Curriculum

DNB Broad Specialty

Anaesthesiology

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I. OBJECTIVES OF THE PROGRAMME

At the end of training a post-graduate in Anaesthesiology should be able to act as a specialist in community, medical teacher and a researcher in Anaesthesiology and in the related field of medicine.

Scope of the Course:

A DNB student after obtaining degree should be able to acquire optimal theoretical knowledge and understanding of the basic anatomical physiological, physical & pharmacological principals involved in the practice of safe anesthesia, ICU care and chronic pain management etc.

i. Examine, evaluate, and optimize the patient for anaesthesia for the proposed surgery.
ii. Identify the anaesthetic problems that require special attention, skill and equipments.
iii. Should know the handling of various noninvasive and invasive monitoring equipments and their data interpretations.
iv. Should possess the knowledge of all anaesthetic equipments, drugs, and their appropriate uses.
v. Acquire skills and proficiency for the conduct of safe anaesthesia for elective and emergency procedures.
vi. Diagnose emergency medical/surgical conditions and institute emergency treatment and administer anaesthesia, if required
vii. Resuscitate and manage critically ill in Intensive Care Unit and postoperative care unit.
viii. Manage acute pain.
ix. Manage chronic pain.
x. Manage palliative care of terminally ill patients.
xi. Manage trauma and mass casualties.
xii. Communicate with patients and relatives, regarding prognosis and possible complications.
xiii. Discharge medico-legal and ethical responsibilities.
xiv. Plan, conduct and write the results of the research in speciality, as well as present the same in scientific forum and journals.
xv. Teach and train undergraduate medical students, nursing students, paramedical and other health professionals.
xvi. Ensure patient safety.

xvii. Perform and demonstrate the technical skills mentioned in the course content.

Every candidate admitted to the training programme shall pursue a regular course of study (on whole time basis) in the concerned recognized institution under the guidance of recognized post graduate teacher for assigned period of the course.

II. TEACHING AND TRAINING ACTIVITIES

The teaching programme should include following components:

Case presentations & discussion	once a week
Seminar	Once a week
Journal club	Once a week
Grand round presentation (by rotation departments & subspecialties)-	once a week
Faculty lecture /Tutorial	once in two weeks (minimum)
Clinical Audit	Once a Month
Additional Teaching & Learning Modalities: • Institutional clinical meetings • CME lectures • Conferences, workshops and updates • Use of teaching and learning aids, including audio-visual techniques • Simulator-based teaching, training and management of various clinical scenario.	
At least one poster and/or one paper presentation during the training period in a recognized state /zonal/national conference with medical council credit hours granted.	
In addition to a thesis dissertation each trainee should have at least one research paper published/ accepted for publication /submitted for publication / at the end of the training period.	

The training program would focus on knowledge, skills and attitudes (behavior), all essential components of education. It is being divided into theoretical, clinical and

practical in all aspects of the delivery of the rehabilitative care, including methodology of research and teaching.

A. **Theoretical:** The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate curriculum.

B. **Symposia:** Trainees would be required to present a minimum of 15 topics based on the curriculum in a period of three years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.

C. **Clinical:** The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.

D. **Bedside:** The trainee would work up cases in the pre-operative period, learn management of cases by discussion with faculty of the department.

E. **Journal Clubs:** This would be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.

F. **Research:** The student would carry out the research project and write a thesis/ dissertation in accordance with NBE guidelines. He/ she would also be given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution so as to learn various aspects of research.

G. Presentation & Publications: The students will be encouraged to at least one poster and/or one oral presentation during the training period in a recognized

conference. One research paper published/ submitted for publication at the end of the training period

III. SYLLABUS

During the course, the candidate should be exposed to the following areas of clinical anaesthesia practice:

- Pre anaesthesia clinic
- Pain clinic
- Recovery and Post anaesthesia care unit (PACU)
- All Surgical specialty theatres- Surgery, Gynae & Obs, Orthopaedics, ENT, Eye
- Surgical super-specialty theatres: Urology, Pediatric Surgery, Burns & Plastic Surgery, Neurosurgery, CTVS, Oral & Maxillofacial surgery, Oncosurgery
- Intensive Care Units
- Dialysis and transplant
- Induced hypotensive techniques
- Day care Anaesthesia
- Anaesthesia outside the OT and in remote locations (like-ECT, Radiology, IVF, Dental, Palliative /Radiotherapy, Endoscopy/ERCP, Orthopaedic reductions in Trauma Centre/ A&E)
- Anaesthesia at high altitude and in difficult terrains
- Robotic surgery (preferable)
- Monitored anaesthesia care/ conscious sedation

The course content shall include the following:

A. 1st Year Theory

- **Anatomy** – Anatomy of the Heart, Coronary Circulation, Lung and Broncho- pulmonary segments. Diaphragm, larynx, upper and lower airway; cranial nerves; relevant anatomy for regional anesthesia. Special anatomical area of interest to the anesthesiologist e.g., Orbit of the eyes, Base of Skull, Vertebral Column, Spinal Cord and meninges, Intercostal Space, Nerves and Nerve Plexuses e.g., Brachial, Coeliac, Superior Hypogastric etc.

- **Physiology** – Pertaining to Anaesthesia.
  Respiratory, Cardiovascular, Central Nervous System, Autonomic Nervous System, Hepatobiliary, Renal and Endocrine System, Pediatric and Geriatric Physiology, Pregnancy, Blood Groups and Blood Transfusion, Muscle and Neuro Muscular Junction, Regulation of temperature & Metabolism, Stress response, Acid-Base Homeostasis, Fluid and Electrolytes

- **Biochemistry–**
  i. Biochemistry relevant to fluid balance & blood transfusion, artificial blood and perioperative fluid therapy.
  ii. Acid base homeostasis in health and diseases.
  iii. Interpretation of blood gases, electrolytes and other relevant biochemical values. Various function tests related to systems e.g. LFT, KFT and basics of measurement techniques.

- **Medical physics as applied to practice of Anaesthesiology**

  i. Anaesthesia workstation / machine – checking the machine and assembly of necessary items.
  ii. Airway Management equipments including Tracheostomy – Anaesthesia face masks, different types of laryngoscopes like Macintosh, McCoy etc., supraglottic airway devices (SGAD) like LMA, I GEL, PLMA, Aura gain etc, video laryngoscopes like C-MAC, Airtraq, Kingvisionetc, Flexible intubating laryngoscopes, adjuncts like stylets, bougies, airway exchangers, equipments for cricothyroidomy and percutaneous tracheostomy, self inflating bag (AMBU bag).
  iii. Breathing system continuous flow systems, draw over system - Assembly and checking, vaporizers, Gas laws.
  iv. Monitoring in Anesthesia with concepts of minimal monitoring.
  v. HR, ECG, NIBP, EtCO2, SpO2, Temp, RR, NM Monitoring, BIS, IBP, CVP, PAP, Agent Gas Monitoring, Anaesthesia machine ventilator monitoring, scavenging system, Negative / neutral/ positive pressure Operation Theatres
  vi. Safety in Anesthesia equipments.
  vii. Medical gases – storage and central pipeline system, Cylinders, liquid oxygen, pipleline, guage and pressures.
  viii. Air Conditioning in OR
  ix. Laminar Flow
  x. HFNC / HFOT/ Jet Ventilation

xi. Suction- Central/ Portable/ Foot suction
xii. Principles of electro cautery & diathermy
xiii. Defibrillator / AED

- **Pharmacology– including but not limited to**
  i. General pharmacological principles.
  ii. Concepts of pharmacokinetics and pharmacodynamics of various Drugs used during Anaesthesia and relevant to Anaesthesia practice.
  iii. Uptake and distribution of inhaled anesthetics agents.
  iv. Intravenous anaesthesia agents
  v. Opioids and non-opiod analgesics
  vi. Neuro Muscular Blockers, anti-cholineesterase agents,
  vii. Anti- sialogogue agents, anticholinergic agents
  viii. Drugs used in common medical disorder like HT& IHD, Asthma,DM, Thyroid disorders, etc.
  ix. Emergency drugs, e.g. Adrenaline, Atropine, Inotropes, Diuretics, Anti arrhythmic drugs, alpha & beta agonists / antagonists, etc.
  x. Antacids and Anti emetic agents, Prokinetics
  xi. Benzodiadepines, sedatives and hypnotics
  xii. Concept of TIVA/ conscious sedation
  xiii. Drugs affecting coagulation- pro and anti coagulants
  xiv. Local anaesthetics, including toxicity, intralipid
  xv. Drugs acting on autonomic nervous system
  xvi. Use of steroids in anaesthesia and ICU
  xvii. Malignant hyperthermia and dantrolene
  xviii. Immuno modulators/ immunosuppressants
  xix. Drug interaction in Anesthesiology.
  xx. Obstetric Drugs- oxytocin, methergin, etc
  xxi. Drugs used in Neurosurgery: Mannitol, anticonvulsants, steroids, etc.

- **Anaesthesiology:**

  General Aspects
  i. History of anaesthesia with specific reference to Indian scenario
  ii. Role of anaesthesiologists in wider perspective
  iii. Introduction to the operation theatre, recovery rooms (concepts of PACU), ICU, Pain clinic, Pre-anesthetic check-up (PAC)room

iv. Preoperative assessments and pre-medication –general principles.
v. Introduction to anatomical, physiological, pharmacological and biochemical aspects of pain and pain management both Acute and Chronic
vi. General principles of Prevention of Hospital Acquired infection to Health care workers and communicable diseases
vii. Theoretical background of the commonly used anesthetic techniques of general and regional anesthesia viz.
viii. GA –Intravenous, Inhalational, Endotracheal etc, using spontaneous and controlled mode of ventilation.
ix. RA –Spinal, epidural, CSE and Nerve block
x. MAC (Monitored Anaesthesia Care)

Medicine related to:

i. Cardiovascular System.
ii. Respiratory System.
iii. Hepatobiliary System.
iv. Genitourinary System.
v. Endocrine system,
vi. Obstetrics
vii. Nervous System

- **Documentation, aspects of medico-legal care, informed consent and record keeping**
  i. Documentation and medico–legal aspects of anaesthesia.
  ii. Emphasize the importance of accurate documentation.
  iii. Details of consent- informed, written, recorded, local language, witnessed Adult patient, unknown patient, pediatric patient, etc

- Introduction to research methodology, Randomized Controlled trials etc. Basics of biostatistics.

- **Resuscitation**
  i. Cardiopulmonary Resuscitation; both BCLS/ BLS & CCLS/ ACLS,
  ii. Theories of cardiac pump, thoracic pump
  iii. Recent Advances/ Guidelines
  iv. Defibrillation & AED

v. Resuscitation & ICU management of a patient with overdose of drugs/ poisoning/ snake bite/ management of unconscious patients, severely injured / polytrauma patient.
vi. Neonatal Resuscitation
vii. Obstetric Resuscitation.

- **Critical Care**

General ICU Care

i. Introduction to artificial ventilation
ii. General nursing care of a patient in ICU
iii. Care of patient on mechanical ventilator.
iv. Oxygen therapy- Ventimask, Non Rebreathing Mask, HFNC/ HFOT, etc
v. Basic Modes of ventilation: NIV & Invasive
vi. Ventilatory strategies in different medical & surgical conditions
vii. Weaning & Extubation
viii. Nutrition & Alimentation: enteral & parentral, etc
ix. Fluids & Electrolytes
x. Antibiotics
xi. Sedation, analgesia & role of NM Blockers in ICU
xii. Biochemical, Hematological Investigations and monitoring
xiii. VAP, Nosocomial infections
xiv. Breaking the bad news
xv. Counseling
xvi. End of Life care
xvii. Organ donation- counseling, medico legal issues, certification of brain death, anaesthesia for organ donation
xviii. PCT & Care of tracheostomy

- **Recovery from anaesthesia**
  i. Causes of delayed recovery
  ii. Management of Delayed Recovery and prolonged unconsciousness.
  iii. Recovery criteria for Day Care Procedures

- **Shock – pathophysiology, clinical diagnosis and management**

- **Pulmonary function tests – Principles and application.**
  i. Bedside PFT

ii. Lab PFT- interpretation and clinical correlation and treatment modification

- **Effects of positioning on the OT table and ICU bed.**
    i. Different positions, adverse effects & prevention
    ii. Diathermy burns

- Principles of USG in anaesthesia practice:
- Regional anaesthesia
- ICU- FAST, Lungs, Heart, Vessel, etc
- Vascular access
- Airway management
- PCPNDT Act requirements and regulations
- Type of Probes
- Physics of equipment used in anaesthesia.
- Medical gases –gas plant, central pipeline, scavenging system.
- Pressure Reducing valves.
- Anesthesia machine,
- Humidifiers.
- Flowmeters
- Safety measures related to anesthesia equipments

B. 2nd Year Theory

- Applied anatomy of each system.
- Vaporizers –characteristics and functional specifications.
- Breathing systems / anaesthesia circuits -Assembly, functional analysis, flow.
- Requirements of APL and flow directional valves.
- Minimum monitoring standards.
- Sterilization of equipment
- Computers, Utility, Computer assisted learning and data storage. Computerized anaesthesia records.
- Pharmacology of drugs used in cardiovascular, respiratory, endocrine, renal diseases and CNS disorders.
- Principles of monitoring equipment used for assessment of:
    i. Cardiac function viz. Rhythm, pulse, venous and arterial pressures, and cardiac output.
    ii. Temperature.

iii. Respiratory function viz. Rate, volumes, compliances, resistance, blood gases.
iv. Intracranial pressure, depth of anesthesia and
v. Neuromuscular block.

- Working principles of ventilators.
- Special anaesthesia techniques as relevant to outpatient anaesthesia, hypotensive anaesthesia, anaesthesia in abnormal environments and calamitous situations.
- Anaesthetic management in special situations – Emergency, ENT, Ophthalmology, Obstetric, Obstetrics analgesia, Plastic, Dental, Radio- diagnosis and Radio therapeutic procedures and patients with systemic diseases.
- Training in research methodology and Medical statistics with special relevance to data collection, analysis, comparison and estimation of significance.

i. Principles of pediatric anaesthesia. Management of neonatal surgical emergencies, RA in infants. Pediatrics – Prematurity, Physiology, anatomy of neonate in comparison with adult.
ii. Associated Medical disorders in surgical patient – Anaesthetic implications and management.
iii. Basics of orthopedic anaesthesia.
iv. Day care anaesthesia.
v. Rural anaesthesia – anaesthesia for camp surgery.
vi. Anaesthesia for otorhinolaryngology with special emphasis on difficult airway management.
vii. Blood and blood component therapy.
viii. Anaesthetic implications on coagulation disorders. Role of TEG/ ROTEM
ix. Massive blood transfusion, Autologous blood transfusion techniques
x. Maintenance of haemostasis and fluid and fluid management
xi. Monitored anaesthesia care (MAC).
xii. Recovery from Anaesthesia: Management of Delayed Recovery and prolonged unconsciousness.
xiii. Anaesthetic implications in diabetes mellitus, thyroid and parathyroid disorders. Phaeochromocytoma, cushings disease, etc.
xiv. Management of acid base disorders.
xv. Principles of geriatric anaesthesia.
xvi. Role of anesthesiologist in a Pandemic
xvii. Extended universal precautions in infectious diseases (special reference to COVID 19)
xviii. Anaesthesia outside the OR and in special situations.

xix. Principles of management in Trauma and mass casualties.
xx. Basics and principles of ICU
xxi. Design and functional Utility of Operation Theatre and ICUs
xxii. Application of USG in Anaesthesia Practice

Principles of Regional Anaesthesia

Central Neuraxial Blockade (CNB)

- Spinal anaesthesia: all approaches: Midline, paramedian, Lumbo sacral
- Epidural anaesthesia & Analgesia: Interlaminar, Caudal, Thoracic, parasaggital
- Combined Spinal & Epidural Anaesthesia & Analgesia
- Brachial plexus block-all approaches
- Superficial and Deep Cervical plexus block
- Awake craniotomy blocks
- Awake Intubation Blocks
- Stellate Ganglion Blocks
- Intercostal Blocks
- PEC I & II Block
- Paravertebral block
- Erector Spinae block
- Quadratus Lumborum block
- Celiac Plexus block
- Lumbar Sympathetic block
- Sup & Inf Hypogastric Plexus Block
- Sciatic nerve block- all approaches
- 3-in 1 block
- TAP Block: all approaches
- Ilio-inguinal & ilio hypogastric block
- Rectus sheath block
- Field Block
- Surface anaesthesia
- Use of adjuvants with local anaesthetics
- Complications & Side Effects and mamnagement
- Conversion from RA to GA
- Requirements of the set up for administering RA
- Role of Nerve Stimulator and USG

- IVRA: Lower & Upper Limb

C. 3rd Year Theory

- Anaesthesia for patients with cardiac, respiratory, renal, hepatobiliary, endocrine disorders posted for surgery.
- Principle of one lung anaesthesia
- Principles of anaesthetic management of neuro/cardiac/thoracic/vascular
- /urology / transplantation/ burn and plastic surgery.
- Principles of anaesthetic management of surgery in neonatal, paediatric, Obstetric, geriatric patients.
- Principles of Anaesthesia for Bariatric surgery
- Management of patients in shock, renal failure, critically ill and / or on ventilator.
- Management of patients for cardiac surgery / CPB beating heart surgery.
- Principles of neonatal ventilation and critical care.
- Chronic pain therapy and therapeutic nerve blocks.
- Selection and maintenance and sterilization of anaesthesia and related equipment.
- Principles of human resources and material management.
- General principles of medical audit.

Anaesthesia Non-Technical Skills

- Orders and prioritize appropriate investigations
- Biostatistics, Research Methodology and Clinical Epidemiology
- Medico legal aspects relevant to the discipline
- Health Policy issues as may be applicable to the discipline
- Medical Ethics &Communication Skills:
    i. Principles of informed consent
    ii. Principles of crisis management, conflict resolution, negotiation and debriefing
    iii. Understand nonverbal communication with critically ill patients
    iv. Principles of delivering bad news to patients and families
    v. Strategies to communicate complicated critical care issues to the general population

IV. COMPETENCIES

A. Attitude Development :

The student should develop attitudes that lead to:

- Life- long learning and updating.
- Sympathetic communication with relatives.
- Sympathetic communication with patients.
- Appropriate communication with colleagues to function in a group in OR/ ICU.
- Become teacher for Technicians, Nurses, Paramedic Staff and undergraduates.
- Ability to discuss, Participate in case discussion and scientific presentations.
- Ability to function as a leader in the operating room / ICU.
- Ability to cope up with stress, eg long working hours, night rosters and grave emergency situation.
- Decision making abilities

B. Skill Development:

Requirement of practical training by Junior Resident (3 years training course)

- Plan and conduct anaesthesia, recovery and postoperative pain relief for elective and emergency surgery related to all surgical specialties.
- Carry out basic life support (BCLS/BLS) and advanced life support (CCLS/ALS) and train medical and emergency staff in BCLS/BLS and CCLS/ALS.
- Manage unconscious patients: Airway management and long term management of unconscious patient.
- Manage patients admitted to an intensive care unit.
- Manage patients suffering from chronic intractable pain.
- Organize the Hospital environment to manage mass casualty situations.
- Critically review and acquire relevant knowledge from the journals about the new development in the specialty.

  Should be able to participate in anaesthesia audit.

Major stress is on practical training. The Goals of postings i.e. both the general goals and of the specific sub specialty postings will be fulfilled by rotating and Junior Resident in various operating theaters, Intensive Care, Pain Clinic, Emergency Room (Casualty), Emergency / Distress calls in wards, out- patient department and peripheral anesthesia facilities. The recommended period of stay in each area is as follows:

Department/Area of Rotation	Duration of Posting
General Surgery#	06 months
Urology	02 month
Eye	01 month
ENT#	02 months
Dental/Faciomaxillary Surgery	01 month
Orthopedic / Trauma / Emergency Medicine #	05 months
Gynecology#	03 months
Obstetrics/ Labour Room#	03 months
Pediatrics Surgery	02 months
Burns /Plastic Surgery	01month
CTVS, Cardiac CATH lab	01 month
Neurosurgery	02 months
ICU	04 months
Pain Clinic#	01 month
Recovery area (PACU)	01 month
Peripheral Theatre / Family Planning OT, / Radiology, Radiotherapy, ECT	01 month

* A copy of MOU should be submitted with other NBE accredited institute/hospital or medical college where DNB trainees are posted for any of the above rotations, if the same is not feasible within the institute/hospital.

Core areas which needs to available in-house and cannot be fulfilled through externship.

The student is instructed for preoperative preparation of the patients and discussion of the intra-operative problems of cases being conducted on the day. During these postings the students initially observe and then perform various procedures and conduct the anesthetic procedure as listed. Each procedure observed and performed will be listed in the logbook, which is signed by attending faculty.
The trainee will undergo a graded training in the following manner:

i. **Orientation-**

At the beginning of three years training, each student should be given an orientation to the hospital operation theatre, intensive care and pain clinic, and subject of

anaesthesia. The candidates are assigned thesis guides so as to help them prepare protocols.

Introductory lectures are aimed to familiarize the student with the:

- Basic anaesthesia delivery equipment, monitors and important principles of physics that govern the function of these equipments.
- Intravenous Anaesthesia drugs and Inhalation agents, NMB's
- Patient evaluation, pre-anaesthetic assessment, interpretation of laboratory investigation as applied to the care of the patients planning and conduct of general anaesthesia and postoperative care and conduct of spinal and epidural anaesthesia.
- Students are taught basic and advanced cardiac life support.
- The students are familiarized about the principle of the sterilization and universal precautions.
- The students are encouraged and taught to search literature to be able to write a thesis protocol.

ii. 1st year Objectives:

The first year resident is taught to have expertise in the management of ASA I and II cases. To start with, they observe and slowly become independent in giving general anesthesia and spinal anesthesia to ASA I & II cases for minor and major surgery, under graded supervision. They are posted to the following specialties during the first year: Gynecology, General surgery, Orthopedic, ENT, Recovery room and Urology.

iii. 2nd year Objectives:

The students are taught to give general anaesthesia / regional anaesthesia to ASA I, II, III & IV under supervision. They should be able extradural block (EDB), spinal block and peripheral nerve blocks under supervision. Should learn pediatrics and trauma life supports and maintain skills for basic and advanced cardiac life support. They are posted in the following specialties Obstetrics, Dental Surgery, Eye, ICU, Pain Clinic and Peripheral Theatres.

The student should be able to analyze data and write a thesis. They should be able to present scientific data.

iv. 3rd year Objectives:

The student should be able to plan and administer anaesthesia to all patients under graded supervision including patients for Cardiac surgery, Neurosurgery, and Pediatric Surgery and for all major surgeries. The aim at the end is to be competent and independent soon after the third year of junior residency in providing anesthesia

to elective and emergency cases. They should also know how to organize mass casualty.

V. Log Book

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant.

This log book shall be made available to the board of examiners for their perusal at the time of the final examination. The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s). The candidate will maintain the record of all academic activities undertaken by him/her in log book.

- Personal profile of the candidate
- Educational qualification/Professional data
- Record of case histories
- Procedures learnt
- Record of case Demonstration/Presentations
- 6. Every candidate, at the time of the practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
- In the absence of production of a log book, the result will not be declared

Minimum Procedures / Cases to be entered in Log Book

1. Regional

Subarachnoid(SAB)	= 100 SAB (Perform)
Lumbar/thoracic epidural (Perform)	=50 including single shot / continuous
Caudal epidural block	= 30 (Perform)
CSE	= 30 (Perform)
Sciatic / Femoral nerve blocks	= 5 + 5 (Perform)
Bier block	=5 (Perform)
Ankle block	=5 (Perform)
Stellate Ganglion	= 5 (observe)

Brachial Plexus (all approaches)	= 5 (observe) 30((Perform)
Coeliac Plexus Block	= 3 (observe)
Trigger Point Injection	=5 (Perform)
Other peripheral N.Block	=10 (Perform)
Ophthalmic Blocks	= 5 (observe)
Field Block	=5 (Perform)
Blocks for Awake intubation	=15 Observe, 5 Perform
Awake Craniotomy	= 3 (observe)

2. Anaesthesia for:

Open Heart on Pump	= 10(observe / assist)
Off Pump Surgery	= 10(observe / assist)
Closed Cardiac Surgery	= 10(observe / assist)
Craniotomy	= 10(observe / assist)
Spine Surgery	= 10(observe / assist)
Joint replacement	= 10(observe / assist)

3. Procedures:

Internal Jugular Cannulation	= 10(Perform)+10 (observe)
External Jugular Cannulation	=10 (perform)
Subclavian Vein Cannulattion	= 10(Perform)+10(observe)
Peripheral Central Line	=10 (perform)
Arterial Line Cannulation	=10(Perform)+10(observe)
PA Catheter	= 5 (observe/ assist)

4. Conduct of Cases:

ASA I	= 100 Perform under supervision
ASAII	= 50 Perform under supervision
ASAIII	= 30 Assist /Perform under supervision
ASAIV	= 10 Assist / Perform under supervision
Labour Analgesia	= 10(observation/ Assist/ perform)
Organ Transplant	= 5 (observation)
Ext. Cardiac compression	= 15
Cardiac defibrillation	= 15
O2 failure drill	=10
Cardiac arrest drill	= 5
Mass casualty drill	= 1
Difficult Airway Drill	= 20

PCT
ICD
ICU CARE

5. Other Procedures

Detailed Curriculum for Postings

- **Objectives:**
  - **i. Learn to perform preoperative evaluation**

    - Learn to collect and synthesize preoperative data and to develop a rational strategy for the perioperative care of the patient.
    - Learn a thorough and systematic approach to preoperative evaluation of patients with systemic diseases. Perform preoperative medical evaluations of patients undergoing many different types of operations, both of inpatients and outpatients but especially elderly patients with complex medical illnesses such as alcoholism, chronic obstructive pulmonary diseases, congestive heart failure, coronary artery disease, hepatic failure, hypertension, myocardial infarction, renal failure, and stroke.
    - Learn to prioritize problems and to present cases clearly and systematically to attending consultants.
    - Develop working relationships with consultants in other specialties to assist in preoperative evaluation. Learn to get a good consultation.
    - Learn to interact with preoperative patients and develop effective counseling techniques for different anesthetic techniques and preoperative procedures.
    - Learn to assess and explain risk of procedure and take informed consent.

  - **ii. Learn anesthetic techniques &skills:**

    - Understand operation of different equipment used by anaesthesiologists; develop optimum plans depending on patients' condition.
    - Know the special considerations and techniques required to anesthetize patient in location inside and outside of the operating room, for example, the Cardiac Catheterization laboratory, Electroconvulsive Therapy, Genitourinary Clinic, Magnetic Resonance Imager, Radiology & Radiotherapy.

- Perform the anaesthesia machine check and prepare basic equipment necessary for all anaesthetic cases.
- Prepare drug table: select appropriate drugs for a case and develop a good system for arranging the drug and worktables.
- Place standard monitors, for example, electrocardiogram, noninvasive blood pressure device, precordial stethoscope, neuromuscular blockade monitor, pulse oximeter and capnograph.
- Learn proper techniques of preoxygenation.
- Learn how to induce anaesthesia, both routine induction and rapid sequence induction, and the pertinent mechanical skills and choice of drugs.
- Perform airway management by knowing various procedures and equipment:
- They should know how to use/ do
- Orophayngeal/ nasopharyngeal airway.
- Direct laryngoscopy using curve and straight blade.
- Laryngeal mask airway (classic LMA, ILMA, Proseal LMA, flexible LMA, Ambu Aura masks
- Combitube or Laryngeal Tube Insertion
- Provide positive pressure ventilation with self inflating bag.
- Flexible intubating techniques
- Light wand techniques
- Blind techniques

Failed Intubation or difficult airway algorithms:

- All techniques for endotracheal intubation
- Additional techniques such as retrograde wire intubation and surgical cricothyroidotomy, both of which will be learned on a mannequin.

Awake Intubation

- Topical / Local anesthesia for airway.
- Airway nerve blocks, e.g., superior laryngeal nerve and glossopharyngeal nerve block.

Learn anesthesia maintenance: appropriate choice and use of anesthetic drugs and adjuvant drugs such as muscle relaxants.

- Assessment of anesthesia depth.
- Assessment of volume status.
- Replacement of intraoperative fluid losses.
- Appropriate use of blood and blood products.

Effect of different types of surgical procedures on anesthetic management, e.g., effects of aortic cross-clamping.

Appropriate use of intraoperative laboratory tests blood gas coagulation tests etc.Become skilled in catheterizing or cannulating the following vessels for sampling blood, measuring concentrations or pressures, or administering drugs or fluids.

- Veins: all ages and all sizes
- Arteries: radial and other sites.
- Central vessels: internal jugular, subclavain, external jugular, femoral vein and "long arm" routes.

Become skilled in using and interpreting the following routine noninvasive and invasive monitors intra-operatively.

- Electrocardiogram with ST segment analysis
- Noninvasive blood pressure
- Capnograph: value and changes in value and waveform
- Pulse oximetry: values and changes in values
- Neuromuscular blockade monitor
- Invasive arterial pressure: waveform and changes in the wave form
- Central venous pressure: value and wave form
- Pulmonary artery pressure: values and waveforms, Pulmonary capillary wedge (PCW) tracing.
- Cardiac output monitoring.
- Mixed venous oxygen saturation monitoring
- Evoked potential monitoring: Somatosensory, motor, Brain stem, Auditory and visual.
- Transesophageal echocardiography: basic understanding.
- Temperature monitoring

Become skilled in techniques for regional anesthesia

- Brachial plexus blockade: interscalene, supraclavicular, axillary, infraclavicular, techniques with and without nerve stimulator for ocalization with ultrasound guidance.
- Spinal anesthesia (including continuous spinal where appropriate)
- Epidural anesthesia: lumber, caudal and thoracic
- Lower extremity blockade: femoral, sciatic, lateral femoral cutaneous nerve, post tibial and popliteal nerves
- Upper extremity blockade: ulnar, median, and radial nerves
- Bier's block
- Cervical plexus block: superficial and deep cervical plexus

Become skilled in discontinuing anesthesia and monitoring emergence from anesthesia

- Reversal of neuromuscular blockade
- Determination of appropriate time for extubation
- Monitoring of airway function during and after emergence

Become familiar with skills in peri-operative pain management

- Postoperative epidural infusion (opiates. Local anaesthesia)
- Postoperative
- Patient – controlled analgesia(PCA)
- Adjunctive nerve blockade

Become skilled in use of techniques for conscious sedation and monitored anaesthesia care

- Selection of patient for conscious sedation
- Selection of drugs for use in conscious sedation
- Monitoring techniques helpful in controlling depth of sedation
- Recognition of when conscious sedation has become unconscious sedation

Know how to successfully resuscitate, and develop skills of Basic Life Support (BCLS/BLS) and Advance Cardiac Life Support (CCLS/ACLS)

Work with other members of the OR team, including surgeons and nurses, to optimally care for surgical patients, especially develop communications skill.

iii. Anaesthesia Outside Operating Room / Non Operating Room Anaesthesia (Nora)

- Radiology and interventional neuroradiology: know special anesthetic considerations in these settings:
    a. Dye allergies/Anaphylaxis
    b. Embolization
    c. Examination for magnetic resonance imaging(MRI)
- Monitoring in CATH Lab
- Equipment options in the MRI suite
- General anesthetic / sedation techniques
- Radiotherapy
- CT Scan and Radiological Procedure
    a. Electroconvulsive Shock Therapy(ECT)
    b. Preoperative
    c. Anesthetic techniques and drug effects on seizure duration
    d. Hemodynamic responses and appropriate treatment

iv. Evaluation to Determine Goal Achievement

- The resident will be evaluated at the end of every 3 months by all attending consultants who worked with them. The attending physicians complete a Departmental Resident Evaluation Form, which is reviewed by the Clinical Competence Committee. Inform them of any problems identified. The serious problem will be discussed with them immediately after they occur.
- Residents will complete a log book. After each posting it will be checked and signed by the faculty concerned.

VI. Trauma and Resuscitation

All residents must achieve basic and advanced cardiac life support, advanced trauma life support, and pediatric life support training. Training in Basic and Advanced Life support by a certified body should be mandatory. They should start with the training of Airway breathing circulation (ABC) training and master the skills repeatedly and then proceed to advanced cardiac life support.

1. Goals of Trauma / Traumatised Patient and Disaster Management

- Acquire improved ability to evaluate & triage the patient and formulate anaesthetic plans, especially in the trauma patient
- Acquire ability to administer operative anaesthesia safely and rapidly
- Acquire ability to identify, prevent and care for postoperative complications.

2. Objectives

- Manage anesthesia for severely traumatized patients by doing the following as rapidly as possible
  - **i.** Evaluation
  - ii. Placement of intravascular catheters
  - iii. Airway intubation
  - iv. Choose among anesthetic options, induce and maintain anesthesia safely
- Perform a thorough preoperative evaluation and documentation

3. Post Anaesthesia Care Unit (PACU)

Goals:

Understand the importance, purpose and components of the anesthesia record and the report from the anaesthetizing anesthesiologist. Use information about the patient that is received and observed on admission to the PACU and during c the stay for the following purposes:

i. To create a care plan
ii. To score the patient's condition according to scoring system
iii. To assess the patient's recovery and condition for a safe discharge or transfer

Observe, recognize and learn to treat the most commonly occurring problems likely to arise in the Post Anesthesia Care Unit (PACU). Understand the parameters patients must meet for safe discharge from the PACU to the following:

i. Home
ii. Inpatient Ward
iii. Intensive care Unit

Detection of Hypoxemia and Oxygen therapy should be learned in this posting. Students should be able to recognize:

i. Airway integrity and compromise
ii. Arrhythmia
iii. Hypertension
iv. Hypotension
v. Pain prevention and relief
vi. Nausea and vomiting
vii. Decreased urine output
viii. Emergence delirium
ix. Delayed emergence from anaesthesia
x. Maintenance of body temperature
xi. Post obstructive pulmonary edema
xii. Hypoxia
xiii. Hypercarbia

Evaluation to Determine Goal Achievement (End of posting- Summative)

4. **<u>Intensive Care Unit (ICU)</u>**

- **Goal**
  i. Understand the spectrum of critical illnesses requiring admission to ICU recognize the critically ill patient who needs intensive postoperative care from the patient who does not require such are
  ii. Principles of Managing Critically Ill Patients

- **Airway**
  i. Recognize, and manage airway obstruction. Care of Tracheotomy

- **Cardiovascular**
    i. Recognition and management of shock (all forms), Cardiac arrhythmias, cardiogenic pulmonary edema, Acute cardiomyopathies, Hypertensive emergencies and Myocardial infarction.

- **Respiratory**
    i. Recognition and management of acute and chronic respiratory failure, status asthmaticus, smoke inhalation and airway burns, upper airway obstruction, including foreign bodies and infection, near drowning, adult respiratory distress syndrome. Use of Pulmonary function tests including bedside Spirometry.

- **Renal**
    i. Recognition and acute management of fluid and electrolyte disturbances. Students should be able to prescribe fluids in Renal failure and Acid-basis disorders and should be able to prescribe drugs based on principles of drug dosing in renal failure. They should know when to use Dialysis / hemofiltration.

- **Central Nervous System (CNS)**
    i. Recognition and acute management of Coma, Drug overdose. Know Glasgow coma scale (GCS)

- **Metabolic and Endocrine**
    i. Emergencies like Diabetic ketoacidosis Hypo adrenal crisis, pheochromocytoma, Thyroid storm, myxedema coma

- **Infectious Diseases**
    i. Recognition and acute management of Hospital acquired and opportunistic infections, including acquired immunodeficiency syndrome.
    ii. Students should know how to protect against cross infection risks to healthcare workers.

- **Hematological Disorders**
    i. Recognition and acute management of defects in hemostasis& hemolytic disorders

ii. Should be able to prescribe component therapy based on the result of coagulation profile in thrombotic disorders

iii. To diagnose Deep Vein thrombosis and know principle of Anticoagulation and fibrinolytic therapy. Know the indication of plasmapheresis for acute disorders, including neurologic and hematologic disease.

- **Gastrointestinal Disorders**
  i. To recognize and manage gastrointestinal bleeding (prescribe prophylaxis against stress ulcer bleeding)
  ii. Hepatic failure

To do the following (ideally) at the end of the posting:

- Radial arterial catheters and other sites as necessary
- Central venous catheters
  i. Subclavian route
  ii. Internal or external jugular route Pulmonary artery (PA) catheters (observe only)

- Understand and interpret the following PA catheters variables, initiate appropriate therapy in response to change in them:

i. PA waveform
  - Normal
  - Pathologic
  - PA wedge

ii. Mixed venous oxygen saturation

iii. Right ventricular ejection fraction

iv. Thermodilution Cardiac output
  - Technological basis for cardiac output measurement
  - Factors producing errors in cardiac output measurements

- Manage cardiovascular instability
  i. Know different fluid therapy option and when to use them
  ii. Know the different inotropic drugs and when to use them
  iii. Know how to use invasive monitoring devices to guide therapeutic use of fluids and inotropic drugs

- Manage respiratory failure and postoperative pulmonary complications
    i. Know how to use arterial blood gas and ventilatory variables to evaluate postoperative patients with respiratory failure.
    ii. Understand the operation of mechanical ventilators including different ventilatory modalities and how each is best used for management of respiratory failure and noninvasive including modes complications and mode of weaning.
    iii. Principles and applications of oxygen therapy.

- Pathophysiology and clinical manifestation of septicemia and its treatment
    i. Recognize sepsis in the postoperative patient including all the typical homodynamic findings.
    ii. Know the appropriate tests to diagnose sepsis.
    iii. Use various monitoring devices to assist in managing sepsis; specifically understand the optimization of oxygen delivery to tissues in the septic patient and the appropriate management of fluids and vasopressors to accomplish these goals.
    iv. Know the different classes of antibiotics and antifungal agents and their use in treating sepsis.

- Deliver appropriate nutritional support
    i. Learn about the use of enteral nutrition in the patient who cannot tolerate input peroral.
    ii. Learn about the use of parental nutrition in the critically ill surgical / medicine patient.
    iii. Interact with nutrition support services in planning nutrition for the critically ill patient.

- Provide effective pain management and sedation postoperatively
    i. Learn the appropriate use of pain management modalities in the ICU including:
        - Patient controlled analgesia(PCA)
        - Epidural and sub-arachnoid narcotics
    ii. Learn use of sedative / hypnotic drugs in the ICU for a patient on ventilator.

- **Monitoring and Biostatistics:** Should be able to use prognostic indices such as acute physiology and chronic health evaluation (APACHE), therapeutic intervention scoring system (TISS) and know the concept of audit.

- **Ethical and legal aspects of critical care:** Know the legal importance of informed consents, Do not resuscitate orders; (DNAR) withdrawing of therapy: Brain dead: consent for organ retrieval explain / prepare.

- **Psychosocial issues:**
  i. Classes on Communication Skills
     a. Student should be able to communicate with distressed relatives
     b. Student should be able to give the correct picture of a critical patient, but with compassion in view of critical nature of the illness
     c. Student should be able to Transport a critically ill patient/ resuscitate patient with acute traumatic injury.

5. <u>Cardiovascular Anaesthesia</u>

Goals:

- Understand cardiac physiology, develop knowledge of cardiovascular anesthesia (anaesthesia for the patient with cardiovascular disease), Choose appropriate anaesthetic techniques for patients with different types of cardiovascular disease and skills for lifelong continuing education.
- Develop technical and monitoring skills necessary for cardiovascular anaesthesia,
- Administer anaesthesia for a wide variety of cardiothoracic cases and develop interest in further learning.
- Perform a thorough preoperative assessment of the patient undergoing cardiovascular surgery.
- Know intraoperative anesthetic management for the patient undergoing cardiopulmonary bypass. Know how cardiopulmonary bypass is instituted and discontinued. Understand cardiopulmonary bypass and discuss the mechanical aspects of it as follows:
  i. Different types of pumps – pulsatile and non-pulsatile
  ii. Physiology of hypothermia, cardiac and cerebral protection
  iii. Effects of bypass on volumes of distribution and clearness of anesthetic drugs and anesthetic maintenance, including amnesia
- Know how and why to use inotropic support, vasodilators and antiarrhythmic drugs that may be necessary before but are especially necessary after cardiopulmonary bypass.

- Pathophysiology of HT, Drug therapy, anaesthetic implication and perioperative management of Hypertensive patient coming for surgery
- IHD – MI Pathophysiology, drug therapy, anesthetic implication and management in patient coming for surgery
- Develop understanding of the major issue involved in the preoperative care of the child with congenital heart disease.
- Pacemaker in anaesthesia
- Insert vascular catheters or cannulas for adult and pediatric patients. Observe / know about a Transesophageal echocardiography (TEE) probe and interpret TEE image.
- Manage care during cardiac surgery as follows:
    i. Blood replacement
    ii. Monitoring the effect of heparin and its reversal
    iii. Post cardio-pulmonary bypass coagulopathy

Rationale for various therapies such as aprotinin designed to prevent coagulopathy.

- Know following procedures and anaesthetic implications:
    i. Aortic repairs
    ii. Congenital repairs – pediatric
    iii. Coronary artery bypass grafting and valves – adults
    iv. Thoracic surgery and vascular surgery
- Work as a team member with fellow anaesthesiologists, surgeons, perfusionists and nurses
- Evaluation to Determine Goal Achievement

6. Neuro - Anaesthesia

A. Goals

- Administer anaesthesia safely to patients with neurosurgical disease who are undergoing neurological or non-neurological surgery, diagnostic procedures requiring anaesthesia or nonsurgical interventions requiring anaesthesia.
- Understand the basic concepts of central nervous system (CNS) physiology as they relate to neuro-anaesthesia specifically autoregulation of cerebral blood flow, blood flow response to CO2, blood flow response to cerebral oxygen (CMRO2) and glucose (CMRglu) metabolic rates and cerebrospinal fluid physiology.
- Know the effect (s) of commonly used anesthetic agents and adjuvant agents, for example antihypertensive on cerebral physiology.

- Understand the anaesthetic implication of the most common neurosurgical procedures including complications likely to occur during neurosurgery that will affect anaesthetic management.
- Understand the basic concepts behind electrophysiologic monitoring of the brain and spinal cord.
- Understand how concurrent medical illnesses affect anaesthesia during neurologic surgery.
- Cerebral Neuroprotection strategies for Cerebral Resuscitation

B. Objectives

Review the medical history and physical examination of patients; assess their major neurosurgical problem. Evaluate the patients' Glasgow Coma scale score as well as other medical problems that may affect anesthetic care; and know what information about nervous system function and pathology are important to be anaesthesiologist

- Recognize both the adult and pediatric patient with increased intracranial pressure (ICP)
- Methods of Neuro-protection techniques
- Knows the general principle of neuroanaesthesia and spinal surgery including stereotactic surgeries and neurosurgical procedures
- Airway management of patient with unstable cervical spine and Monitoring during neuroanaesthesia
- Detect and treat air embolism during neurosurgery:
    i. Know use of monitors to detect air embolism and what monitoring patterns are associated with air embolism.
    ii. Recognize the relative risks of different procedures and positions for air embolism
- Know general principles of positioning the patient for neurologic surgery and the advantages and disadvantages of each position
- Understand the basic indications and techniques, and if possible, perform the following special procedures used during neuroanaesthesia:
    i. Induced hypotension
    ii. Moderate Hypothermia
- Know the management of Head Trauma, and its anaesthesia management.

7. Ediatric & Neonatal Anaesthesia

- General principle, monitoring, fluid therapy, temperature control, pain relief in children including neonates
- Emergency and elective surgery in neonates and infants

- Special equipment used in pediatric anesthesia
- Ventilation strategies
- Skill development related to procedures performed in neonates, infants and older children

8. Postoperative

- Transport safely and manage immediate postoperative care in the following areas:
- Ventilation, Oxygen administration, temperature control, cardiovascular monitoring, fluid balance and pain relief.
- Recognize postoperative croup and treat it.
- Understand post anesthesia apnea factors associated with it, the appropriate duration of monitoring and treatment.

9. Special problems

Manage the following in pediatric patients undergoing anesthesia and surgery:

i. Blood replacement
ii. Drug administration and anesthetic requirement (minimum anaesthetic concentration)
iii. Fluid and electrolyte balance, glucose requirement and renal maturation
iv. Hypocalcaemia
v. Hypoglycemia
vi. Metabolism
vii. Temperature control
viii. Vitamin K administration

10. Obstetric Anaesthesia

A. Goals:

- Physiology of normal pregnancy alters the response to anaesthesia.
- Pertinent aspects of fetal and placental physiology.
- Implications of Pregnancy on obstetric and non-obstetric surgery and emergency and elective situations
- Principles of labor analgesia

B. Objectives:

- Principle and techniques for anesthesia for cesarean section
- Know the risk factor, prevention and treatment of maternal aspiration

- Evaluate difficult airways and manage failed intubation and aortocaval compression
- Recognize high-risk factors in obstetric patients and how they affect anesthetic management for example
    i. Morbid obesity
    ii. Preeclampsia and eclampsia
    iii. Concurrent medical disease
    iv. Neurologic disease and pregnancy

- Understand anesthetic choices for the pregnant patient with heart disease.
- Identify and manage common medical emergencies in the post-parturient.

11. Pain Management

A. Goals

- Should understand pathophysiology of acute and chronic pain and differentiate between the two types of pain
- Know the multidisciplinary approach to chronic pain management and cancer pain management.
- Manage acute (Postoperative pain, Labour pain) and chronic pain syndromes proficiently.

B. Objectives:

- Assessment of patients with pain including: history taking, physical examination, and interpretation of investigations.
- Classify types of pain - acute chronic, traumatic, cancer pain, etc. with the
- knowledge of Pain pathways in detail.
- Practice routes of administration and risk/benefits of drugs used for acute and chronic pain relief, patient controlled analgesia and treat the common pain syndromes.
- Demonstrate practice of pain management in patients with problem drug use, drug dependency and addiction and identify the parameters for referral to a pain medicine specialist.
- Demonstrate Organization of acute pain service and role of acute pain nurse for pain assessment in various groups of patients, Physiological changes secondary to Pain, practice different modalities of pain control.
- Pharmacology and side effects of opioid analgesia and non-opioid analgesia, principle of patient-controlled analgesia and assessment of its efficacy,

- Pharmacology and side effects of epidural/intra-thecal opioid. Neurological assessment of epidural blockade and management of failed block.
- Management of epidural abscess.
- Substance abuse and acute pain control.
- Pain control in concurrent medical diseases – COAD, IHD, bleeding tendency, geriatric. Pain control in burns patients.
- Pain control in trauma patients included multiple rib fracture
- Practice Different Modalities of Chronic Pain Management - interventional pain procedures, pharmacotherapy, physical therapy, psychotherapy, (including cognitive behavioural approaches), neuroablation, neuro-augmentation, spinal opioid, interventional neuro-blockade, non-opioid analgesia.
- Anatomy, indication, technique and complication of chemical sympathectomy (lumbar sympathectomy, stellate ganglion block, celiac plexus block).
- Practice principles of management of cancer pain, principle of management of non-cancer neuropathic pain - phantom limb pain, post-herpetic neuralgia, complex regional pain syndrome, trigeminal neuralgia.
- Principle of management of non-cancer nociceptive pain - myofascial pain, lower back pain, intractable angina, burns, chronic pancreatitis, PVD.
- Practice Epidural steroid injection (all levels) and long-term epidural catheterization.
- Observe and practice following blocks: Infra-orbital nerve, Intercostal nerve
- Recognize complications associated with each blocks and know appropriate treatment of each
- Know the indications for stimulation techniques such as transcutaneous electrical nerve stimulation (TENS), dorsal column stimulation, and deep brain stimulation.
- Mechanisms and side effects of other therapies used for treating pain.
- The principles of pain management in special patient groups including the elderly, children, disabled, intellectually handicapped and those unable to communicate.
- Awareness of the principles for insertion and management of implantable drug delivery pumps.
- Awareness of the basic principles of palliative care. Know the cancer pain guidelines.
- Treatment based on WHO treatment ladder
    i. Drugs: Analgesic, Opiates, Sedatives and stimulants
    ii. Nerve block
    iii. Neurolytic Block

iv. Palliative Care

12. Regional Anaesthesia

A. Goals:

- To teach anaesthesia residents the art and sciences of regional anaesthesia.
- Anatomy, pathophysiology and appropriate management of complications and side effects of regional anaesthesia techniques
- To understand general principles of local anesthetic pharmacology, including the pharmacodynamics and pharmacokinetics of various local and adjuvant anaesthesia.
- Understand the indications and the contraindications to regional anaesthetic techniques.

B. Objectives

Learn the anatomy of the sympathetic nervous system, specifically the anatomy of the epidural and subarachnoid spaces and the location of sympathetic and parasympathetic ganglia. Performing the following regional anaesthesia techniques:

- Brachial plexus, cervical plexus, stellate ganglion block, lumbar plexus, lumbar sympathetic, Sciatic nerve block, Femoral nerve block, 3 in 1block, Wrist block, Popliteal Nerve block, Trigeminal nerve block, Retro bulbar blocks, Paravertebral blocks, Intercostal blocks, Caudal block –adult and pediatric, Ankle block, Epidural block/Catheter, Subarachnoid block, Bier's block, All peripheral nerves of the upper and lower limbs.

C. Objectives Of Dental Anaesthesia

Understand the principles of conscious sedation Principles of anaesthesia in a Dental Chair

Local Blocks for Dental Surgery

D. Objectives Of Transplant Anaesthesia

Know the basic principles of anaesthetizing an immuno compromised patient, Principles of anaesthetizing patient with end stage, renal / liver disease.

E. Objectives for Ophthalmology Anaesthesia

- Principle of intra and extra ocular surgery
- Monitored Anesthesia Care (MAC) and sedation technique
- Ophthalmic blocks

F. Objectives for ENT Posting

- Principle anesthesia for Ear, Nose and Throat surgery
- Anesthesia for MLS
- Anesthesia for laser surgery of airway
- Vascular malformations/ tumors of nose and oral cavity
- To give anesthesia for major / cancer surgery of upper airway including laryngectomy, maxillectomy

G. Special Anaesthesia

- Liver and Kidney Anaesthesia

  i. Basic Anatomy, physiology, pathophysiology
  ii. Principles, management and anesthetic consideration in a patient with hepatobiliary disease, jaundice, portal hypertension, cirrhosis and Kidney diseases
  iii. Anaesthesia for organ transplantation – liver and kidney

- Endocrine Anaesthesia

  i. Knowledge of various endocrine disorders and their anesthetic management related to surgery of that endocrine disorder or with other surgical procedures – Thyroid, Adrenal, Thymus, Pancreas, Pituitary

- GIT and Anaesthesia

  i. Principle of GI surgery, laparoscopic, minimal access, bariatric and robotic surgeries

- Miscellaneous

  i. Anaemia
  ii. Coagulopathies and bleeding disorders
  iii. Neuropathies
  iv. Geriatric Anaesthesia

VII. RECOMMENDED TEXT BOOKS AND JOURNALS

- Miller RD, ed. Anesthesia,
- Clinical Anesthesia Barash
- Wylie Churchill Davidson, 7thedn.
- Stoelting RK, Miller RD, eds. Basics of Anesthesia & co-existing diseases & Pharmacology
- JA Kaplan: Cardiac Anesthesia
- Lee's Synopsis of Anesthesia
- ICU Book, Paul Marino
- ECG by Shamroth/Goldman
- Physics for Anesthesia by Sir Robert Macintosh
- Physics applied to Anesthesia by Hill
- Pediatric Anesthesia by Gregory
- Medicine for Anesthetists by Vickers

Reference

- The Management of Pain, Bonica
- Pediatric Anesthesia, Smiths
- Textbook of Obstetric Anesthesia, Chestnut
- Neuro Anesthesia, Cottrill

List of Journals

- Indian Journal of Anesthesia
- Journal of Anesthesiology and Clinical pharmacology Anesthesia
- Journal of Anesthesiology and Clinical Pharmacology
- Indian Journal of Anesthesiology
- British Journal of Anesthesia
- Anesthesia and Analgesia
- Anesthesiology
- Anesthesia and Intensive Care
- Canadian Journal of Anesthesia
- Acta Anesthesia Scandanavia
- Regional Anesthesia and Pain Medicine

Year Books

- Anesthesia Clinic of North America
- International Anesthesiology Clinics

- Year book of Anesthesia
- Recent Advances in Anesthesia
- Anesthesia Review

आयुर्विज्ञान में राष्ट्रीय परीक्षा बोर्ड

स्वास्थ्य एवं परिवार कल्याण मंत्रालय, भारत सरकार

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