including quinsy and postoperative bleeding
- Microlaryngoscopy
- Radical head and neck surgery
- Laryngectomy and Pharyngolaryngectomy
- Laser surgery
- Nasal and sinus operations
- Parotid tumour surgery
- Myringoplasty
- Middle ear surgery
- Microsurgery of the ear
- Managing partial airway obstruction including:
- Epiglottitis
· Foreign bodies
· Laryngeal tumours
· Oropharyngeal cysts and abscesses
· Elective and emergency tracheostomy
· Paediatric problems, eg, relating to disease, airway, larynx and craniofacial disorders
· Post-operative care

**Anaesthesia for Dental surgery**
· Outpatient dental procedures- sedation and general anaesthesia
· Inpatient dental surgery
· Dental procedures on the mentally challenged
· Dental procedures on patients with bleeding disorders
· Oral surgery
· Fractured jaw
· Maxillary fractures according to the Le Fort classification
· Dental sepsis

**Anaesthesia for Eye surgery**
· Anatomy and physiology of extremes of age
· Anatomy of orbit and contents
· Physiology of intraocular pressure
· Ocular perfusion
· Eye reflexes (oculocardiac, oculorespiratory, oculoemetic)
· Anatomy of orbit, extraocular muscles, blood vessels, lacrimal apparatus
· Local anaesthetic agents for eye surgery
· Other drugs for eye surgery, eg, topical agents, vasoconstrictors, mydriatics, miotics,
  and agents to reduce intraocular pressure
· General anaesthesia for eye surgery including:
· Examination under anaesthesia
· Laser eye surgery
· Intraocular surgery
· Extraocular surgery
· Retinal detachment
· Plastic and orbital surgery
Emergency eye surgery and use of suxamethonium in penetrating eye injury

Monitoring

Postoperative care, management of nausea and vomiting

Principles of regional retrobulbar and peribulbar block and choosing between general and regional anaesthesia techniques

Sedation for eye procedures

Principles of anaesthesia for day-case

Paediatric considerations

Anaesthesia for Maxillofacial, Thyroid, and Head and Neck Surgery

Pre-operative airway assessment

Management of anaesthesia for major maxillofacial surgery, which may involve prolonged anaesthesia, major blood loss, hypothermia and multiple procedures

Management of anaesthesia for facial trauma: emergency and semi-elective, including fractured jaw and maxilla

Management of anaesthesia for cancer, plastic and cosmetic surgery on the face, head and neck, including surgery for cleft palate

Management of thyroid surgery, including

Anaesthesia for thyroid and parathyroid surgery

Stabilisation of thyroid and parathyroid disorders preoperatively

Post thyroidectomy bleeding

Managing a “thyroid storm”

Sedation for head and neck procedures

Post-operative care

ENT, Eye, Dental, Maxillofacial, and Head and Neck Surgery: Skills

Tracheal intubation

Nasal intubation

Use of special tubes

Placement and removal of packs

Applying topical local anaesthesia to the airway

Securing the difficult airway
- Recognising the high-risk airway
- Use of stylets and bougies
- Awake intubation
- Retrograde catheter technique
- Fibreoptic intubation
- Laryngeal mask airway intubation
- Failed intubation or ventilation drill
- Cricothyroidotomy and percutaneous tracheostomy
- Transtracheal ventilation
- Managing the airway in trauma and burns
- Upper airway obstruction drill
- Post extubation of difficult airway drill
- Spontaneous gaseous induction for airway obstruction
- Regional and local anaesthesia of the head and neck
- Management of postoperative nausea and vomiting in head and neck surgery
- Management of postoperative facial and airway swelling

**Paediatric Anaesthesia: Knowledge**
- Anatomy relevant to airway management and breathing
- The physiology of respiration, circulation, fluid balance and thermoregulation
- The pharmacology of anaesthetic agents, analgesics and common paediatric medications, especially the relationship of dose to the size/maturity of child
- The relevance of surface area of children of various ages
- Stages of development of the normal child and their relevance to hospitalisation
- General principles of perioperative management relevant to children, emphasising:
  - common childhood illnesses and their influence on anaesthesia and surgery
  - fasting guidelines
  - fluid and electrolyte replacement
  - temperature control
  - specialised equipment for children of different sizes
· perioperative monitoring
· dosage and administration of emergency drugs
· postoperative apnoea detection and management
· acute and persistent pain management
· Relevant features of important childhood conditions: respiratory infections, asthma
· prematurity and its complications
· facial anomalies affecting the airway
· Neonatal emergencies
· respiratory distress,
· tracheoesophageal fistula,
· congenital diaphragmatic hernia,
· necrotising enterocolitis,
· abdominal wall defects
· other childhood emergencies - inhaled/ingested foreign bodies, fractures, head injuries and burns /Scalds
· congenital cardiac disease; especially ASD, VSD, Tetralogy of Fallot
· cerebral palsy
· chronic diseases of childhood; especially cystic fibrosis, muscular dystrophy
· congenital syndromes- Down’s, Pierre-Robin, mucopolysaccharidoses
· malignancy and the treatment of malignancy
· renal failure

Paediatric anaesthesia Knowledge-Clinical management
· Applying principles of paediatric anaesthesia for the following surgical subspecialties:
· Neurosurgery
· Ophthalmology
· Dental surgery
· Plastics and reconstructive surgery
· Thoraco-abdominal surgery
· Cardiac surgery and procedures
· Urology surgery and procedures/investigations
- Orthopaedic Surgery Otolaryngology
- General surgery
- Trauma and Burns
- Applying principles of paediatric anaesthesia for diagnostic procedures
- Recognising and managing the sick child
- Recognising and managing reversal to transitional fetal circulation
- Managing fluid therapy in paediatric patients
- Managing specific childhood syndromes and disorders
- Applying principles of paediatric anaesthesia for procedures outside the operating theatre, including patient transport
- Caring for paediatric patients undergoing imaging investigations, which may require sedation or anaesthesia
- Recognising and managing paediatric emergencies including basic and advanced life support
- Understanding the organisation of a paediatric anaesthesia and analgesic service

**Paediatric Anaesthesia: Skills**

Post-graduates should demonstrate decision-making and clinical skills, and perform
- Paediatric advanced life support
- Manage emergencies and conditions including
  - Hypoxia
  - Bronchospasm
  - Apnoea
  - Upper airway obstruction including upper airway infection
  - Bradycardia and other arrhythmias
  - Cardiac arrest
  - Hypovolaemia
  - Neurological compromise
  - Epiglottitis and croup
- Inhaled foreign body
- Infantile airway obstruction
- Laryngospasm
- Masseter spasm
- Postoperative stridor
- Aspiration of gastric contents
- Technical skills, such as airway management, vascular cannulation and regional anaesthesia should be demonstrated for paediatric patients
- Interpersonal skills in dealing with paediatric patients and their parents

**Intensive Care: Knowledge**

Post-graduate should understand

**Acute Circulatory Failure**
- Classification, causes, pathogenesis and sequelae of shock
- Principles of management of all forms of shock
- Monitoring in the management of shock
- Causes of cardiorespiratory arrest and the effects on body systems
- Cardiopulmonary resuscitation and external defibrillators
- Cardiac dysrhythmias and their current therapies
- Valvular heart disease
- Endocarditis
- Pulmonary embolism
- Congestive cardiac failure
- Anaphylaxis
- Ischaemic Heart Disease and Myocardial Infarction
- Factors involved in the balance of oxygen supply and demand to the heart
- Aetiology of coronary artery disease and its effects
- Signs and symptoms of ischaemic heart disease
- Signs and symptoms of myocardial infarction
- Principles of the management of acute myocardial infarction including thrombolysis, angioplasty and surgery
- Indications for a transvenous pacemaker
- Right heart catheterisation, angiography and echocardiography
Long-term effects of acute myocardial infarction and late complications

**Respiratory Failure**
- Causes and pathogenesis of respiratory failure
- Oxygen therapy and mechanical ventilatory support (invasive and noninvasive)
- Respiratory disease processes & representative conditions
- Cardiogenic/non-cardiogenic pulmonary oedema/ARDS
- Airway obstruction
- Airway stenosis and tracheomalacia
- Bronchopleural fistula
- Pneumothorax
- Aspiration syndromes
- Fat embolism
- Pneumonia (community and nosocomial)
- Chronic airway limitation
- Asthma

**Renal Failure**
- Definitions of acute and chronic renal failure
- Causes and pathogenesis of renal failure
- Acute renal failure
- Principles of renal replacement therapy and their indications

**Neurological Failure**
- Definition and causes of coma
- Causes, pathogenesis and treatment of cerebral swelling and raised intracranial pressure
- Principles of cerebral function monitoring, especially intracranial pressure
- Principles of diagnosing brain stem death
- Representative conditions to be understood:
  - Acute vascular disorders of the central nervous system
  - Acute infective disorders of the central nervous system
  - Cerebral oedema
  - Brain stem death
  - Seizures
  - Hemiplegia, paraplegia, quadriplegia
Guillain Barre syndrome
Peripheral nerve and or muscle dysfunction associated with critical illness
Myasthenia gravis
Hyperthermia, hypothermia
Tetanus
Delirium

Severe Trauma
Effects of severe trauma on organs and organ systems
Principles of EMST for the management of trauma and advantages of an organized team approach
Technique of cricothyroidotomy/tracheostomy/mini-tracheotomy
Principles of the management of head injury and Glasgow Coma Scale
Management of cervical spine injuries
Principles of the safe transfer of injured children and adults and portable monitoring systems

Sepsis
Definition, pathogenesis and pathophysiology of sepsis and related syndromes
Risk factors for nosocomial infection
Infection control measures in ICU and operating suites

Supportive Care of Critically Ill Patients
Inotropic Therapy
Recognise when to use inotropic or vasopressor therapy
Choose an appropriate agent, dose, physiological endpoint, rate and route of administration
Review the efficacy of inotropic therapy at regular intervals
Provide appropriate nutritional support and General Care
Appropriate plan for care of bowels, skin, mouth, eyes and maintenance of mobility and muscle strength

Intensive Care: Skills
Cardiovascular Related
Choosing and using inotropic agents, vasodilators, and vasoconstrictors
Managing dysrhythmias
Choosing and using antimicrobial agents in heart disease
Assisting with intra-aortic balloon pumping
Cardioversion
Advanced life support
Respiratory Related
Oxygen therapy
CPAP & Non-invasive ventilation
Mechanical ventilation, including modes of ventilation
Pleural drainage
Percutaneous tracheostomy
Fibreoptic bronchoscopy
Renal Failure
General care of continuous dialysis and haemofiltration techniques
Neurological Failure
Maintaining cerebral perfusion pressures and intracranial pressures
Gastro-intestinal Hemorrhage management
Assisting with placing a Sengstaken Blakemore tube

**Diagnostic imaging and interventional procedures (radiology and cardiology): Knowledge**
- Preanaesthetic preparation
- Techniques appropriate for adults and children for CT scanning, MR imaging and interventional radiology, angiography and interventional cardiology
- Post-investigation care

**Diagnostic imaging and interventional procedures (radiology and cardiology): Skills**
- Pre-anaesthetic preparation
- Sedation and general anaesthetic techniques for:
  - angiography and interventional procedures
  - CT scanning, adults and children
- Magnetic resonance imaging
- Problems due to magnetic field
- Post-investigation care

**Pain Medicine: Knowledge**
- Neurobiology of Pain
- Overview of “Pain Pathways”
- Multi-dimensional aspects of pain; role of physiological, psychological and environmental factors
- Pharmacology of Analgesic Agents
- Pharmacokinetic and pharmacodynamic principles, drug interactions, and side effects.

**Knowledge of the pharmacology of:**
- Opioids
- Paracetamol
- Non-steroidal anti-inflammatory agents (NSAIDs)
- Antidepressants (TCAs and SSRIs)
- Anticonvulsants
- Membrane-stabilising agents
- Alpha-2 agonists
- NMDA-receptor antagonists
- Local anaesthetics
- Anti-emetics
- Agents used to treat hypotension associated with neuraxial blockade
- Awareness of the role of the following in pain management
- Anti-migraine agents
- Steroidal anti-inflammatory agents
- Topical agents (NSAIDS, Capsaicin)
- Neurolytic agents
- Experimental agents for analgesia
- Knowledge of different routes of analgesic drug delivery, including factors governing choice of route, side effects relevant to particular route,
- Principles of additive and synergistic effects when agents are combined
- Oral
- Intramuscular
- Subcutaneous (including continuous infusion)
· Intravenous (including continuous infusion)
· Patient-controlled analgesia (PCA) via different routes (ie intravenous, subcutaneous, intranasal, epidural, intrathecal
Other-methods- topical, transdermal, rectal, transmucosal (intranasal, inhalational and sublingual / buccal), intra-cerebroventricular, intraarticular, infiltration under skin

**Psychological and Socio cultural Issues**
The importance of psychological (emotional and cognitive), social, and other factors in the presentation and management of pain with emphasis on:
· Factors involved in the wide variation in individual response to tissue injury
· The relationship between depression and persistent pain
· The role of anxiety and/or depression in acute pain
· Differentiation of active and passive coping strategies
· The role of illness behaviour
· The influence of the health care provider on the response to pain treatment
· The importance of an interdisciplinary approach to pain assessment and treatment including the potential role of other members of the pain team (particularly psychiatrist, clinical psychologist, physiotherapist, nursing staff, occupational therapist, social worker)
· The placebo effect and its implications for treatment of pain

**Pain Assessment and Measurement**
· Assess pain and outcome of pain treatment using history, clinical examination and pain measurement tools
· Recognise the limitations of pain measurement techniques, particularly in some patient groups (eg, persistent pain, children, those with cognitive impairment)
· Understanding of – Neuroendocrine and metabolic responses to surgery stressors and impact of analgesic techniques
Consequences of poorly controlled pain
Current evidence for and against pre-emptive analgesia and clinical implications
Current evidence for the effect of analgesic technique on morbidity and mortality
Importance of aggressive multimodal postoperative rehabilitation
Relationship between acute and persistent pain including factors involved in progression from one to the other, and potential interventions to prevent such progression
Choose the most appropriate technique of acute pain management –
Pharmacological techniques (opioid and non-opioid) via a variety of routes
Regional techniques including central neuraxial, plexus and peripheral nerve blockade
Non-pharmacological techniques
Formulate a pain management plan based upon –
Patient preference, physical and mental status, and available expertise and technology
Special requirements in specific patient groups (eg, the elderly, children, pregnant and postpartum patients, Obstructive sleep apnoea, concurrent hepatic or renal disease; non-English speaking, cognitive impairment
Special requirements in patients with opioid-tolerance and/or a substance abuse disorder including an understanding of guidelines and regimens for analgesic drug use (equi-analgesic dosing for opioids; tolerance and dependence)
Special requirements under specific clinical situations (eg, spinal injuries, burns, acute back pain, musculoskeletal pain, acute medical pain, acute cancer pain and patients in Intensive Care and the Emergency Department)
Include in a pain management plan
· Appropriate evaluation of the patient’s pain
· Informed consent, including disclosure of risk and appropriate documentation
· Patient education about the selected technique and alternatives
· Recognise common presentations of acute musculoskeletal pain (e.g., rib fracture, acute back pain) and other non-surgical acute pain syndromes (migraine, renal colic) including in the Emergency Department and Intensive Care Unit
· Identify when to seek advice from, or refer to, a Pain Medicine Specialist

**Cancer Pain**

Undertake assessment of pain in patients with cancer based on –
· Understanding of the multiple potential aetiologies of pain associated with cancer
· Differentiation between somatic, visceral, and neuropathic pain
· Evaluation of psychological, social, cultural and spiritual issues
· Undertake treatment of cancer-related pain syndromes based on therapies available (including chemotherapy, radiotherapy, surgery, invasive and non-invasive analgesic techniques, and psychological approaches)
· Understand guidelines and regimens for analgesic drug use including equianalgesic dosing for opioids; tolerance and dependence and their management in the patient with cancer
· Identify when to seek advice from, or refer to, a Palliative Medicine Specialist

**Neuropathic Pain**

· Understand diagnostic criteria, clinical features and management of specific neuropathic pain syndromes including—
  · Central pain (pain after stroke, thalamic pain, spinal cord injury pain, deafferentation pain, phantom limb pain)
  · Neuralgias (trigeminal neuralgia, postherpetic neuralgia, occipital neuralgia)
- Painful peripheral neuropathy (e.g., metabolic, toxic, ischaemic)
- Pain after nerve injury (e.g., neuroma)
- Post-surgical pain syndromes (e.g., post-thoracotomy, post-CABG pain, postmastectomy, postamputation)
- Complex regional pain syndrome types I and 2 (including the differentiation of sympathetically maintained from sympathetically independent pain)
- Recognise and understand the ways in which acute and persistent pain in children differ from pain in adults, including:
  - The effect of developmental stage on assessment and management of pain in children
  - The selection of pain assessment tools for children of different developmental stages
  - Principles of managing acute, procedural and persistent pain in children

**Pain in the Elderly:**
- The epidemiology of pain syndromes in the elderly
- Physiological changes associated with ageing and effects of these on pain and pain management (including changes in pharmacokinetics, pharmacodynamics, and pain biology)
- Effects of concurrent disease, and psychological, social and cognitive changes on assessment and management of pain
- Risks associated with polypharmacy in the elderly

**Pain Medicine: Skills-Clinical Evaluation**
- Post-graduates should demonstrate skills in the clinical evaluation of patients with acute and persistent pain by:
  - Obtaining a specific pain history – Onset, location, nature, duration, intensity, aggravating and relieving factors
  - Physical, psychological and social consequences of the patient’s pain
· Current and past pain treatments and outcome
· Other relevant history (past patterns of drug use or misuse, family history, medical and surgical history)
· Treatment expectations
· Interpreting relevant investigations
· Formulating a management plan and evaluating outcome

**Pain Medicine-Technical Skills**

Post-graduates should become competent in-

· Central neuraxial blocks
· Regional techniques (including knowledge of anatomy, technique, indications, contraindications, complications and their management) including
· Peripheral and plexus blocks of the upper and lower limb
· Head and neck blocks
· Truncal blocks including intercostal and paravertebral block

Trainees need to understand the anatomy, technique, indications, contraindications, complications and management of (but not necessarily be able to perform)-

· Stellate ganglion blockade
· Coeliac plexus blockade
· Lumbar sympathetic blockade
· Intrathecal drug delivery for cancer and persistent pain

**Anaesthesia and Perioperative Care (including Analgesia) for Patients with Cardiac and Vascular Disease for Non-cardiac Surgery: Knowledge**

· Pathophysiology, investigation, diagnosis, anaesthesia implications, and management of:
· Ischaemic heart disease
· Congenital heart disease
· Valvular heart disease
· Hypertension
· Cardiac arrhythmias
· Other acquired diseases, eg, myxomas, cardiomyopathies
· Understanding the principles of anaesthesia and perioperative care for patients with:
· Recent myocardial infarction
- Ischaemic heart disease
- Cardiac valvular lesions
- Congenital heart disease, corrected and uncorrected
- Hypertensive disease
- Cardiac arrhythmias
- Other acquired diseases, eg, myxomas, cardiomyopathies
- Cerebrovascular disease
- Peripheral vascular disease

**Anaesthesia for Cardiac Surgery** -- Understanding the anaesthesia, complications and perioperative care (including analgesia) of:
- Coronary revascularisation with/without cardiopulmonary bypass
- Valvular repair or replacement
- Emergency cardiac surgery
- Cardioversion
- Procedures in the cardiac catheterisation laboratory
- Electrophysiological procedures
- Congenital heart disease surgery (paediatric and adult)
- Procedures on the great vessels, eg, for aortic dissection
- Heart or heart/lung transplantation

**Anaesthesia for Vascular Surgery** -- Understanding the anaesthesia, complications and perioperative care (including analgesia) of:
- Surgery on the vessels supplying the head and neck
- Surgery on the abdominal vessels
- Surgery on the limb vessels
- Minimally invasive procedures on the vessels (eg, intraluminal stenting)

Understanding the principles, role, and management of procedures, problems, or events associated with anaesthesia for cardiac and vascular surgery, including:
- Myocardial protection
- Cerebral protection
- Spinal cord protection
Blood coagulation and anticoagulation
Perioperative arrhythmias
Poor cardiac output states
Temperature management (including deep hypothermic circulatory arrest)
Cardiopulmonary bypass including weaning from bypass and ECMO
Cross-clamping of the aorta

Organ Transplantation -- Anaesthesia for organ transplantation including:
Legal and ethical considerations of organ harvesting and transplantation
Brain death and the legal definition of death
Physiological and pharmacological considerations

Protocols and planning Anaesthesia for Patients with Pulmonary Disease Chronic respiratory disease, pathophysiology, diagnosis
Preoperative evaluation of patients with respiratory diseases
Lung function tests

Thoracic trauma Anaesthesia and Perioperative Care (including Analgesia) for Thoracic Surgery
Preoperative assessment for fitness for lung surgery and one-lung ventilation
Thoracotomy and – Lung resection, including pneumonectomy and lung reduction surgery
Mediastinal mass resection
Oesophageal surgery
Surgery on the thoracic aorta
One-lung anaesthesia, including management of hypoxia and ventilation
Differential lung ventilation
Tracheal and bronchial surgery (including use of lasers and stents)
Thoracosopic procedures
Bronchoscopy, including removal of foreign body
Mediastinoscopy
Lung or heart/lung transplantation
Management of problems or critical events –
Fluid management postpneumonectomy
Cardiac herniation postpneumonectomy
Bronchopleural fistula
Lung bullae and cysts
- Tension pneumothorax
- Superior vena cava obstruction
- Empyema

Understanding the types and uses of endotracheal, double-lumen, and endobronchial tubes and bronchial blockers

Understanding chest tube drainage systems and suction

**Anaesthesia and Perioperative Care (including Analgesia) for Patients with Cardiac and Vascular Disease for Non-cardiac Surgery: Skills – Clinical**

Post-graduates should observe and assist in the following

- Fibreoptic bronchoscopy
- Placement and use of vascular monitoring lines (arterial, central venous, pulmonary artery, and femoral and neck vessels)
- Basic trans-oesophageal echo examinations (subject to local practices)
- Use of cardiac pacemakers
- Placement of endobronchial tubes and blockers
- Use of bougies and tube exchangers

Post graduates should able to perform

- Interpretation of ECGs and ECG monitoring
- Interpretation of chest x-rays and common chest CT and MRI imaging films
- Assistance with cardiopulmonary bypass
- Placement and care of chest drains and appropriate use of suction

**Neuroanaesthesia: Knowledge**

- Neuro anatomy -- Central nervous system, Spinal cord and meninges
- Ventricular system and flow of CSF
- Blood supply to brain and spinal cord
- Cranial vault and spinal column
- Cerebral blood flow and Cerebral blood volume
- Cerebral metabolism
- Cerebrospinal fluid dynamics and physiology
- Intracranial pressure
- Blood-brain barrier
- Physiology and metabolism of normal and abnormal brain and spinal cord
- Physiological and metabolic effects of anaesthesia on brain and spinal cord
- Abnormal water and sodium homeostasis
- Temperature and CNS function
- Pharmacology relevant to neuroanaesthesia:
  - Sedatives
  - Hypnotics
  - Analgesics
  - Inhalation agents
  - Neuromuscular blocking drugs
  - Anticholinesterases
  - Neuroprotection
  - Diuretics
  - Hypotensive agents
  - Vasopressors
  - Corticosteroids
  - Drug interactions with neuromuscular disorders
- Principles of clinical measurement and monitoring in neuroanaesthesia, including techniques and clinical importance.
  - Haemodynamic and respiratory monitoring
  - Cerebral blood flow
  - Intracranial pressure (ICP) and cerebral perfusion pressure
  - Cerebral metabolism
  - Transcranial doppler ultrasonometry
  - Electrophysiological monitoring, eg, electroencephalogram and evoked potentials
  - Electrical safety standards

Interventions to minimise Cerebral Damage
- Principles of cerebral protection
- Haemodynamic stability
- Fluid and osmotic therapy
- Management of intracranial hypertension
- Sedation and ventilatory support
Anaesthesia for Neurosurgery

- Understanding the assessment, anaesthesia and perioperative care of patients for:
  - Intra cerebral vascular surgery
  - Extra cerebral vascular surgery
  - Supratentorial surgery
  - Posterior fossa surgery
  - Pituitary surgery
  - Epilepsy surgery
  - ‘Awake craniotomy’
  - Craniofacial and craniobasal surgery
  - Spinal surgery
  - Emergency spinal cord decompression
  - Paediatric neurosurgery

Principles, role and management of procedures, problems, or events associated with anaesthesia for neurosurgery: –

- Positioning for neurosurgery
- Use of inhalation or total intravenous general anaesthesia
- Induced hypotension
- Induced hypertension
- Hypothermia
- Sitting position
- Air embolism; precautions, diagnosis and management
- Injury of head, spinal column and neurological injuries
- Epilepsy and other neurological disorders
- Paediatric considerations

Neuroanaesthesia: Skills

- Pre-anaesthesia preparation for neuroanaesthesia
- Monitoring in neuroanaesthesia – setting up and calibration, placement of cannulae, interpretation of variables
- Post-anaesthesia care and post neurosurgical care
- Protocols and drills for
- Failed airway intubation
- Reducing raised ICP
- Suspected cervical spine injury
- Intraoperative air embolism
- Initial management of a head injury
- Positioning of patients

**Research and Scientific Enquiry: Knowledge**
- Proposing a hypothesis
- Information search and literature review
- Research design, bias and appropriate methods of measurement
- Data collection and storage
- Good record keeping
- Common statistical tests and application of statistics
- Interpretation of results
- Responsibilities of investigator to the ethics committee
- Principles of writing a scientific paper
- Principles of oral or poster presentation of a paper
- Ethical principles
- The process of obtaining funding and writing a basic grant application

**Research and Scientific Enquiry: Clinical-Skills**
Post-graduates should acquire skills in scientific learning as a medical specialist
- Conducting and appraising literature searches
- Appraising journal articles including the application of statistics
- Applying the principles of evidence-based medicine to clinical practice
- Carrying out oral presentations and professional communication
- Presenting quality assurance exercises or projects
- Developing facilitation skills, such as tutoring in small-group learning and conducting small-group meetings

**Research and Scientific Enquiry: Attitudes**
Post-graduates should develop an appreciation of and continue research and scientific enquiry
- Valuing rigorous educational and scientific processes
· Distinguishing between practice with a sound scientific basis and that which requires further objective assessment
· Committing to informed consent, confidentiality and all other ethical principles of research
· Committing to continuing professional development

**ATTITUDES INCLUDING COMMUNICATION SKILLS:**
· To learn the attributes of a
· Medical expert
· Communicator
· Collaborator
· Manager
· Teacher
· Professional
· To practise good communication with colleagues, patients and others
· To work as a member of a team, but to assume responsibilities and/or delegate duties as a team leader when necessary
· To commit to, and believe in, a culture of safety and ethical, high quality care
· To accept that medical knowledge and skills are not the only requirements of specialist practice
· To be aware of medicolegal obligations relating to medical practice
· To have insight into one’s own limitations, abilities and areas of expertise
· To commit to continuing professional development

**TRAINING IN RESEARCH METHODOLOGY, MEDICAL ETHICS, BIO ETHICS AND MEDICOLEGAL ASPECTS**
Students are encouraged to attend workshops/CME’s on Bioethics conducted by the University and other reputed Institutions.

Medical ethics, bioethics, moral and legal issues, medical audit are part and parcel of the curriculum and syllabus

**Professionalism and Ethics**
To commit to, and believe in the ethical and professional principles –

- The best care for the patient must be the principal driving force of practice
- *Patient autonomy:* patients’ ability to determine their treatment
- *Beneficence:* the principle of “doing good” to patients
- *Non-maleficence:* the principle of not doing harm to patients
- *Fidelity:* faithfulness to one’s duties and obligations. This principle underlies excellence in patient care, confidentiality, telling the truth, a commitment to continuing professional development and lifelong learning, and not neglecting patient care
- *Social justice:* the right of all patients to be fairly treated
- Duty to oneself in terms of personal health care, and maintenance of competence to practise
- *Accountability:* the anaesthetist is responsible for his/her actions
- Honour and integrity in all conduct, including the generation and use of resources
- Respect for others, work as a team and practise conflict resolution
- Appropriate response to clinical error

**Patient Considerations**

To commit to, and believe in, the rights of patients with respect to:

- Autonomy
- Confidentiality of the doctor-patient relationship
- Appropriate, excellent clinical care, including pre-operative assessment
- Informed consent
- Comprehension of the risks of anaesthesia techniques
- Appropriate care irrespective of race, culture, gender and socio-economic status
- Research Considerations
- To value rigorous educational and scientific processes
- To commit to the ethical principles of research

4. **TEACHING AND LEARNING METHODS:**

- Introductory lectures
- Seminars, group discussions and symposia.
- Problem case discussion, before and after the conduct of the case
- Journal club presentation and discussion
- Presenting in Conferences and attendance in CME ‘s & Workshops
- Training in the Operation Theatres (both elective and emergency), Intensive Care
  Unit, Pre-anaesthetic clinic, Pain Clinics, Peripheral areas like Radiology (including CT MRI and interventional radiology), Endoscopy suite and Interventional cardiology lab.

5. STRUCTURED TRAINING PROGRAMME

Duration of the Training - 2 years

Orientation-
- To the hospital, wards, operation theatres and peripheral areas
- Anesthesiology as a subject

Objectives for 1st year
- Orientation- To the hospital, wards, operation theatres and peripheral areas and also to Anaethesiology as a subject
- To observe and learn assessment and management of cases in ASA I and II in the specialities of General Surgery, Orthopaedics, Obstetrics & Gynaecology and Recovery room. The level of supervision is slowly graded to facilitate independent management of general and spinal anaesthesia.

Objectives for 2nd year
- General and regional anaesthesia (including epidural, nerve and plexus blocks) for ASA III AND IV cases in the specialities of Paediatrics, ENT, Dental, ICU, Obstetrics, Eye, Urology, Pain, Peripheral areas and Trauma.
- Should learn BLS, ACLS, PALS and ATLS.
- The post-graduate should be able to analyse a journal article and data and able to present
free papers in conferences, and should attend continuous education programme & workshops.

• Post-graduates should be able to anaesthetise under supervision cardiac, neuro, paediatric and all major cases.

• They should be able to anaesthetise all other elective and emergency cases independently and manage acute pain and make decisions and know how to organize mass casualty.

• Simulation based training

**First year : Basic skills and orientation to broad speciality departments**
- General surgery 3 months
- Orthopaedics surgery 3 months
- Pre assessment clinic 1 month
- ENT & Day care surgery 2 month
- PACU/Recovery room/ casualty 1 month
- Obstetric & Gynecology: 2 month
- Emergency Operation Theatre, Minor operation Theatre & Day care surgery postings on rotation basis.

**2nd year multi speciality training**
- Paediatric surgery OT 1 month
- Ophthalmic surgery 2 weeks
- Radiology- USG, CT scan, MRI, IVP Radio oncology 2 weeks
- Urology OT 1 month
- Plastic surgery OT 1 month
- Neuro surgery OT 1 month
- Cardio thoracic surgery OT 1 month
- Dental/ Oro Facial Maxillary surgery 1 month
- ICU/IRCU/PACU/ 1 month
- Vascular OT / Endocrine/ Geriatrics 1 month
- Laparoscopic Endoscopic & Laser Surgery OT 1 month
- Pain Management 1 month
- Trauma/ Casualty/ organ harvesting (ICU) 1 month
- Emergency Operation Theatre, Minor operation Theatre & Day care surgery postings on rotation basis.

7. Evaluation of the candidates in both theory and practical aspects will help the candidate in improvement of his/her knowledge, skills and attitude.

8. COMPETENCY ASSESSMENT:

• OVERALL:
  a) Communication / commitment / Contribution / ()
  Compassion towards patients and Innovation () - 5 Marks
  b) Implementation of newly learnt techniques/skills ()
• Number of cases presented in Clinical Meetings/
  Journal clubs/seminars - 5 marks
• Number of Posters/Papers presented in Conferences/
  Publications and Research Projects - 5 marks
• No. of Medals / Certificates won in the conference /
  Quiz competitions and other academic meetings with details. - 5 marks

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Total 20 Marks
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PG CLINICAL COURSES
VIVA including Competency Assessment - 80 Marks (60 + 20)
Log Book - 20 marks

ASSESSMENT SCHEDULE IS AS FOLLOWS

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<tr>
<th>Year of study</th>
<th>Period</th>
<th>Total Marks</th>
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<td>I year</td>
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9. PUBLICATION IN UNIVERSITY JOURNAL OF MEDICAL SCIENCES
Regarding submission of articles to the University Journal of Medical Sciences for all
the PG Degree/Diploma courses, it is mandatory that the students have to submit atleast
one research paper. Case Reports are not considered as Research Paper

10. THEORY EXAMINATION
Theory examination will comprise 3 papers.
Paper I: Applied Basic Sciences related to Anaesthesia, History of
Anaesthesia and Physics in Anaesthesia
Paper II: Anaesthesiology
Paper III: Anaesthesiology including Critical Care and Recent Advances in Anaesthesia
Question paper pattern: PAPER I, II & III
I. Elaborate on 2 x 15 = 30
II. Write note on 10 x 7 = 70
Total = 100 marks

11. PRACTICAL EXAMINATION
Particulars. Maximum Marks.
Clinical
Long Case 1 X 80 = 80 marks
Short case 2 X 35 = 70 marks
150
OSCE – 5 stations x 5 marks 25
Ward Rounds/Case Scenario - 5 X 5 marks 25
Viva-Voce 80
Log Book 20
Total 300
Minimum for Pass 150

Type of case Duration of case
examination by student
Duration of candidate
examination by
examiner
Marks
**Morning session 200 marks (A)**
Long case - 01 20 min 30 min 80
Short cases - 02 Each 10 min Each 15 min 35 X02 =70
Ward rounds /
Case scenario 05
Each 05 min Each 05 min 05X05= 25
OSCE 05 Each station 05 min --- 05X05= 25

**Afternoon session 100 marks (B)**
VIVA VOCE 04 ------ Each station 15 min 80
Log Book ------- ------- 20

12. Log book
- A detailed log book should be maintained for the entire duration of the course. It should contain the following details.
- Procedures performed
- Journal clubs/Clinical Meetings
- Seminars/CME/Conferences
- Important cases discussed/presented
- The Post Graduates students shall maintain a record (Log) book of the work carried out by them and the training Programme undergone during the period of training.
- Periodic review of Log book have to be done in the Department by guide/HOD once in every 6 months

13. **VIVA including Competency Assessment** :
VIVA including Competency Assessment - 80 Marks (60 + 20)
1. Anaesthesia Machine, Gas cylinders,Equipments, Monitors
2. Drugs, IV fluids, Instruments, Procedure Tray
3. Investigation Charts, ECG, Xray, ABG, Capnograph, Ventilator Graphics, etc..
4. Resuscitation mannequin, Difficult airway mannequin, Defibrillator , Ventilator

14. **OSCE**
Five stations – Five minutes each station 5X5 =25 marks
1. Equipments, monitors, circuits, Vaporiser
2. Flow volume loops/ABG/ Capnographs/ Ventilator graphs /
3. Physiology, History relevant to Anaesthesiology
4. Drug Pharmacology, invasive procedure, Nerve block
5. Communication skill assessment- high risk informed consent, Cancellation/
consent for tracheostomy due to difficult intubation, Delayed recovery, Breaking bad news, etc.

15. REFERENCE BOOKS:
S.no. Name of the book Author
1. A synopsis of Anaesthesia J. Alfred Lee
2. Management of pain J J Bonica
3. Anaesthesia for infants and children R.M Smith
4. A Practice of Anaesthesia Wylic and Churchill Davidson
5. Anaesthesia - Vol.I and II Miller
6. Clinical Anaesthesia Barash
7. Critical Care Joseph Civetta
8. Anaesthesia and neurosurgery Cottrell and Smith
9. Cardiac anaesthesia Kaplan
10. Paediatric anaesthesia Gregory
11. Pharmacology & Physiology in Anaesthetic practice Robert K.Stocling
12. Understanding Anaesthesia Equipment Dorsch and Dorsch
13. Anaesthesia for Co-existing diseases Robert K. Stoleting

** Note : The editions are as applicable and the latest editions shall be the part of the syllabi

16. JOURNALS
S. no Name of Journal
1. Anaesthesiology
2. Anesthesia Analgesia
3. Anaesthesia
4. Anesthesia Intensive Care
5. Canadian Journal of Anaesthesia
6. British Journal of Anaesthesia
7. Indian Journal of Anaesthesia
8. Journal of Anaesthesiology Clinical Pharmacology