

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

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SYLLABUS FOR

**D.M. PAEDIATRIC AND NEONATAL
ANAESTHESIA**

ACADEMIC YEAR 2026 – 2027

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

**SYLLABUS – D.M. PAEDIATRIC AND NEONATAL
ANAESTHESIA**

Preamble

Paediatric & neonatal anaesthesiology encompasses the principles and practice of care from the pre-anaesthesia clinic to operating rooms, other anaesthetizing locations, the post-operative anaesthesia care unit, pain service and intensive care units.

We care for a diverse age group of patients with varying clinical requirements, from newborns just entering our world, rapidly growing infants to children and adolescent's patients who are approaching adulthood.

Candidates who have completed residency will be able to practice autonomously in their core specialty and act as a community resource for expertise in the field, create and integrate new knowledge into practice, and educate future generations of paediatric and neonatal anaesthetists.

The super-speciality program can be often physically, emotionally, and intellectually demanding, and occurs in a variety of clinical learning environments committed to medical education and the well-being of patients. However, we endeavour to work together passionately and collaboratively with a diverse group of residents, fellows, faculty members, students, and all members of the health care team to achieve highest standards of professional excellence.

Our Mission/Aims and Objectives

- Compassionate, high-quality clinical care
- Clinical education
- Advanced scientific research
- To function as a faculty or consultant in the specialty
- To plan, set up and expand paediatric anaesthesia services in the community.

Clinical education experiences include the following.

- Pre-anaesthesia preparation
- Providing anaesthesia both for inpatient and outpatient surgical procedures
- Non-operative procedures outside the operating rooms
- Post-anaesthesia care
- Pain management
- Advanced life support for neonates, infants, children, and adolescents.

- Critical Care

Admission Requirements

Kindly refer to latest NMC guidelines

MD/DNB Anaesthesia

Entrance Exam

NEET SS

Duration of Course

36 months

Number of Candidates

As per sanctioned Intake.

Teaching Faculty Requirement: As per NMC guidelines

Teaching Methods

The DM super speciality program is an advanced graduate medical education beyond a core residency program for anaesthetists who desire to enter more specialized practice.

Candidates will be given gradually increasing responsibility for independently managing the paediatric operations and decision making.

Faculty members serve as role models of excellence, compassion, cultural sensitivity, professionalism, and scholarship. The clinical care of patients within the speciality is undertaken with appropriate faculty supervision and conditional independence.

DM-trained physicians undergo an intensive program of subspecialty clinical and didactic education that focuses on the multidisciplinary care of patients to provide specialised core anaesthesia care. They develop deep medical knowledge, patient care skills, and expertise applicable in their focused area of practice.

Educational and scientific programs such as seminars, workshops, journal club will be organized for sharing knowledge, ideas and resources.

Teaching MD post graduate students is part of the training.

In addition to clinical education, the program advances the candidate's skills in scientific research. The ability to create new knowledge expands the ability to pursue hypothesis-driven scientific inquiry that results in contributions to the medical literature and advancement in patient care.

Teaching Program and Rotations	Months
Paediatric Surgery (10 months) and Neonatal Surgery (4 months)	14
• Assessment Clinic (Pre-Anaesthetic Check- up)	
• PALS Certificate	
• Simulation Skill Lab	
• Fibre-Optic Bronchoscope Tracheo-bronchial Toilettng	
• One-Ventilation of Lung (Techniques)	
• Tracheostomy	
Non-Operating Room Anaesthesia (NORA)	3
• MRI	
• Interventional Radiology-DSA/CT/USG	
• GI Scopy	
• Cardiac Cath lab	
• Radiation therapy	
• Acute Pain	
• Chronic Pain[PMR]	
CVTS (Transthoracic ECHO, Transesophageal ECHO)	3
Neurosurgery, BIS, Neuro-Monitoring, Peripheral Monitoring	3
Plastic Surgery,	2
Paediatric Orthopaedics	2
ENT / Ophthalmology	2 (1+1)
Paediatric Anaesthesia ICU / Paediatric Medicine ICU (Ventilator Management)	2
Paediatric Emergency [Casualty]	1
Neonatal ICU (Ventilator Management)	2
Posting in Speciality Centre (Foetal Surgery, Pain Management)	1
Exam Preparation(As per institutional rules)	1
Total	36

Curriculum

The training programme shall be updated as and when required. A log book should be maintained as per the format in the appendix.

Outline of Curriculum

1. Basic Principles
 - a. Special characteristics of paediatric anaesthesia highlighting the fundamental differences between infants and children
 - b. Growth and development
 - i. Pre natal growth
 - ii. Post natal growth
 - iii. Development assessment /Embryology
 1. Motor
 2. Language
 3. Cognitive
 - iv. Clinical relevance in paediatric anaesthesia
 - c. Preoperative evaluation
 - d. Ethical issues and informed consent
2. Physiology
 - a. Airway physiology and development
 - b. Respiratory system
 - c. Cardiovascular system
 - d. Regulation of Fluids and Electrolytes
 - e. Thermoregulation
3. Pharmacology
 - a. Developmental Pharmacology
 - b. Intravenous Agents
 - c. Inhaled Anaesthetic Agents
 - d. Local Anaesthetic Agents
 - e. Opioids
 - f. Neuromuscular Blocking Agents
 - g. Anaesthetic Adjuncts
4. General Approach
 - a. Psychological Aspects of Paediatric Anaesthesia
 - b. Preoperative Preparation and management
 - c. Equipment
 - d. Monitoring
 - e. Airway management
 - i. Normal
 - ii. Difficult
 - f. Point of care ultrasonography
 - g. Induction, Maintenance, and Recovery
 - h. Transfusion Medicine & Blood conservation
 - i. Pain Management
 - i. Acute Pain

- ii. Regional Anaesthesia
 - iii. Chronic pain
- 5. Clinical management of specialized surgical problems
 - a. Neonatology for Anaesthesiologists
 - b. Anaesthesia for General Surgery in the Neonate
 - c. Anaesthesia for Fetal Surgery
 - d. Anaesthesia for Congenital Heart Surgery
 - i. Bypass Procedures
 - ii. Non Bypass Procedures
 - e. Anaesthesia for Neurosurgery
 - f. Anaesthesia for Thoracic Surgery
 - g. Anaesthesia for General Abdominal and Urologic Surgery
 - h. Anaesthesia for Paediatric Otorhinolaryngologic Surgery
 - i. Anaesthesia for Paediatric Plastic Surgery
 - j. Anaesthesia for Paediatric Orthopedic Surgery
 - k. Anaesthesia for Ophthalmic Surgery
 - l. Anaesthesia for Organ Transplantation /Organ Retrieval
 - m. Anaesthesia for Conjoined Twins
 - n. Anaesthesia for the Paediatric Trauma Patient
 - o. Anaesthesia for Burn Injuries
 - p. Anaesthesia for Paediatric Dentistry
 - q. Anaesthesia and Sedation for Paediatric Procedures
 - r. Non operating room anaesthesia
 - s. Paediatric Sedation
 - t. Anaesthesia for Same-Day Surgery (Day-Care)
 - u. Anaesthesia for Surgical Missions
 - v. Paediatric palliative care
- 6. Systemic Disorders & Associated Problems
 - a. Endocrine Disorders
 - b. Respiratory Disorders
 - c. Cardiovascular Disorders
 - d. Hematology and Coagulation Disorders
 - e. Oncologic Disorders
 - f. Genetic Muscle Disorders
 - g. Malignant Hyperthermia
 - h. Paediatric Obesity
 - i. Special Paediatric Disorders
 - j. Dermatology for the Anaesthesiologist
 - k. Infection Diseases
- 7. Critical Care in Paediatric Anaesthesia
 - a. Cardiopulmonary Resuscitation
 - b. Critical Care Medicine
 - c. Cardiac critical care
 - d. Safety and Outcome in Paediatric Anaesthesia
 - e. History of Paediatric Anaesthesia
 - f. Medicolegal and Ethical Aspects

- g. Education
- h. Statistics

Knowledge and Skill Based Learning

1. Paediatric Developmental Principles

a. Knowledge

- i. Define Preterm, Prematurity, Neonate, Infant, and Child.
 - ii. Understand the terms Gestational Age and Post-Conceptual Age.
 - iii. Understand the transition from fetal to neonatal circulation including the effect on vascular and cardiac structures (conversion from parallel to series circulation), fetal hemoglobin and blood gas values, arterial and pulmonary artery pressure changes, and ventricular function.
 - iv. Understand normal airway and respiratory development, cardiac development, neurologic development, renal development and hematopoietic development including the conversion of fetal to adult hemoglobin.
 - v. Understand the effect of prematurity upon organ system development and the short and long-term risks of prematurity including respiratory distress syndrome, bronchopulmonary dysplasia, apnea, anemia, intraventricular hemorrhage, retinopathy of prematurity, and hypoglycemia.
 - vi. Understand the basis of pharmacokinetic and pharmacodynamic differences of anaesthetic agents between neonates, infants and children.
- b. Skills
- i. Appropriately administer anaesthesia to all age groups and account for differences in drug volume of distribution, MAC, protein binding, metabolism, and excretion.

2. Coexisting Paediatric Diseases

a. Knowledge

- i. Understand the anatomy and pathophysiology of common cyanotic and acyanotic congenital heart lesions including ventricular septal defect, atrial septal defect, patent ductus arteriosus, critical aortic stenosis and coarctation, pulmonary stenosis, tetralogy of Fallot, and transposition of the great arteries.
- ii. Understand the anaesthetic implications for children with congenital heart disease including associated syndromes, preoperative assessment, SBE prophylaxis, anaesthetic cardiovascular effects, and the effects of an intracardiac shunt on intravenous and inhalation induction of general anaesthesia
- iii. Understand the pathophysiology and anaesthetic implications of obstructive sleep apnea, asthma, and acute upper respiratory tract infection.
- iv. Learn the common congenital syndromes that include difficult airways, e.g., Pierre Robin, Treacher-Collins, etc.

- v. Know the anaesthetic implications of cerebral palsy, seizure disorders, hydrocephalus, neuromuscular diseases, muscular dystrophies, and diseases of the neuromuscular junction and neuromuscular transmission.
- vi. Understand the anaesthetic implications for pyloric stenosis, gastro-esophageal reflux, renal disease and liver disease in the paediatric patient.
- vii. Understand the anaesthetic implications and perioperative management of inherited disorders of coagulation (e.g. hemophilia) and hemoglobinopathies (e.g., sickle cell disease).
- viii. Know the anaesthetic considerations for children with oncologic disease and who have had chemotherapy.
- ix. Know the anaesthetic implications of children with a newly diagnosed anterior mediastinal mass.
- x. Understand the anaesthetic considerations for Trisomy 21.
- xi. Understand the anaesthetic considerations for a child with a latex allergy.
- xii. Know the residual medical problems in children born premature (e.g., bronchopulmonary dysplasia) and the potential impact on anaesthetic care.
- xiii. Know the essentials of Paediatric Advanced Life Support (PALS).

b. Skills

- i. Perform a preoperative evaluation and participate in an anaesthetic for a paediatric patient with congenital heart disease.
- ii. Perform a preoperative evaluation and present an anaesthetic plan for a paediatric patient with an upper respiratory tract infection (URI). Develop a decision process for proceeding with elective surgery in a child with an acute or recovering URI.
- iii. Identify and evaluate the child with a difficult airway.
- iv. Be able to evaluate and institute appropriate therapy for a child with respiratory failure.
- v. Plan an anaesthetic for a child with a neuromuscular disease.
- vi. Develop a plan for the perioperative management of a child with sickle cell disease.
- vii. Develop a plan for the perioperative management of a child with a congenital bleeding disorder.
- viii. Describe a plan for the induction of anaesthesia in a paediatric patient with gastroesophageal reflux.
- ix. Plan an anaesthetic for the prematurely born child.
- x. Using PALS, be able to preside over the resuscitation of a child in cardiac arrest, or with a life-threatening hemodynamic disturbance or arrhythmia.
- xi. Chemoport for Chemotherapy.

3. Anaesthetic Techniques

a. Knowledge

- i. Understand the pre-operative issues relevant to the anaesthetic care of neonates, infants and children including: coexisting morbidities,

- medications, allergic reactions, labor and delivery history, maternal history, family history, the normal paediatric physical exam and the evaluation of abnormal findings.
- ii. Know the ASA guidelines for preoperative fasting including clears, breast milk and formula based upon patient age. Understand the appropriate ordering of preoperative laboratory testing and evaluation.
 - iii. Know the options available for premedication including agents, routes and side-effects.
 - iv. Understand the differences between the various paediatric breathing circuits to provide oxygen and anaesthesia/Anaesthesia Workstations.
 - v. Understand the factors determining the speed of inhalation induction in paediatric patients and the various agents currently available for inhalation induction including the benefits and side-effects of each.
 - vi. Understand the regulation of temperature in infants and children and compensatory mechanisms, effects of anaesthesia on temperature and the consequences of hypothermia.
 - vii. Know the differential diagnosis and management of perioperative hyperthermia.
 - viii. Know the age-related fluid and electrolyte requirements for infants and children including calculation of deficit, intra-operative fluid requirements, glucose requirements and the guidelines, indications and side effects for blood and blood product administration in the paediatric patient.
 - ix. Understand the differences between the paediatric airway and the adult airway and the effects on paediatric airway management.
 - x. Know the various sizes of oral/nasal airways, facemasks, LMAs, blades for laryngoscopy and endotracheal tube sizes (cuffed and uncuffed) and their appropriate use in children of all ages/Video Laryngoscopes, Fibre-Optic Bronchoscope.
 - xi. Know the prevention, management and consequences of laryngospasm.
 - xii. Know the paediatric doses of intravenous anaesthetic medications including induction agents, opiates, muscle relaxants, reversal agents and emergency medications including side-effects and contraindications.
 - xiii. Know the criteria for tracheal extubation and how to perform a deep extubation safely.
 - xiv. Know the therapeutic and toxic doses of local anaesthetics in infants and children.
 - xv. Understand the indications and contraindications for spinal and epidural anaesthesia and peripheral blocks in infants and children plus side effects and complications.
 - xvi. Understand the post-operative anaesthetic complications for paediatric patients including stridor, croup, nausea/vomiting and emergence delirium and their management.

b. Skills

- i. Perform appropriate preoperative evaluation of neonates, infants and children.
- ii. Obtain informed consent from a parent and assent from an appropriately aged child.
- iii. Administer premedication to a child.
- iv. Perform a parent-present induction of general anaesthesia, if allowed by the institution.
- v. Use a precordial or esophageal stethoscope for an anaesthetic.
- vi. Perform inhalation inductions on paediatric patients of all ages.
- vii. Monitor patient temperature and perform warming methods on a neonates, infants and children.
- viii. Appropriately choose and administer fluids to paediatric patients of all ages.
- ix. Calculate allowable blood loss for children of all ages.
- x. Demonstrate the ability to estimate blood loss in paediatric patients.
- xi. Perform mask ventilation, LMA placement and intubation on paediatric patients of all ages.
- xii. Appropriately manage upper airway obstruction, laryngospasm, and bronchospasm in paediatric patients.
- xiii. Perform commonly used regional analgesic techniques in paediatric patients.
- xiv. Simulation Skill Lab

4. Anaesthesia for Paediatric Surgical Procedures

a. Knowledge

- i. Know the pathophysiology, indications for surgical intervention, and anaesthetic implications for the following common paediatric and neonatal surgical conditions:
 - ii. congenital diaphragmatic hernia (CDH)
 - iii. inguinal hernia
 - iv. intussusception
 - v. necrotizing enterocolitis (NEC)
 - vi. omphalocele and gastroschisis
 - vii. pyloric stenosis
 - viii. otitis media requiring myringotomy and tube placement
 - ix. obstructive sleep apnea or recurrent tonsillitis requiring adenotonsillectomy
 - x. acutely bleeding tonsil
 - xi. esophageal foreign body
 - xii. tracheal or bronchial foreign body
 - xiii. retropharyngeal abscess
 - xiv. epiglottitis
 - xv. hydrocephalus requiring ventriculo-peritoneal (VP) shunt insertion or revision
 - xvi. myelomeningocele
 - xvii. blocked tear ducts requiring lacrimal duct probing and irrigation
 - xviii. open globe injury
 - xix. strabismus

- xx. scoliosis
- xxi. craniosynostosis
- xxii. cleft lip or palate
- xxiii. tracheoesophageal fistula
- xxiv. paediatric trauma
- xxv. paediatric burns
- xxvi. Understand the age-related changes and pathophysiology of intracranial pressure (ICP) in children.
- xxvii. Know the pathophysiology and treatment of the oculocardiac reflex.
- xxviii. Understand the implications of subcutaneous infiltration of epinephrine in paediatric patients.
- xxix. Understand the implications of providing paediatric anaesthesia for radiation therapy, CT scan, MRI, and additional procedures outside of the traditional OR environment.
- xxx. Robotic surgery, Foetal Surgery

b. Skills

- i. Develop the ability to choose appropriately between endotracheal intubation, laryngeal mask airway, or facemask ventilation for any paediatric surgical procedures.
- ii. Be able to choose whether or not to place an intravenous catheter during a general anesthetic.
- iii. Be able to place an intravenous catheter in a paediatric patient.
- iv. Develop a plan when intravenous catheter placement fails.
- v. Develop the ability to appropriately manage intraoperative hypoxemia.
- vi. Develop the ability to appropriately manage intraoperative hypocarbia or hypercarbia.
- vii. Develop the ability to appropriately manage intraoperative hypotension or hypertension.
- viii. Develop the ability to appropriately manage intraoperative bradycardia or tachycardia.
- ix. Develop the ability to appropriately manage intraoperative increased ICP.

5. Paediatric Pain Management

a. Knowledge

- i. Understand methods for recognition and assessment of pain in different paediatric age groups.
- ii. Know methods for treatment of acute postoperative pain in children.
- iii. Understand the age-related differences in use of opioid analgesics in children.
- iv. Know different regimens for postoperative epidural analgesia in children.
- v. Understand the pathophysiology and treatment of common chronic painful conditions in children (e.g., sickle cell disease, oncologic disease, reflex sympathetic dystrophy, etc.)

b. Skills

- i. Demonstrate the ability to develop and carry out a plan to manage and treat postoperative pain in children across all age groups.
- ii. Demonstrate the ability to treat refractory postoperative pain in children of all ages. Pain management (Chemical/RF ablation)
- iii. Be able to evaluate and treat common complications of analgesic therapy in children (e.g., nausea, vomiting, pruritus, and ventilatory depression).
- iv. Be able to evaluate and manage children with epidural analgesic therapy and break-through pain.
- v. Be able to evaluate a child for the use of patient-controlled analgesia (PCA), and demonstrate appropriate ordering of PCA for all age groups.
- vi. USG-guided Nerve blocks,

Recommended Reading

1. A Practice of Anaesthesia for Infants and Children
Charles J. Cote, Jerrold Lerman, I. David Todres
2. Smith's Anaesthesia for Infants and Children
Peter J. Davis, Etsuro K. Motoyama
3. Paediatric Anaesthesia
George A. Gregory
4. Paediatric Cardiac Anaesthesia
Carol L. Lake
5. Paediatric and Obstetrical Anaesthesia
Theodore H. Stanley, P.G. Schafer
6. Anaesthesia for Genetic, Metabolic, and Dysmorphic Syndromes of Childhood
Victor C. Baum, Jennifer E. O'Flaherty
7. Manual of Paediatric Anaesthesia: With an Index of Paediatric Syndromes
David J. Steward, Charles J. Cote, Jerrold Lerman
8. Anaesthetic management of difficult and routine paediatric patients
Frederic A. Berry
9. Regional Anaesthesia in Infants, Children and Adolescents
Bernard Dalens
10. Nelson Paediatric Medicine

Recommended Journal

Paediatric Anaesthesia

Log Book, Formative assessments (DOPS, CBDs) and summative assessments (6 monthly)

Detailed Syllabus

I.BASIC SCIENCES

ANATOMY

- Definition of Preterm, Prematurity, Neonate, Infant, and Child.
- Definition of the terms Gestational Age and Post-Conceptual Age.
- Normal growth and development.
- Normal airway and respiratory development. Differences between paediatric and adult airway.
- Cardiac development, neurologic development, renal development and hematopoietic development including the conversion of foetal to adult haemoglobin.
- Anatomy of common cyanotic and acyanotic congenital heart lesions including ventricular septal defect, atrial septal defect, patent ductus arteriosus, critical aortic stenosis and coarctation, pulmonary stenosis, tetralogy of Fallot, and transposition of the great arteries.

PHYSIOLOGY

- Transition from foetal to neonatal circulation including the effect on vascular and cardiac structures (conversion from parallel to series circulation), foetal haemoglobin and blood gas values, arterial and pulmonary artery pressure changes, and ventricular function.
- Effect of prematurity upon organ system development and the short and long-term risks of prematurity including respiratory distress syndrome,
- bronchopulmonary dysplasia, apnoea, anaemia, intraventricular haemorrhage, retinopathy of prematurity, and hypoglycaemia.
- Understand the pathophysiology and anaesthetic implications of obstructive sleep apnoea, asthma, and acute upper respiratory tract infection.

PHARMACOLOGY

- Pharmacokinetic and pharmacodynamic differences of anaesthetic agents between neonates, infants and children.
- Differences in drug volume of distribution, MAC, protein binding, metabolism, and excretion.

- Therapeutic and toxic doses of local anaesthetics in infants and children. Additives in regional blocks.
- Neurotoxicity of anaesthetic agents in children
- Drugs used for premedication including agents, routes and side-effects.
- Paediatric doses of intravenous anaesthetic medications including Antibiotics induction agents, opiates, muscle relaxants, reversal agents and emergency medications including side-effects and contraindications.
- Antibiotics

PHYSICS

- Laws of physics as applied to anaesthesia. Principles of monitoring equipment and equipment used for conduct of anaesthesia including ultrasound.

PSYCHOLOGICAL AND ETHICAL ISSUES

- Consent, assent, issues related to ethics of research in paediatric anaesthesia.
- Psychological differences, perioperative anxiety, issues in children with special needs.

II. CLINICAL SCIENCES AS RELATED TO PAEDIATRIC ANAESTHESIA

- Perform appropriate preoperative evaluation of neonates, infants and children. Understand the pre-operative issues relevant to the anaesthetic care of neonates, infants and children including: coexisting morbidities, medications, allergic reactions, labour and delivery history, maternal history, family history, the normal paediatric physical exam and the evaluation of abnormal findings.
- Know the ASA guidelines for preoperative fasting including clear fluids, breast milk and formula based upon patient age.
- Understand the appropriate ordering of preoperative laboratory testing and evaluation.
- Understand the regulation of temperature in infants and children and compensatory mechanisms.
- Effects of anaesthesia on temperature and the consequences of hypothermia.
- Know the differential diagnosis and management of perioperative hyperthermia.
- Know the age-related fluid and electrolyte requirements for infants and children including calculation of deficit, intra-operative fluid requirements and glucose requirements.
- Guidelines, indications and side effects for blood and blood product administration in the paediatric patient.
- Plan an anaesthetic for the prematurely born child.
- Know the residual medical problems in children born premature (e.g., bronchopulmonary dysplasia) and the potential impact on anaesthetic care.
- Learn the common congenital syndromes that include difficult airways, e.g., Pierre Robin, Treacher-Collins, Trisomy 21 etc. Identify and evaluate the child with a difficult airway.

- Preoperative evaluation and an anaesthetic plan for a paediatric patient with an upper respiratory tract infection (URI).
- Develop a decision process for proceeding with elective surgery in a child with an acute or recovering URI.
- Evaluate and institute appropriate therapy for a child with respiratory failure.
- Understand the anaesthetic implications for pyloric stenosis, gastro-esophageal reflux, renal disease and liver disease in the paediatric patient.
- Know the anaesthetic implications of children with a mediastinal mass.
- Understand the anaesthetic considerations for a child with a latex allergy.
- Plan an anaesthetic for a child with a neuromuscular disease.
- Develop a plan for the perioperative management of a child with haemoglobinopathies.
- Develop a plan for the perioperative management of a child with a congenital bleeding disorder.
- Understand the indications and contraindications for spinal and epidural anaesthesia and peripheral blocks in infants and children including side effects and complications.
- Know the prevention, management and consequences of laryngospasm.
- Know the criteria for tracheal extubation and how to perform a deep extubation safely.
- Understand the post-operative anaesthetic complications for paediatric patients including stridor, croup, nausea/vomiting and emergence delirium and their management.
- Know the pathophysiology, indications for surgical intervention, and anaesthetic implications for the following common paediatric and neonatal surgical conditions:
 - Congenital diaphragmatic hernia (CDH), Abscess (Psoas Abscess etc.,)
 - Tracheoesophageal fistula
 - Inguinal hernia
 - Intussusception
 - Necrotizing enterocolitis (NEC)
 - Omphalocele and gastroschisis
 - Pyloric stenosis
 - Intestinal obstruction
 - Intra-abdominal tumors, cysts
 - Congenital lobar emphysema
 - Empyema, lung abscess
 - Posterior urethral valves, hydronephrosis
 - Undescended testis
- Understand the implications of pneumoperitoneum in the neonate and child and the physiologic changes due to carbodioxide insufflation.
- One Lung Ventilation Strategies & Techniques
- Tracheostomy

- Understand the haemodynamic changes in thoracoscopy and the physiology of one lung ventilation in children.

III. ALLIED SCIENCES

- Common cyanotic and cyanotic congenital heart lesions including ventricular septal defect, atrial septal defect, patent ductus arteriosus, critical aortic stenosis and coarctation, pulmonary stenosis, tetralogy of Fallot, and transposition of the great arteries.
- Understand the anaesthetic implications for children with congenital heart disease including associated syndromes, preoperative assessment, SBE prophylaxis, anaesthetic cardiovascular effects, and the effects of an intracardiac shunt on intravenous and inhalation induction of general anaesthesia.
- Perform a preoperative evaluation and participate in an anaesthetic for a paediatric patient with congenital heart disease.
- Understand the principles of cardiopulmonary bypass in paediatric patients.
- Know the anaesthetic implications of cerebral palsy, seizure disorders, hydrocephalus, intracranial tumors, neuromuscular diseases, muscular dystrophies, and diseases of the neuromuscular junction and neuromuscular transmission.
- Understand the anaesthetic implications and perioperative management of inherited disorders of coagulation (e.g. haemophilia) and hemoglobinopathies (e.g., sickle cell disease).
- Develop a plan for the perioperative management of a child with a congenital bleeding disorder.
- Know the anaesthetic considerations for children with oncologic disease and who have had chemotherapy.
- Understand the anaesthetic considerations in children with endocrine abnormalities including pheochromocytoma, thyroid disorders, etc.
- Principles and conduct of solid organ transplantation in children. (Organ Retrieval)
- Know the pathophysiology, indications for surgical intervention, and anaesthetic implications for the following common paediatric and neonatal surgical conditions:
 - Otitis media requiring myringotomy and tube placement
 - Obstructive sleep apnoea or recurrent tonsillitis requiring adenotonsillectomy
 - Acutely bleeding tonsil
 - Oesophageal foreign body
 - Tracheal or bronchial foreign body
 - Retropharyngeal abscess
 - Choanal atresia
 - Hydrocephalus requiring ventriculo-peritoneal (VP) shunt insertion or revision
 - Myelomeningocele
 - Intracranial tumors
 - Blocked tear ducts requiring lacrimal duct probing and irrigation

- Open globe injury and Ophthalmic injuries.
 - Strabismus
 - Congenital cataract
 - Scoliosis
 - Congenital talipes equinovarus
 - Craniosynostosis
 - Cleft lip and palate
 - Paediatric trauma
 - Paediatric burns
- Understand the age-related changes and pathophysiology of intracranial pressure (ICP) in children.
 - Know the pathophysiology and treatment of the oculocardiac reflex.
 - Understand the implications of providing paediatric anaesthesia for radiation therapy, CT scan, MRI, cardiac catheterisation lab and additional procedures outside of the traditional OR environment including dental anaesthesia and endoscopic procedures.
 - Anaesthesia for day care surgery and office-based procedures.
 - Anaesthesia for separation of conjoined twins.

Paediatric Pain Management and Intensive care

- Understand methods for recognition and assessment of pain in different paediatric age groups.
- Know methods for treatment of acute postoperative pain in children.
- Demonstrate the ability to develop and carry out a plan to manage and treat postoperative pain in children across all age groups.
- Demonstrate the ability to treat refractory postoperative pain in children of all ages.
- Understand the age-related differences in use of opioid analgesics in children.
- Learn and perform epidural catheterisation in neonates and infants.
- Know different regimens for postoperative epidural analgesia in children.
- Be able to evaluate and manage children with epidural analgesic therapy and break-through pain.
- Learn the diagnosis and treatment of chronic pain in children.
- Understand the pathophysiology and treatment of common chronic painful conditions in children (e.g., sickle cell disease, oncologic disease, reflex sympathetic dystrophy, etc.)
- Understand the concepts of Patient Controlled Analgesia.
- Be able to evaluate and treat common complications of analgesic therapy in children (e.g., nausea, vomiting, pruritus, and ventilatory depression).
- Understand the principles of mechanical ventilation and modes of ventilatory support in neonates and children.
- Management of paediatric mechanical ventilation and ICU care.
- Bio Statistics and Research Methodology
- Hospital Administration:

- Liquid Oxygen/Manifold
- Sterilization/Gas supply,
- Equipment maintenance
- Ambient air control and
- Infection control techniques in OT
- Microbiology: Infection control, prevention diagnosis, Antibiotics, Antibiotic Policy and management

IV. RECENT ADVANCES

- Recent advances in the field of paediatric surgery, paediatrics, neonatology, paediatric and neonatal critical care.
- Advances in Pulmonary support - ECMO, Nitric oxide, High frequency oscillatory Ventilation, Ventilator Management.
- Blood substitutes
- Current advances and concepts in drugs, equipments, and monitoring methods

Research

- The trainee shall be required to undertake research and write papers under the guidance of the faculty.
- The candidate will have to submit a proposal/topic for the project work within three months of the joining of the course.
- The work period for the project will be 1½ years to 2 years.
- Papers from the project should be accepted for publication in an indexed journal.
- Another article as first author should also be submitted for publication in an indexed journal before the candidate appears in the final D M. Paediatric Anaesthesiology examination.

Assessment & Examination

- Regular three internal assessments, both in theory and practicals, shall be made for every candidate.
- Internal assessment will be made in day to day work of the trainee, which involves patient care, teaching, and anaesthesia management in the operation room, emergency service, bed side presentation and research.

Final Examination

Eligibility

Candidate will be allowed to appear after three years of training and after completion of his / her research project and as per university rules.

Board of Examiners

Paediatric anaesthesiologists with minimum 3 years of teaching experience in the specialty.

Theory Papers

- 4 Papers (Paper I to Paper IV, 100 Marks each.)
- This system is followed in other subjects of D.M.Courses as per university requirements
- There shall be four theory papers with the following titles
 - Basic sciences as related to paediatric anaesthesia
 - Clinical Sciences aspects of paediatric anaesthesia
 - Allied Sciences
 - Recent advances in paediatric anaesthesia

Clinical Practical and Viva Voce

- One long case and two short cases will be given to the candidates and the discussion thereon would last 30-40minutes in each case.
- The candidates will also be given ECG, X-rays, and ABG to be interpreted. Various equipment used in OT, intensive care, drugs, fluids, catheters for invasive monitoring will also be discussed.
- Viva voce
- OSCE

Passing Criteria

- As per existing system of passing criteria, it is mandatory for the candidate to obtain minimum 40% of passing marks in each Theory Paper and 50% of marks in overall aggregate in all papers.
- For Clinical practical & viva minimum 50% of marks in overall aggregate are required.
