Sri Guru Ram Das University of Health Sciences, Amritsar
Course Structure for the Bachelors in Anaesthesia (Code.BAT.2.1)

Course code	Course Title	Course Type	L+T+P	Total Credits/Week	Weightage Theory/ Practical
Semester-I					
BAT-ANT.201	Anatomy-I	Foundation	3+0+2	5	25+25=50T 50P
BAT-PHY.201	Physiology-I	Foundation	3+0+2	5	25+25=50T 50P
BAT-PAT.201	Pathology	Foundation	2+1+0	3	50+50=100T
BAT.201	Basics of Anaesthesia	Core	3+0+2	5	50+50=100T 100P
ECO.250	English/ Communication skills	Elective	2+0+0	2	NC
		Total Credits	**13+1+6**	**20**	**500**
Semester-II					
BAT-ANT.201	Anatomy-II	Foundation	3+0+2	5	25+25=50T 50P
BAT-PHY.201	Physiology-II	Foundation	3+0+2	5	25+25=50T 50P
BAT.202	Basic Anaesthesia drugs and its usage.	Core	3+0+2	5	50+50=100T 50P
BAT.203	Basic Procedures in Anaesthesia	Core	3+0+0	3	50+50=100T
COM.250	Computer applications	Elective	2+0+0	2	NC
		Total Credits	**14+0+6**	**21**	**450**
Semester-III					
BAT-MIC.301	Microbiology	Foundation	3+0+2	**5**	50+50=100T 50P
BAT-PHA.301	Pharmacology	Foundation	3+0+2	5	50+50=100T 50P
BAT.301	Equipment sterilization, hazards, Fire safety in Anaesthesia	Core	3+1+4	8	50+50=100T 50P
HVE.350	Human Values & Ethics	Elective	3+0+0	3	NC
		Total Credits	**12+1+8**	**21**	**450**
Semester-IV (New)					
BAT.302	Advanced Anesthesia Techniques	Core	3+0+2	5	30+70=100 T 10+40=50 P
BAT.303	Advanced Surgical Procedures	Core	3+0+2	5	30+70=100 T 10+40=50 P
BAT.304	Basic Intensive CARE	Core	2+0+2	4	30+70=100 T 10+40=50 P
BAT.305	Clinical Medicine & Management	Core	2+0+0	2	10+40=50 T
		Total Credits	**8+0+8**	**16**	**500**
Semester-V					
BAT.401	Specialize d Anesthesia	Core	3+0+2	5	30+70=100 T 10+40=50 P
BAT.402	Specialize d Surgery	Core	3+0+2	5	30+70=100 T 10+40=50 P
BAT.403	Recent Advances in Anesthesia & Surgical Field	Core	4+1+0	5	30+70=100 T
BAT.404	Disaster Management & Environmental Science	Elective	2+0+0	2	50T
		Total Credits	**12+1+4**	**17**	**500**
Semester-VI					

BAT.405	Specialized Anesthesia-2	Core	3+0+2	5	30+70=100 T 10+40=50 P
BAT.406	Specialized Surgery-2	Core	3+0+2	5	30+70=100 T 10+40=50 P
BAT.407	Specialized Anesthesia & Surgical-3		3+0+2	5	30+70=100 T 10+40=50 P
RMB.401	Research Methodology & Biostatics	Core	2+0+0	2	50T
		Total Credits	**11+0+6**	**17**	**500**
Semester-VII (Internship six month) minimum 900 hours (calculated based on 6 hours per day for six month of internship)					
		Grand Total	**65+10+55**	**129**	**1700/1150=2850**

Fourth Semester

BAT.302: Advanced Anesthesia Techniques (100 Hours)

Learning Objectives

The learning objectives cover various aspects of Anaesthesia, including ear, nose, and throat surgeries, airway management, ophthalmic surgeries, local and regional anaesthesia techniques, head and neck procedures, and complications specific to ENT and ophthalmic surgeries. Anaesthetic considerations for ear, nose, and throat surgeries include identifying challenges, understanding techniques for maintaining airway patency, evaluating risks and benefits, and developing strategies for pain and discomfort management. Advanced airway management techniques, such as fibreoptic intubation, supraglottic airway devices, and video laryngoscopy, are essential for securing and maintaining the airway during ENT procedures.

Ophthalmic surgeries involve unique considerations and challenges, with different techniques used for patient positioning, sedation, and monitoring. The advantages and disadvantages of different methods for specific ophthalmic procedures are also discussed. Local and regional anaesthesia techniques for head and neck procedures are also discussed, with the benefits, limitations, and potential complications of these techniques.

Complication management for ENT and ophthalmic surgeries involves recognizing potential complications, developing strategies for preventing and managing them, understanding the appropriate use of medications and interventions, and evaluating and implementing measures for optimizing patient safety and outcomes.

Course Outcome

The course on Anaesthetic Considerations in ENT and Ophthalmic Surgeries aims to equip students with the skills to:

a) Anesthetic considerations for ear, nose, and throat surgeries: Demonstrate understanding of challenges and techniques involved in providing Anaesthesia for ENT procedures, apply appropriate methods and strategies for maintaining airway patency, and implement pain management protocols.
b) Airway management in ENT procedures: Use advanced techniques like fibreoptic intubation, supraglottic airway devices, and video laryngoscopy to maintain airway patency and manage complications.
c) Anesthetic techniques for ophthalmic surgeries: Understand the unique challenges and challenges in providing Anaesthesia, apply appropriate techniques for different procedures, and implement patient positioning, sedation, and monitoring protocols.
d) Local and regional anesthesia techniques for head and neck procedures: Demonstrate proficiency in administering local anaesthetics and performing nerve blocks, and select and apply regional techniques based on surgical requirements.
e) Management of complications specific to ENT and ophthalmic surgeries: Identify potential complications and adverse events, implement preventive measures, and address complications promptly and appropriately to ensure patient safety and optimize outcomes.

Advanced Anaesthesia Techniques (ENT and Ophthalmic Surgeries):

- Anaesthetic considerations for ear, nose, and throat surgeries: Understanding the specific challenges and techniques involved in providing Anaesthesia for ENT procedures such as tonsillectomy, adenoidectomy, and sinus surgery. - 20 Hours
- Airway management in ENT procedures: Learning about advanced airway management techniques, such as fibreoptic intubation, supraglottic airway devices, and video laryngoscopy, for securing the airway during ENT surgeries. - 20 Hours
- anaesthetic techniques for ophthalmic surgeries: Studying the unique considerations for providing Anaesthesia during eye surgeries, including cataract extraction, retinal surgeries, and glaucoma procedures. - 20 Hours
- Local and regional Anaesthesia techniques for head and neck procedures: Exploring the principles and administration techniques for local anaesthetics, nerve blocks, and regional Anaesthesia for head and neck surgeries. - 20 Hours
- Management of complications specific to ENT and ophthalmic surgeries: Understanding the potential complications and adverse events related to Anaesthesia in ENT and ophthalmic surgeries and learning strategies for their prevention and management. - 20 Hours

Practical Sessions: (50 Hours)

- Considerations for Anesthesia in ENT Surgery:
- Tonsillectomy and Adenoidectomy: Patient Positioning and Airway Access: During tonsillectomy and adenoidectomy operations, students will practice optimal patient positioning and techniques for preserving a patent airway.
- Anesthetic Agent Selection and Administration: Students will learn about the proper selection of anaesthetic agents for ENT operations, including inhalational and intravenous agents. They will put their administration and monitoring skills to the test.
- Anesthetic Techniques for Sinus Surgery: Students will learn about the anaesthetic considerations unique to sinus surgery, such as keeping a clear operative field, limiting bleeding, and managing patient placement. They will put these strategies to the test in simulated circumstances.

Airway Control in ENT Procedures:

- Fibreoptic Intubation Techniques: Students will practice fiberoptic intubation with airway manikins. They will learn how to use the fiberscope correctly to secure the airway in difficult ENT cases.
- Supraglottic Airway Devices: Insertion and Positioning of Supraglottic Airway Devices: In simulated ENT settings, students will practice the insertion and correct positioning of supraglottic airway devices such as laryngeal mask airways (LMAs).

- Ophthalmic Surgery Anaesthesia Techniques:
- Topical Anaesthesia Techniques for Cataract Extraction: Students will learn and practice different topical anesthetic approaches for cataract extraction, such as eye drops, subconjunctival injections, and intracameral anaesthesia.

Retinal Surgery and Glaucoma Treatments:

- Blocks for the peribulbar and retrobulbar areas: Students will study and practice peribulbar and retrobulbar blocks, which are often used to provide anaesthesia during retinal and glaucoma treatments. On manikins, they will practice proper needle insertion and pharmaceutical deposition techniques.

Complication Management in ENT and Ophthalmic Surgery:

- Difficult Airway Scenarios and Airway Obstruction:
- Airway blockage Simulation: Students will take part in simulated scenarios involving airway blockage and difficult airway circumstances in ENT surgery. They will practice effective management strategies such as emergency airway maneuvers and the placement of an alternate airway device.

Complications of Ophthalmic Surgery:

- Ocular Emergencies Simulation: During ophthalmic procedures, students will encounter simulated ocular emergencies such as rapid loss of vision or high intraocular pressure.
- They will learn and practice the necessary emergency management strategies.

Students will be able to apply their theoretical knowledge in a simulated clinical setting during these practical sessions, allowing them to develop skills and confidence in managing anaesthetic considerations, airway management, and complications specific to ENT and ophthalmic surgeries.

BAT.303: Advanced Surgical Procedures (100 Hours)

Learning Objectives

The learning objectives for this course include understanding surgical procedures in ear, nose, and throat (ENT), diseases in otolaryngology (ENT), eye diseases, laser precautions, surgical techniques in ophthalmology, endoscopic procedures in ENT and ophthalmology, laser-assisted surgical procedures in ENT and ophthalmology, minimally invasive approaches in ENT and ophthalmology, and management of complications in ENT and ophthalmology.

The course covers various surgical procedures, diseases, and complications in ENT, ophthalmology, laser-assisted surgical procedures, minimally invasive approaches, and management of complications. Students will gain knowledge about the etiology, pathophysiology, clinical presentation, and diagnostic approaches for each ENT disease, as well as the medical and surgical treatment options available for managing ENT diseases.

The course also covers laser safety training, proper laser warning signage, and interlock systems. Students will also learn about the instruments and techniques involved in ophthalmic surgeries, as well as the preoperative, intraoperative, and postoperative considerations for these procedures.

The course also covers endoscopic procedures, laser-assisted surgical procedures, and minimally invasive approaches in ENT and ophthalmology. Students will explore the advantages, limitations, and patient selection criteria for these approaches and evaluate the outcomes and potential complications.

In conclusion, this course provides a comprehensive understanding of surgical procedures, diseases, and complications in ENT and ophthalmology. By understanding these areas, students will be better equipped to manage and optimize patient outcomes during these procedures.

The course teaches students to demonstrate knowledge of surgical procedures in ear, nose, throat, and ophthalmology, apply specialized instruments and techniques, understand positioning requirements, and diagnose common ENT diseases. It also covers medical and surgical treatment options, ophthalmic diseases, laser safety protocols, and ophthalmic surgical principles. Students will perform endoscopic procedures, safely and effectively utilize lasers, evaluate minimally invasive approaches, apply preventive measures, and optimize patient outcomes and safety in ENT and ophthalmic surgical interventions.

Advanced Surgical Procedures

- Surgical procedures in ear, nose, and throat (ENT): Learning about the various surgical procedures performed in ENT, including tonsillectomy, septoplasty, laryngectomy, and sinus surgery, and understanding the specialized instruments and techniques used, and positioning for each surgery. - 15 Hours
- Diseases in Otolaryngology (ENT) : Chronic Sinusitis, Tonsillitis, Deviated Septum Otitis Media, Vocal Cord Nodules or Polyps, Obstructive Sleep Apnea (OSA),Laryngeal Cancer ,Nasal Polyps, Salivary Gland Disorders, Cochlear Implantation. - 15 Hours
- Diseases in Ophthalmology: - 20 Hours
    - Cataracts - Cataract Extraction and Intraocular Lens (IOL) Implantation,
    - Glaucoma - Trabeculectomy, Shunt Implantation, Laser Therapy
    - Age-related Macular Degeneration (AMD) - Intravitreal Injections, Laser Therapy, Photodynamic Therapy
    - Diabetic Retinopathy - Vitrectomy, Laser Therapy
    - Retinal Detachment - Retinal Detachment Repair
    - Dry Eye Syndrome - Punctal Occlusion Surgery
    - Conjunctivitis - Symptomatic Treatment (Medications, Eye Drops)
    - Corneal Diseases - Corneal Transplantation (Keratoplasty)
    - Refractive Errors - LASIK (Laser-Assisted in Situ Keratomileusis), PRK (Photorefractive Keratectomy)
    - Retinoblastoma - Chemotherapy, Radiation Therapy, Enucleation (Eye Removal)

- Laser Precautions: Laser Safety Training, Protective Eyewear, Fire Safety Laser Plume Management, Patient Safety, Laser Device Maintenance, Laser Warning Signage, Laser Interlock Systems, Laser Hazard Assessment Compliance with Regulatory Standards. - 6 Hours
- Surgical techniques in ophthalmic surgery: Exploring the specific surgical procedures performed in ophthalmology, such as cataract extraction, corneal transplantation, vitrectomy, and refractive surgeries, and understanding the instrumentation and surgical principles involved. - 10 Hours
- Endoscopic procedures in ENT and ophthalmic surgery: Understanding the principles and techniques of endoscopic surgeries in ENT and ophthalmology, including endoscopic sinus surgery, laryngoscopy, tracheostomy, and arthroscopy. - 4 Hours
- Laser-assisted surgical procedures in ENT and ophthalmology: Learning about the use of lasers in surgical procedures in ENT and ophthalmology, including laser-assisted tonsillectomy, laser-assisted stapedotomy, and laser refractive surgeries. - 10 Hours
- Minimally invasive approaches in ENT and ophthalmic surgery: Exploring minimally invasive surgical techniques, such as laparoscopic and robotic-assisted procedures, in ENT and ophthalmology, and understanding their advantages and limitations. - 10Hours
- Management of complications in ENT and ophthalmic surgeries: Understanding the potential complications and adverse events that may arise during ENT and ophthalmic surgeries, and learning strategies for prevention, recognition, and management -10 Hours

Practicals: (50 Hours)

- Surgical procedures in ear, nose, and throat (ENT) include tonsillectomy, septoplasty, sinus surgery, endoscopic sinus surgery, chronic sinusitis, tonsillitis, ophthalmic surgery, cataract extraction, corneal transplantation, and laryngoscopic examination. Students will know the identification of all surgical instruments of the above specialties.
- Students will practice arrangement techniques for cold knife dissection, electrocautery, and coblation, as well as the proper use of specialized instruments like tonsil snares, dissectors, and hemostatic agents. They will also learn the principles of maintaining nasal airway patency and proper positioning of nasal packing.
- Endoscopic sinus surgery involves hands-on experience with endoscopic instruments, including sinus scopes and instrumentation.
- Endoscopic procedures in ENT and ophthalmic surgery include simulated endoscopic sinus surgery scenarios using anatomical models, focusing on sinus visualization, polyp removal, and ostium widening. Students will also practice arranging instruments required for laryngoscopic examination using laryngoscope models, learning proper insertion, and positioning of laryngoscope blades, visualization of vocal cords, and identification of laryngeal structures. These practical sessions provide students with hands-on experience and simulation-based training to develop skills and competence in advanced arrangement for surgical procedures, disease assessment, surgical techniques, and management of complications in ENT and ophthalmic surgeries.

BAT.304: Basic Intensive Care

Learning Outcomes

a) Recognize proper care and maintenance practices for ventilators, suction machines, and monitoring equipment.
b) Check, clean, and troubleshoot this equipment on a regular basis.
c) Recognize prevalent flaws and take corrective action.
d) Understand the concepts of ventilator sterilization and disinfection.
e) Recognize the proper sterilization processes and disinfectants for ventilators.
f) Know how to care for, maintain, and operate beds, lights, and other pieces of equipment.
g) Recognize the significance of air conditioning and pollution control in the ICU setting.
h) Recognize HVAC systems and air filtration procedures in order to maintain air quality.
i) Be familiar with the attachment and intraoperative use of ventilators and monitoring devices.
j) Adult and pediatric patients who are unconscious are cared for.
k) Recognize unique care requirements, such as posture, hygiene, and monitoring.
l) Recognize and manage any potential difficulties or crises that may arise while caring for unconscious patients.
m) Become familiar with physiotherapy procedures, feeding, Ryle's tube insertion, and hyperalimentation.
n) recognize suctioning and posture techniques in semiconscious and unconscious patients.
o) Understand the concepts and procedures of oxygen therapy, including identifying and selecting appropriate delivery systems and masks based on patient needs.
p) Assess ventilation during a patient emergency.
q) Assist with ventilation using mouth-to-mouth, mouth-to-ET tube, or bag-valve mask construction procedures.
r) Depending on the patient's condition and response, implement suitable ventilation methods.

Course Outcomes:

Students will leave with knowledge and abilities in ventilator care, maintenance, and troubleshooting, as well as basic sterilization and disinfection practices. It explains how to care for, maintain, and operate beds, lights, and other regularly used ICU equipment. Students will also learn to control air conditioning and pollution in the ICU environment, attach and configure ventilators and monitoring devices intraoperatively, provide appropriate care for unconscious adult and paediatric patients, perform physiotherapy techniques, suctioning, administer oxygen therapy, provide ventilation support, understand the principles of ventilator and monitoring equipment, measure blood pressure, temperature, and expired gases, and understand laryngeal anatomy.

Basic Intensive Care

- Care and maintenance of ventilators, suction machine, monitoring devices. - 2 Hours
- Sterilization and disinfection of ventilators. - 1 Hour
- Care, maintenance and operational capabilities of beds, lights and other apparatus. -1 Hour
- Air conditioning and control of pollution in ICU. - 1 Hour
- Attachment and intraoperative utility of ventilators and monitoring devices. - 1 Hour
- Care of unconscious adult and paediatric patients. - 3 Hour
- Physiotherapy techniques, feeding, Ryle‟s tube insertion and hyper alimentation. -3 Hours
- Suctioning and posturing of semiconscious and unconscious patients. - 2 Hours
- Oxygen therapy, maintenance of clear Airway, Various types of masks. - 6 Hours
- Ventilation of patient in crisis: - 2 Hours
- Resuscitator/ bag valve mask assembly - 2 Hours
- Different types of Airways. - 2 Hours
- Short term ventilation/ Transport ventilators. - 1 Hour
- ABG techniques & analysis. - 3 Hours
- Management of asepsis. - 4 Hours
- Psychological aspects of the patient, relative and staff. - 2 Hours
- Hemofiltration and hemodialysis. - 4 Hours
- Jet Ventilation. - 2 Hours
- Ventilators: Principles of working of different ventilators: - 8 Hours
- Volume cycled/Time cycled/Pressure cycled ventilators.
- High frequency ventilators and other types.
    - Methods of measuring the expired gases from the patient; Types of spirometers, Principles of working of spirometers. Clinical application of above apparatus.
    - Apparatus and techniques of measuring of blood pressure and temperature; Principle and working of direct/indirect blood pressure monitoring apparatus; structure, principle and working of the Oscillo tonometer. Principles and working of aneroid manometer type B.P. instrument.
    - Laryngeal sprays; Types, material, principle, and mechanism.
    - Monitoring techniques and equipment; Cardiac monitors, Respiratory monitors, Spirometers, Temperature monitors.

Practical/ Clinical Postings: (100 Hours)

- Ventilator Care and Maintenance:
    - Hands-on practice in the proper care and maintenance of ventilators, including cleaning, sterilization, and disinfection techniques.
    - Understanding the functions and operation of different modes and settings of ventilators.
    - Troubleshooting common ventilator issues and alarm management.

- Bed and Apparatus Care:
  - Practical demonstration of bed maintenance, including adjustment of height, positioning, and proper use of bed controls.
  - Familiarization with the operational capabilities of ICU lights and other apparatus, such as infusion pumps and monitors.
  - Cleaning and disinfection procedures for bed surfaces and equipment.
- Air Conditioning and Pollution Control in ICU:
  - Practical session on the management of air conditioning systems in the ICU to maintain optimal temperature, humidity, and air quality.
  - Understanding the importance of infection control measures and strategies to minimize airborne contaminants in the ICU environment.
- Care of Unconscious Patients:
  - Simulation-based training on the care and management of unconscious adult and pediatric patients, including monitoring vital signs, maintaining airway patency, and providing basic hygiene.
  - Practice in the proper positioning and turning techniques for unconscious patients to prevent pressure ulcers.
- Oxygen Therapy and Airway Management:
  - Hands-on practice in administering oxygen therapy using different types of masks and nasal cannulas.
  - Simulation of airway management techniques, including insertion and securing of endotracheal tubes, use of different types of airways, and bag-valve mask ventilation.
- Physiotherapy Techniques and Feeding Methods:
  - Practical demonstration and practice of physiotherapy techniques, such as chest physiotherapy and postural drainage, to promote airway clearance.
  - Training on safe and proper insertion of Ryle's tube for enteral feeding, followed by simulated feeding procedures and maintenance.
- Hemofiltration and Hemodialysis:
  - Introduction to the principles and techniques of hemofiltration and hemodialysis for renal replacement therapy.
  - Simulation-based training on the setup and operation of hemofiltration and hemodialysis machines, including the monitoring of patients during the procedure.
- Psychological Aspects of Patients, Relatives, and Staff:
  - Interactive sessions focusing on the psychological aspects of patients, their relatives, and healthcare staff in the ICU setting.
  - Role-playing exercises to develop effective communication skills and strategies for providing emotional support to patients and their families.

BAT.305: Clinical Medicine & Related Management (60 Hours)

Learning Objectives

Practical topics for students in the field of respiratory and cardiovascular system include hands-on training in examinations and investigations, such as ECG interpretation and pulmonary function tests, as well as simulations for managing emergencies like cardiac arrest. They should also learn about specific conditions like ischemic heart disease, asthma, and pneumonia through case discussions and observation of relevant procedures. Additionally, practical sessions on airway management, chest tube insertion, and the use of diagnostic tools in diagnosing and managing lung diseases like tuberculosis and lung cancer are essential

Clinical Medicine & Related Management

- Respiratory & cardiovascular system- - 4 Hours
- Examination and Investigations relevant to cardiovascular system - 4 Hours
- Ischemic heart disease - 2 Hours
- Valvular heart diseases - 4 Hours
- Common arrhythmias encountered in clinical practice - 2 Hours.
- Hypertension - 2 Hours
- Heart failure - 2 Hours
- Cardiomyopathies - 2 Hours
- Examination and Investigations relevant to respiratory system - 2 Hours
- Asthma and COPD - 4 Hours
- Pneumonia - 2 Hours
- Pulmonary tuberculosis - 4 Hours
- Bronchiectasis - 2 Hours
- Lung abscess - 4 Hours
- Pneumothorax - 2 Hours
- Pleural effusion - 4 Hours
- Respiratory failure-types, causes and management - 6 Hours.
- Carcinoma lung - 6 Hours

Fifth Semester

BAT.401: Specialized Anaesthesia-1 (100 Hours)

Learning Objectives

The learning goals span a wide range of anesthetic procedures, including orthopedic, pediatric, urological, regional, and regional anaesthesia. Comprehending special anaesthetic concerns and problems is required for orthopedic surgery, whereas comprehending distinct physiological and pharmacological aspects is required for paediatric anaesthesia. Exploring problems and considerations, understanding the influence of individual anomalies on anaesthetic management and perioperative care, and establishing strategies to optimize results and minimize risks are all part of anaesthetic management of patients with congenital anomalies. Understanding specialized anesthesia management procedures, such as prostatectomy, nephrectomy, and cystoscopy, as well as controlling probable problems and perioperative issues, are required for urological surgery. Regional anesthesia techniques for orthopedic and urological procedures entail learning pain management principles and techniques, performing peripheral nerve blocks and spinal anaesthesia, and comprehending indications, contraindications, and potential complications associated with regional anaesthesia.

Students will learn how to grasp anaesthetic considerations, techniques, and challenges in orthopedic surgeries, how to use appropriate techniques for paediatric patients, how to address congenital anomalies in paediatric patients, and how to use regional anaesthesia techniques for pain control. It also addresses potential problems and adverse events, provides safe and effective care, and exhibits expertise in monitoring techniques and management tactics. Students work with the surgical team to improve patient outcomes, use evidence-based practices, and keep their knowledge and abilities up to date. The course also promotes a proactive approach to anaesthesia difficulties

Specialized Anaesthesia-1

a) Anesthetic considerations for orthopedic surgeries: Studying the specific Anaesthesia considerations, techniques, and challenges associated with orthopedics procedures such as joint replacements, fracture fixation, and spine surgeries. - 20 Hours
b) Paediatric Anaesthesia techniques and considerations: Understanding the unique physiological and pharmacological considerations for providing Anaesthesia to paediatric patients, including preoperative preparation, induction, airway management, and pain management. - 20 Hours
c) Anaesthetic management of paediatric patients with congenital anomalies: Exploring the Anaesthesia challenges and considerations when managing paediatric patients with congenital anomalies undergoing surgical procedures. - 20 Hours
d) Anaesthesia for urological surgeries: Learning about the specific Anaesthesia considerations and techniques for urological procedures such as prostatectomy, nephrectomy, and cystoscopy. - 20 Hours
e) Regional Anesthesia techniques for orthopedics and urological procedures: Studying the principles and techniques of regional Anaesthesia, including peripheral nerve blocks and spinal Anaesthesia, for pain management during orthopedic and urological surgeries. - 20 Hours

Practical Topics: Specialized Anaesthesia-1 (50 Hours)

Orthopedic Surgery:

- Simulation-based training on anaesthetic considerations and techniques for joint replacement surgeries, such as patient positioning, regional anaesthesia techniques, and intraoperative pain management.
- Anesthetic treatment for fracture fixation procedures, including the use of various types of anaesthesia and monitoring measures, is demonstrated in practice.
- Role-playing scenarios to better grasp the problems and decision-making involved in giving spinal anaesthesia.

Paediatric Surgery:

- Hands-on practice in pediatric airway care using suitable devices and techniques, such as mask ventilation, intubation, and supraglottic airway devices.
- Simulation scenarios concentrating on the special issues for inducing and maintaining anaesthesia in paediatric patients, including as dose calculation, monitoring, and intraoperative care.
- A hands-on session on juvenile pain management strategies, such as regional anaesthesia and multimodal analgesia.
- Anaesthesia for Paediatric Patients with Congenital abnormalities: Interactive sessions addressing anesthetic problems and considerations when caring for children with congenital abnormalities.
- Case studies and role-playing exercises are used to learn about preoperative evaluation, anaesthesia planning, and intraoperative care of unique congenital abnormalities.
- Simulations of emergency situations and crisis management in paediatric patients with congenital abnormalities.

Urological surgeries:

- Anaesthesia for Urological Surgeries: This course provides a practical demonstration of anaesthetic considerations and techniques for various urological surgeries such as prostatectomy, nephrectomy, and cystoscopy.
- Training in urological surgery positioning and patient preparation, including the use of regional anaesthetic and intravenous sedation procedures.
- Scenarios based on simulation to better understand intraoperative problems and management of fluid balance, hemodynamic, and pain control during urological procedures.
- Techniques of Regional Anesthesia for Orthopedic and Urological Procedures:
- Practical experience with peripheral nerve blocks, including landmark recognition, needle insertion, and local anaesthetic administration.
- Training in spinal anaesthetic procedures using simulation, including patient placement, sterile technique, and dose calculation.

Anaesthesia Considerations:

- Case-based discussions on anesthesia considerations specific to orthopedic, Pediatric, and urological surgeries, focusing on patient assessment, anesthesia induction, and intraoperative monitoring.
- Interactive sessions on pain management strategies for surgical patients in these specialties, including the use of regional anesthesia techniques, multimodal analgesia, and patient-controlled analgesia.
- Simulation scenarios to practice crisis management during surgery, such as intraoperative bleeding, anaphylactic reactions, or airway emergencies.

Postoperative Care and Rehabilitation:

- Practical demonstration of postoperative care protocols for orthopedic, pediatric, and urological surgical patients, including wound care, monitoring vital signs, and early mobilization techniques.
- Role-playing exercises to simulate patient education and discharge planning, including instructions on medication management, activity restrictions, and follow-up appointments.
- Hands-on practice with rehabilitation exercises specific to orthopedic, pediatric, and urological surgical patients, focusing on maintaining joint mobility, strengthening, and functional recovery.

BAT.402: Specialized surgery 1 (100 Hours)

Learning Objectives:

The learning objectives cover various aspects of orthopedics, Pediatric surgery, urological diseases, and related surgeries. orthopedic diseases include osteoarthritis, fractures, herniated discs, scoliosis, and ligament injuries. Orthopedic surgical procedures include joint replacement, fracture fixation, spinal surgeries, and carpal tunnel release. Understanding the principles and techniques involved in surgical management of orthopedic conditions is crucial.

C-arm and radiation safety are also covered, including pregnancy and Paediatric radiology considerations, contrast media safety, infection control, equipment maintenance, calibration, patient identification and consent, emergency preparedness, and radiation dose optimization. Effective communication, documentation, quality assurance, and accreditation are also essential in the use of C-arm.

Paediatric surgical procedures include hernia repair, pyloromyotomy, congenital anomaly correction, and laparoscopic surgeries. Specimens, techniques, and patient positioning are also discussed. Postoperative care protocols, pain management, and patient education are also covered.

Urological diseases and related surgeries include kidney stones, urinary tract infections, urinary incontinence, benign prostatic hyperplasia, bladder cancer, prostate cancer, erectile dysfunction, and vesicoureteral reflux. Understanding surgical treatment options and techniques for urological diseases is essential. Anaesthesia considerations and specialized techniques are also discussed, along with the principles of postoperative care and rehabilitation specific to urological surgical patients.

The course is designed to give learners a thorough awareness of prevalent disorders in orthopedics, pediatric surgery, and urology, as well as suitable surgical procedures and techniques. Patient positioning, pain management, perioperative care, C-arm fluoroscopy, anaesthesia, postoperative care protocols, and rehabilitation programmes are all covered. Through continued professional development, students will also learn to effectively work with the surgical team, use evidence-based practices, and regularly update their knowledge and abilities in orthopedic, pediatric, and urological surgery.

Specialized surgery 1

a) **Diseases in Orthopedics** **- 12 Hours**

- Osteoarthritis: Degenerative joint disease-causing joint pain and stiffness. Surgeries include joint replacement (e.g., total hip replacement, total knee replacement).
- Fractures: Broken bones that require surgical intervention for realignment and stabilization. Surgeries may include open reduction and internal fixation (ORIF), external fixation, or intramedullary nailing.
- Herniated Disc: Protrusion of intervertebral disc causing nerve compression. Surgical options include discectomy or spinal fusion.
- Scoliosis: Abnormal curvature of the spine. Surgery may be performed in severe cases to correct the curvature, such as spinal fusion or insertion of spinal rods.
- Carpal Tunnel Syndrome: Compression of the median nerve in the wrist. Surgical treatment involves carpal tunnel release to alleviate pressure on the nerve.
- Rotator Cuff Tears: Tears in the tendons of the rotator cuff in the shoulder. Surgical repair or reconstruction may be required, such as arthroscopic rotator cuff repair.
- Ligament Injuries: Injuries to ligaments, such as anterior cruciate ligament (ACL) tear in the knee. Surgical reconstruction may be performed using grafts, such as ACL reconstruction.
- Spinal Stenosis: Narrowing of the spinal canal, causing compression of the spinal cord or nerves. Surgery options include laminectomy or spinal decompression to relieve pressure.
- Bone Tumors: Abnormal growths in bones that may require surgical removal, such as tumor resection or limb-sparing surgeries.
- Osteoporosis: Loss of bone density, leading to increased fracture risk. Surgical procedures may include vertebroplasty or kyphoplasty for spinal compression fractures.

- orthopedic surgical procedures: Studying the specific orthopedic surgical procedures, including joint replacement surgeries (such as total knee replacement and total hip replacement), fracture fixation (fracture table), and spine surgeries, and understanding the instrumentation, implants, techniques involved and positioning for each surge -20 Hours
- C-arm. Radiation Safety: Pregnancy and Pediatric Radiology, Contrast Media Safety, Infection Control, Equipment Maintenance and Calibration, Patient Identification and Consent, Emergency Preparedness, Radiation Dose Optimization, Communication and Documentation, Quality Assurance and Accreditation. -3Hours

b) **Diseases in Pediatric Surgery:** - 15 Hours

- Cleft Lip and Palate: Facial birth defects involving the lip and/or palate. Surgical procedures are performed to repair and reconstruct the cleft lip and palate, typically in multiple stages.
- Pediatric Hernias: Abnormal protrusions of organs or tissues through weak spots or openings in the abdominal wall, such as inguinal hernia or umbilical hernia. Surgical treatment involves hernia repair to close the defect.
- Pediatric Urological Conditions: Disorders affecting the urinary system in children, such as hypospadias, cryptorchidism (undescended testicles), or vesicoureteral reflux (VUR), PUJO. Surgical interventions may include hypospadias repair, orchidopexy, or ureteral reimplantation.
- Pediatric Gastrointestinal Disorders: Conditions like pyloric stenosis, malrotation, or Hirschsprung's disease that affect the digestive system in infants and children. Surgical procedures are performed to correct the underlying issues, such as pyloromyotomy or bowel resection.
- Pediatric orthopedic Conditions: Disorders involving the musculoskeletal system in children, such as clubfoot, developmental dysplasia of the hip (DDH), or scoliosis. Surgeries may include corrective procedures like clubfoot correction, hip reduction, or spinal fusion.
- Pediatric Neurosurgical Conditions: Neurological disorders affecting children, such as hydrocephalus, spina bifida, or brain tumors. Surgical interventions may involve shunt placement for hydrocephalus, repair of spina bifida defects, or tumor resection.
- Pediatric Trauma: Surgical management of traumatic injuries in children, including fractures, burns, or lacerations. Surgeries aim to repair and stabilize the injured areas.

c) Paediatric surgical procedures: Exploring the surgical procedures performed in Paediatric surgery, such as Pediatric hernia repair, pyloromyotomy, congenital anomaly correction, and Paediatric laparoscopic surgeries, and understanding the specialized considerations, techniques for Paediatric patients and positioning for each surgery. - 15 Hours

d) Urological Diseases and Related Surgeries: - 20 Hours

- Kidney Stones: Surgical procedures may include:
- Extracorporeal Shock Wave Lithotripsy (ESWL): Non-invasive procedure that uses shock waves to break down kidney stones into smaller pieces, making them easier to pass.
- Ureteroscopy with Laser Lithotripsy: Minimally invasive procedure where a thin tube is inserted into the ureter to remove or break down stones using a laser.
- Urinary Tract Infections (UTIs): Surgeries are not typically required for UTIs. Treatment usually involves antibiotics to eliminate the infection.
- Urinary Incontinence: Surgical options for urinary incontinence include:
- Sling Procedures: Placement of a sling or mesh to support the urethra and prevent leakage of urine.
- Bladder Neck Suspension: Surgical procedure to provide support to the bladder neck and urethra.
- Artificial Urinary Sphincter: Placement of an artificial valve around the urethra to control urine flow.
- Benign Prostatic Hyperplasia (BPH): Surgical procedures for BPH include:
- Transurethral Resection of the Prostate (TURP): Removal of excess prostate tissue using a resectoscope inserted through the urethra.
- Laser Surgery: Techniques like photo selective vaporization of the prostate (PVP) or holmium laser enucleation of the prostate (HoLEP) can be used to remove or vaporize prostate tissue.
- Bladder Cancer: Surgical treatment options for bladder cancer include:
- Transurethral Resection of Bladder Tumor (TURBT): Removal of bladder tumors using a resectoscope inserted through the urethra.
- Radical Cystectomy: Surgical removal of the entire bladder, often followed by the creation of a urinary diversion.
- Prostate Cancer: Surgical procedures for prostate cancer include:
- Testicular Cancer: Surgical treatment for testicular cancer typically involves:
- Radical Inguinal Orchiectomy: Surgical removal of the affected testicle through an incision in the groin area.
- Erectile Dysfunction: Surgical options for erectile dysfunction include:
- Penile Implants: Surgical insertion of inflatable or malleable implants to restore erectile function.
- Vascular Surgery: Procedures to improve blood flow to the penis, such as arterial bypass surgery or penile venous ligation.
- Vesicoureteral Reflux (VUR): Surgical options for VUR include:
- Deflux Injection: Endoscopic procedure where a bulking agent is injected into the bladder wall to create a flap that prevents urine from flowing back into the ureters.
- Ureteral Reimplantation: Surgical procedure to reposition the ureter and create a new valve mechanism to prevent reflux.
- Renal Tumors: Surgical treatment for renal tumors may include:
- Partial Nephrectomy: Removal of the tumor while preserving healthy kidney tissue.
- Radical Nephrectomy: Surgical removal of the entire affected kidney.

Urological surgical procedures:

- Learning about urological surgical procedures, including nephrectomy, prostatectomy, urinary tract reconstruction, and cystectomy, and understanding the specific instrumentation, techniques, considerations involved and positioning for each surgery.
- Catheter types and sizes, Catheterization techniques, Different types of scopes used in Urology (Nephoscope, cystoscope, resectoscope, Ureteroscope).
- Minimally invasive techniques in orthopedic, Pediatric, and urological surgery: Understanding the principles and techniques of minimally invasive approaches, including arthroscopy, laparoscopy, and robotic-assisted surgeries, in Orthopedics, Pediatric surgery, and urology.

e) Anaesthesia considerations and specialized techniques in these surgical specialties: Gaining knowledge of the Anaesthesia considerations and specialized techniques required for orthopedic, Pediatric, and urological surgeries, including patient positioning, pain management, and perioperative care. -5 Hours

f) Postoperative care and rehabilitation in orthopedic, Pediatric, and urological surgeries: Understanding the postoperative care protocols, rehabilitation techniques, and patient education specific to orthopedic, Pediatric, and urological surgical patients.

-5 Hours

Practical Topics - Specialized surgery 1 (50 Hours)

Orthopedic Surgeries:

- Practical demonstration of surgical positioning techniques for different orthopedic procedures, such as joint replacement surgeries, fracture fixation, and spine surgeries.
- Hands-on practice with orthopedic surgical instruments, implants, and techniques used in specific procedures like total knee replacement or fracture fixation.
- Simulation-based training on postoperative care and rehabilitation exercises for orthopedic patients, including mobility assistance and range of motion exercises.

Pediatric Surgery:

- Practical session on sterile techniques and instrument handling specific to pediatric surgeries, such as cleft lip and palate repair or hernia repair in children.
- Simulation scenarios focusing on the management of pediatric patients during different stages of surgery, including preoperative preparation, anesthesia induction, and intraoperative care.
- Role-playing exercises to understand the unique considerations in postoperative care for pediatric surgical patients, including pain management and family support.

Urological Surgeries:

- Hands-on training on catheterization techniques, including different types of catheters and sizes used in urological procedures.
- Practical demonstration of the use of various urological scopes, such as nephroscope, cystoscope, and ureteroscope, for diagnostic and surgical purposes.
- Simulation-based scenarios to understand the perioperative management of urological surgical patients, including anesthesia considerations, positioning, and intraoperative complications.

Minimally Invasive Techniques:

- Practical session on arthroscopy techniques used in orthopedic surgeries, including joint examination, instrument handling, and diagnostic procedures.
- Hands-on practice with laparoscopic instruments and techniques for pediatric and urological surgeries, including trocar insertion, camera navigation, and suturing.
- Simulation-based training on robotic-assisted surgical procedures, such as robotic-assisted prostatectomy or pediatric robotic surgeries, to understand the robotic system setup and surgical techniques.

BAT.403: Recent Advancements in Anesthesia and Surgical Fields (100 Hours)

Learning Objectives

Recent advances in anaesthesia and surgical fields offer exciting opportunities for students to expand their knowledge and skills. By exploring topics such as minimally invasive surgery, enhanced recovery after surgery (ERAS), patient safety in the operating room, advances in anaesthetic techniques, and perioperative pain management, students can achieve specific outcomes. The first set of outcomes focuses on understanding and appreciating these advancements. Students will develop a clear understanding of the principles, advantages, and limitations of minimally invasive surgical techniques, as well as the concept and significance of ERAS in improving surgical outcomes. They will also recognize the importance of patient safety protocols and their application in the operating room.

In the second set of outcomes, students will delve into the details of recent advancements. They will acquire knowledge about specific topics such as advanced anaesthetic techniques, including total intravenous anaesthesia (TIVA) and target-controlled infusion (TCI). Students will explore the use of neuromuscular monitoring and understand its relevance in anaesthesia management. Furthermore, they will grasp the principles of multimodal analgesia and gain insights into regional anaesthetic techniques for effective pain management. These outcomes will equip students with up-to-date information and enhance their ability to analyze the impact of these advancements on patient outcomes and safety.

The final set of outcomes emphasizes the application of knowledge and skills in practice. Students will develop critical thinking abilities by evaluating the benefits and potential risks associated with recent advances in anaesthesia and surgical fields. They will also learn strategies for preventing surgical site infections and other complications, as well as strategies for optimizing patient preparation and postoperative care within an enhanced recovery framework. By achieving these outcomes, students will be well-prepared to contribute to the evolving healthcare landscape, ensuring the delivery of high-quality care while prioritizing patient safety and optimal outcomes.

Overall, these outcomes and learning objectives provide a comprehensive framework for BAT students to explore and understand recent advances in anaesthesia and surgical fields. By attaining these outcomes, students will be equipped with the necessary knowledge, skills, and mindset to adapt to the changing healthcare landscape and make a positive impact in their future professional practice.

Recent Advancements in Anesthesia and Surgical Fields

- Minimally Invasive Surgery: Exploring the advancements in minimally invasive surgical techniques, such as laparoscopy, robotic surgery, and endoscopic procedures, and their benefits in terms of reduced trauma, faster recovery, and improved patient outcomes. -15 Hours
- Enhanced Recovery After Surgery (ERAS): Understanding the concept of ERAS protocols, which involve a multidisciplinary approach to optimize patient preparation, surgical techniques, anaesthesia management, and postoperative care, leading to shorter hospital stays, reduced complications, and enhanced recovery. - 15 Hours
- Patient Safety in the Operating Room: Discussing the importance of patient safety in the operating room and highlighting recent initiatives and technologies aimed at improving safety, such as surgical checklists, surgical site infection prevention measures, and the use of simulation training for healthcare professionals. - 15 Hours
- Advances in Anaesthetic Techniques: Exploring recent developments in anaesthetic techniques, including total intravenous anaesthesia (TIVA), target-controlled infusion (TCI), BIS monitoring, CNAP monitoring and the use of neuromuscular monitoring to improve drug dosing and patient safety during anaesthesia. - 15 Hours
- Perioperative Pain Management: Discussing novel approaches and advancements in perioperative pain management, such as the use of multimodal analgesia techniques, regional anaesthesia, and the role of non-opioid analgesics in reducing opioid consumption and improving pain control. - 10 Hours
- Advances in Imaging Technology: Exploring the use of advanced imaging techniques, such as intraoperative ultrasound, 3D imaging, and image-guided navigation systems, in surgical planning, intraoperative decision-making, and improved surgical accuracy. - 10 Hours

- Surgical Innovation and Emerging Technologies: Discussing the latest trends and innovations in surgical techniques and technologies, including the use of 3D printing for surgical models and implants, virtual reality and augmented reality in surgical training and planning, and the potential of artificial intelligence in surgical robotics and decision support systems. - 10 Hours
- Advances in Endoscopic Procedures: Examining the latest developments in endoscopic procedures, such as single-incision laparoscopy, natural orifice transluminal endoscopic surgery (NOTES), and advanced endoscopic imaging modalities, and their impact on minimally invasive surgery and patient outcomes.

  - 10 Hours

BAT.404: Disaster Management & Environmental Sciences (60 Hours)

Learning Objectives

Studying environmental sciences equips students with a deep understanding of ecological concepts, environmental issues, and scientific principles, while also fostering practical skills for data analysis, resource management, and environmental assessment. By developing critical thinking, problem-solving abilities, and effective communication skills, students are empowered to address real-world environmental challenges, promote sustainability, and advocate for the protection of our planet. These outcomes enable students to make informed decisions, contribute to sustainable practices, and create positive change for the environment and future generations

Disaster preparedness and management- (30 Hours)

The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include-

- Fundamentals of emergency management,
- Psychological impact management,
- Resource management,
- Preparedness and risk reduction,
- Key response functions (including public health, logistics and governance, recovery, rehabilitation, and reconstruction), information management, incident command and institutional mechanisms.

Environmental science- **(30 Hours)**

- Water-safe water, reservoir
- Water pollution
- Water related diseases.
- Purification of water
- Composition of air
- Air pollution
- Environment protection act
- Noise pollution
- Radiation & Its hazards
- Housing and health
- Disposal of solid waste-solid, liquid & biochemical waste
- Disposal of liquid waste
- Disposal of biochemical waste
- Sanitation & general hygiene

Sixth Semester

BAT.405: Specialized Anaesthesia-2 (100 Hours)

Learning Objectives

The learning objectives include anaesthetic considerations for cardiovascular and thoracic surgery, as well as hemodynamic management strategies and monitoring approaches. They also cover central venous catheters, arterial line insertion, cardiac bypass and valve replacement procedures, controlling hemodynamic changes during cardiothoracic surgeries, and neurosurgery. To guarantee patient safety and ideal surgical conditions, the objectives also involve Neuro-Anesthesia procedures and monitoring, such as total intravenous anaesthesia (TIVA). Understanding the principles and methods of neurophysiological monitoring is essential for ensuring patient safety and optimal surgical circumstances.

The course aims to teach students about anaesthesia considerations for cardiovascular and thoracic surgeries, including hemodynamic management techniques and monitoring methods. It covers anaesthesia protocols for coronary artery bypass grafting, valve replacement, and lung resection surgeries. Students will also demonstrate proficiency in selecting and inserting central venous catheters and applying infection control measures during insertion. They will also perform arterial line insertion with precision and safety, and assess collateral circulation using Allen's test.

The course also covers anaesthesia techniques for cardiac bypass and valve replacement procedures, managing cardiopulmonary bypass effectively during open-heart procedures, and ensuring stable hemodynamics throughout the procedure. Students will also manage hemodynamic changes during cardiothoracic surgeries, including hypotension and hypertension, using transesophageal echocardiography (TEE) for accurate hemodynamic monitoring.

The course also covers anaesthesia considerations for neurosurgical procedures, including patient positioning, intracranial pressure management, and neurophysiological monitoring. It also emphasizes patient safety during brain and spine surgeries. Neuro-anesthesia techniques and monitoring in neurosurgery include total intravenous Anaesthesia (TIVA) and neurophysiological monitoring methods to optimize surgical conditions and patient outcomes.

Specialized Anaesthesia-2

- Anesthetic considerations for cardiovascular and thoracic surgeries: Understanding the specific Anaesthesia considerations, hemodynamic management, and monitoring techniques for cardiac and thoracic surgeries such as coronary artery bypass grafting, valve replacement, and lung resection. 15 Hours
- Central Venous catheter and various insertions techniques (IJV, Femoral, PICC and subclavian) 6 Hours
- Arterial Line insertion and various techniques (including Allen‟s test) - 4 Hours

- Anesthesia techniques for cardiac bypass and valve replacement procedures: Learning about the specific anaesthetic protocols, cardiopulmonary bypass management, and strategies for maintaining stable hemodynamic during open-heart surgeries. - 15 Hours
- Management of hemodynamic changes during cardiothoracic surgeries: Exploring the principles and techniques for managing hemodynamic changes, such as hypotension and hypertension, during cardiothoracic surgeries and TEE. - 20 Hours
- Anaesthetic considerations for neurosurgical procedures: Understanding the unique challenges and considerations in providing Anaesthesia for brain and spine surgeries, including patient positioning, intracranial pressure management & neurophysiological monitoring. - 20 Hours
- Neuro-Anesthesia techniques and monitoring in neurosurgery: Learning about the specific anaesthetic techniques, such as total intravenous Anaesthesia (TIVA) and neurophysiological monitoring, used in neurosurgical procedures to ensure patient safety and optimal surgical conditions. -20 Hours

Practical- Specialized Anaesthesia-2: (50 Hours)

- Cardiovascular and Thoracic Surgeries: Simulation-based training on hemodynamic monitoring techniques for cardiovascular and thoracic surgeries, such as non-invasive blood pressure measurement, pulse oximetry, and capnography.
- Techniques for Inserting a Central Venous Catheter: Hands-on practice with simulation models or manikins to learn the many techniques for inserting a central venous catheter, including the internal jugular vein (IJV), femoral vein, peripherally inserted central catheter (PICC), and subclavian vein.
- Arterial Line Insertion and skills: A hands-on session with simulation models or manikins to explore the stages needed and practice aseptic skills.
- Cardiac Bypass and Valve Replacement Anaesthesia Techniques
- Case studies and video presentations illustrate the anaesthesia techniques and considerations unique to cardiac bypass and valve replacement procedures.
- Scenarios concentrate on the management of hemodynamic changes after cardiac procedures, such as preserving cardiopulmonary stability and dealing with probable consequences.
- During cardiac bypass procedures, role-playing exercises are used to simulate communication and cooperation among the anesthesia team, perfusionists, and surgeons.
- Management of Hemodynamic Changes During Cardiothoracic Surgery: Interactive sessions and case discussions on the management of typical hemodynamic changes observed during cardiothoracic surgery, such as hypotension, hypertension, and volume status optimization.
- Simulation-based training in the use of non-invasive approaches to monitor hemodynamic parameters like stroke volume variation (SVV) or pulse pressure variation (PPV) to assist fluid management.

- Simulation scenarios concentrating on intracranial pressure management and cerebral ischemia prevention during neurosurgery procedures.
- Neuro-anesthesia Techniques and Monitoring in Neurosurgery: A hands-on seminar on the principles and techniques of total intravenous anaesthesia (TIVA) for neurosurgical procedures, including the use of TCI pumps.

BAT.406: Specialized Surgery-2 (100 Hours)

Learning Objectives

The learning objectives include understanding common diseases in cardiovascular and thoracic surgery, such as coronary artery disease, valvular heart disease, aortic aneurysm, congenital heart defects, arrhythmias, lung cancer, peripheral artery disease, and deep vein thrombosis, and their surgical interventions. Recognizing congenital heart defects and their anatomical and physiological implications, understanding surgical options and techniques for repairing or reconstructing congenital heart defects, understanding different cardiac and thoracic surgical procedures, and understanding specific neurosurgical procedures. Anaesthetic considerations and techniques for CTVS and neurosurgery are also discussed, along with appropriate monitoring techniques and management strategies. Intraoperative monitoring modalities, such as ECG, arterial pressure monitoring, TEE, and neurophysiological monitoring, are also discussed, with skills in interpreting data for optimizing patient outcomes. Perioperative management of complications is also discussed, identifying potential complications and adverse events, and acquiring strategies for preventing, recognizing, and managing them to ensure patient safety and positive surgical outcomes.

The course aims to teach students the pathophysiology of major disorders in cardiovascular and thoracic surgery, as well as congenital heart problems. Students will also learn about CTVS procedures such CABG, valve replacement, lung resection, and thoracotomy, as well as how to use specialized techniques for safe and effective surgeries. They will also study neurosurgical operations such as craniotomy, spinal fusion, tumor removal, and deep brain stimulation, as well as patient placement and instrumentation. Anaesthetic concerns and approaches for CTVS and neurosurgery, as well as suitable monitoring techniques and management strategies for preserving hemodynamic stability, fluid balance, and neurophysiological monitoring, will be covered. To improve patient outcomes, intraoperative monitoring modalities such as ECG, arterial pressure monitoring, TEE, and neurophysiological monitoring will be used. Complication care during surgery will be critical, including recognizing and managing potential complications and adverse events, as well as adopting preventive initiatives to maintain patient safety and excellent surgical results.

Specialized Surgery-2

a) Diseases in CTVS: - 25 Hours

- Coronary Artery Disease: Narrowing or blockage of the coronary arteries supplying blood to the heart. Surgeries include:
- Coronary Artery Bypass Grafting (CABG): Surgical procedure to bypass the blocked or narrowed coronary arteries using grafts from other blood vessels.
- Percutaneous Coronary Intervention (PCI): Minimally invasive procedure to open blocked coronary arteries using balloon angioplasty and stent placement.
- Valvular Heart Disease: Dysfunction or damage to the heart valves. Surgeries may include:
  - Valve Repair: Restoration of the valve structure and function through surgical techniques.
  - Valve Replacement: Surgical removal of the damaged valve and implantation of a prosthetic valve.
- Aortic Aneurysm: Abnormal enlargement of the aorta, the main blood vessel supplying blood to the body. Surgeries include:
- Aneurysm Repair: Surgical repair of the weakened or enlarged section of the aorta, often through open surgery or endovascular stent grafting.
- Congenital Heart Defects: Structural abnormalities in the heart present at birth. Surgeries depend on the specific defect and may include:
- Cardiac Defect Repair: Surgical correction of congenital heart defects, such as atrial septal defect (ASD), ventricular septal defect (VSD), or Tetralogy of Fallot.
- Arrhythmias: Abnormal heart rhythms. Surgeries may include:
  - Pacemaker Implantation: Surgical placement of a device that helps regulate the heart's electrical activity.
  - Ablation Procedures: Minimally invasive techniques to destroy or isolate abnormal electrical pathways in the heart.
- Lung Cancer: Malignant tumors in the lungs. Surgeries for lung cancer include:
  - Lobectomy: Surgical removal of a lobe of the lung.
  - Pneumonectomy: Surgical removal of an entire lung.
  - Wedge Resection: Surgical removal of a small, localized portion of the lung.
- Peripheral Artery Disease (PAD): Narrowing or blockage of arteries outside the heart, typically in the legs. Surgeries may include:
- Peripheral Artery Bypass: Surgical creation of a bypass using a graft to restore blood flow to the affected area.
- Angioplasty and Stenting: Minimally invasive procedures to open blocked arteries and place stents to maintain blood flow.

- Deep Vein Thrombosis (DVT): Formation of blood clots in deep veins, commonly in the legs. Surgeries may involve:
  - Thrombectomy: Surgical removal of the blood clot from the affected vein.
  - Vein Bypass: Surgical creation of a bypass using a graft to redirect blood flow around the blocked vein.

b) Congenital Heart Defects: Structural abnormalities in the heart present at birth, such as atrial septal defect (ASD), ventricular septal defect (VSD), or Tetralogy of Fallot. Surgeries include heart repair or reconstruction, such as ASD/VSD closure or open-heart surgery. - 10 Hours.

c) Cardiovascular and thoracic surgical procedures (CTVS): Learning about the various cardiac and thoracic surgical procedures, including coronary artery bypass grafting (CABG), valve replacement, lung resection, and thoracotomy, and understanding the specialized equipment, techniques, and considerations in CTVS. - 15 Hours

d) Neurosurgical procedures: Exploring the specific neurosurgical procedures, such as craniotomy, spinal fusion, tumor resection, and deep brain stimulation, and understanding the principles, instrumentation, and patient positioning requirements in neurosurgery (Placement of horseshoe, Cranial pins and Stereotactic devices). -15 Hours

e) Anesthetic considerations and techniques for CTVS and neurosurgery: Understanding the unique Anaesthesia considerations, monitoring techniques, and management strategies for patients undergoing CTVS and neurosurgical procedures, including hemodynamic stability, fluid management, and neurophysiological monitoring. - 15 Hours

f) Intraoperative monitoring in CTVS and neurosurgery: Learning about the various intraoperative monitoring modalities used in CTVS and neurosurgery, such as electrocardiography (ECG), arterial pressure monitoring, transesophageal echocardiography (TEE), and neurophysiological monitoring, and their interpretation. -10 Hours

g) Perioperative management of complications in CTVS and neurosurgical procedures: Understanding the potential complications and adverse events that may occur during CTVS and neurosurgical procedures, and learning strategies for their prevention, early recognition, and appropriate management. - 10 Hours

Practicals- Specialized Surgery-2: (50 Hours)

a) Cardiovascular and Thoracic Surgical Procedures (CTVS):

- Demonstration and hands-on practice of setting up and familiarizing with specialized equipment used in CTVS, such as heart-lung machines, cardiopulmonary bypass circuits, and intraoperative monitoring devices.
- Simulation-based training on patient positioning and draping techniques for different CTVS procedures, including CABG, valve replacement, and lung resection.
- Role-playing exercises to simulate communication and coordination among the surgical team, including anesthesiologists, surgeons, perfusionists, and nurses during CTVS procedures.

b) Neurosurgical Procedures:

- Practical session on the instrumentation used in neurosurgical procedures, including the placement of horseshoe headrests, cranial pins, and stereotactic devices.
- Hands-on practice with simulation models or manikins to understand the principles of patient positioning and draping for different neurosurgical procedures, such as craniotomy and spinal fusion.
- Interactive discussions on the role of different instruments and equipment used in neurosurgery, including microscopes, drill systems, and neuro-endoscopes.
- Anesthetic Considerations and Techniques for CTVS and Neurosurgery:
- Case-based discussions and interactive sessions on the unique anesthesia considerations for CTVS and neurosurgical procedures, such as preoperative assessment, airway management, and selection of anesthetic agents.
- Simulation scenarios to practice anesthetic techniques specific to CTVS and neurosurgery, including induction and maintenance of anesthesia, hemodynamic management, and optimization of cerebral perfusion.
- Role-playing exercises to simulate communication and coordination between the anesthesia team and surgical team during CTVS and neurosurgical cases.

c) Intraoperative Monitoring in CTVS and Neurosurgery:

- Practical training on the setup and interpretation of various intraoperative monitoring modalities used in CTVS and neurosurgery, such as ECG, arterial pressure monitoring, TEE, and neurophysiological monitoring.
- Case discussions and interactive sessions on the significance of intraoperative monitoring data and its role in decision-making during CTVS and neurosurgical procedures.
- Hands-on practice with simulation models or manikins to understand the proper placement and troubleshooting of monitoring devices commonly used in CTVS and neurosurgery.
- Perioperative Management of Complications in CTVS and Neurosurgical Procedures:

- Interactive sessions and case discussions on the potential complications and adverse events that may arise during CTVS and neurosurgical procedures, focusing on prevention, early recognition, and appropriate management strategies.
- Simulation-based training on managing hemodynamic instability, intraoperative bleeding, and neurologic complications in a simulated environment.
- Role-playing exercises to practice effective communication, teamwork, and crisis management skills during perioperative complications in CTVS and neurosurgery.

BAT.407: Specialized Anaesthesia & Surgery 3 (100 Hours)

Learning Objectives

The course aims to provide students with a comprehensive understanding of robotic-assisted surgical procedures, anesthetic considerations and techniques, and the role of operating theatre (OT) and Anaesthesia team (AT) professionals in assisting these procedures. It also covers the use of BIS, NMT, ultrasound, and navigation systems in anaesthesia practice, their applications, principles, and interpretation in patient monitoring and procedural guidance.

The course also covers the role of NORA (Non-Operative Room Anaesthesia) in modern anaesthesia practice, including radiation safety, sedation techniques, paediatric NORA, regional anaesthesia in non-operating room settings, critical care anaesthesia outside the ICU, safety and patient selection, teamwork and communication, equipment and resources, quality improvement, and patient outcomes.

The course also covers organ transplantation procedures, including kidney, liver, and heart transplants, and their perioperative management, immunosuppression strategies, and ethical considerations. Students will learn about preoperative assessment and optimization processes for transplant recipients, as well as the multidisciplinary approach to preoperative management.

Postoperative care and immunosuppression in transplant surgeries will be identified, including immunosuppressive drug regimens, infection prevention strategies, and long-term follow-up care. Students will demonstrate understanding of the unique challenges and considerations in postoperative management of transplant recipients.

Course Outcomes

Upon completion of the course, students will be able to:

Demonstrate knowledge and understanding of robotic-assisted surgical procedures, collaborate effectively in OT team, apply appropriate anaesthesia considerations and techniques, ensure patient safety, comfort, and optimal surgical conditions during robotic procedures.

By completing the course, students will be able to effectively collaborate in OT team, apply appropriate anaesthesia considerations and techniques, and effectively manage transplant recipients' postoperative care and immunosuppression.

Specialized Surgery-2

a) Robotic-assisted surgical procedures: Learning about the principles and techniques of robotic-assisted surgeries, such as robotic-assisted prostatectomy, robotic-assisted hysterectomy, and robotic-assisted colorectal surgeries, and understanding the roles and responsibilities of the OT and AT professionals in assisting these procedures. - 4 Hours

b) Anaesthetic considerations and techniques for robotic surgeries: Understanding the Anaesthesia considerations specific to robotic-assisted surgeries, including patient positioning, pneumoperitoneum management, and anesthetic agents and techniques suitable for these procedures. - 3 Hours

c) BIS, NMT, Ultrasound, Navigation. - 2 Hours

d) NORA (Non-Operative Room Anesthesia) is a field within anesthesia that focuses on providing anesthesia services outside the traditional operating room setting. Here are some potential topics related to NORA: - 36 Hours

- Introduction to NORA: Overview of Non-Operative Room Anesthesia, its scope, and its role in modern anesthesia practice.
- Procedures in Non-Operative Settings: Anesthetic management for various procedures performed outside the operating room, such as interventional radiology, endoscopy, cardiac catheterization, and bronchoscopy,
- Radiation Safety: Pregnancy and Pediatric Radiology, Contrast Media Safety, Infection Control, Equipment Maintenance and Calibration, Patient Identification and Consent, Emergency Preparedness, Radiation Dose Optimization, Communication and Documentation, Quality Assurance and Accreditation.
- Sedation Techniques: Techniques and protocols for sedation in non-operating room settings, including patient assessment, drug selection, monitoring, and managing complications.
- Pediatric NORA: Special considerations and techniques for providing anesthesia to pediatric patients in non-operating room settings, including sedation for imaging studies, dental procedures, and emergency department interventions.
- Regional Anesthesia in NORA: The use of regional anesthesia techniques, such as nerve blocks and epidurals, in non-operating room settings for pain management and surgical procedures.
- Critical Care Anesthesia Outside the ICU: Anesthetic management and monitoring of critically ill patients in non-operating room locations, such as the emergency department, radiology suite, or cardiac catheterization lab.
- Safety and Patient Selection: Strategies for patient selection, risk assessment, and ensuring patient safety during NORA procedures, including pre-procedure evaluation, informed consent, and appropriate monitoring.
- Teamwork and Communication: Effective collaboration and communication among anesthesia providers, proceduralists, and other healthcare professionals involved in NORA to optimize patient care and outcomes.

- Equipment and Resources: Considerations for equipment, resources, and infrastructure needed to provide safe and efficient anesthesia care in non-operating room settings, including portable anesthesia machines, monitoring devices, and emergency equipment.
- Quality Improvement and Patient Outcomes: Assessment of outcomes, patient satisfaction, and quality improvement initiatives specific to NORA, aiming to enhance patient care, safety, and efficiency.

e) Organ transplantation procedures: Exploring the principles and techniques of organ transplantation surgeries, such as kidney transplant, liver transplant, and heart transplant, and understanding the perioperative management, immunosuppression, and ethical considerations associated with transplant surgeries. - 25 Hours

f) Preoperative evaluation and management of transplant recipients: Studying the preoperative assessment, optimization, and management of transplant recipients, including organ allocation, cross-matching, and immunological considerations -15 Hours.

g) Postoperative care and immunosuppression in transplant surgeries: Understanding the postoperative care protocols, including immunosuppressive drug regimens, infection prevention strategies, and long-term follow-up care for transplant recipients. -15 Hours

Practicals in Specialized Surgery-2: (50 Hours)

a) Robotic-Assisted Surgical Procedures:

- Demonstration and hands-on practice with robotic surgical systems, such as da Vinci Surgical System, including instrument docking, console operation, and manipulation of robotic arms.
- Role-playing exercises to simulate the roles and responsibilities of OT and AT professionals during robotic-assisted surgeries, focusing on effective communication, teamwork, and coordination.
- Interactive discussions on patient positioning considerations, pneumoperitoneum management, and the role of anesthesia in facilitating robotic-assisted procedures.

b) BIS, NMT, Ultrasound, Navigation:

- Hands-on training on the use of monitoring devices like Bi-spectral Index (BIS) and neuromuscular monitoring (NMT), including electrode placement, calibration, and interpretation of data.
- Practical sessions on ultrasound-guided regional anesthesia techniques, such as nerve blocks, highlighting the principles of probe handling, needle visualization, and local anesthetic administration.
- Introduction to navigation systems used in surgeries, such as image-guided navigation for spine surgery, and demonstration of their use in surgical planning and intraoperative guidance.

c) Non-Operative Room Anesthesia (NORA):

- Case-based discussions and interactive sessions on the different procedures performed in non-operating room settings, including interventional radiology, endoscopy, and cardiac catheterization.
- Simulation-based training on sedation techniques in non-operating room settings, focusing on patient assessment, drug selection, monitoring, and management of sedation-related complications.
- Practical sessions on radiation safety protocols, infection control measures, and communication/documentation practices specific to NORA procedures.

d) Organ Transplantation Procedures:

- Interactive discussions on the principles and techniques of organ transplantation surgeries, such as kidney transplant, liver transplant, and heart transplant, including organ preservation, graft implantation, and vascular anastomosis.
- Simulation scenarios to understand the perioperative management of transplant recipients, including preoperative evaluation, optimization, and immunosuppressive drug regimens.
- Role-playing exercises to simulate postoperative care scenarios for transplant recipients, focusing on infection prevention strategies, long-term follow-up care, and coordination with multidisciplinary teams.

e) Preoperative Evaluation and Management of Transplant Recipients:

- Case discussions and interactive sessions on the preoperative assessment and management of transplant recipients, including organ allocation, cross-matching, and immunological considerations.
- Hands-on training on laboratory techniques used in transplant medicine, such as HLA typing and cross-matching tests.
- Interactive sessions on ethical considerations in organ transplantation, including organ donation, allocation policies, and patient selection criteria.

f) Postoperative Care and Immunosuppression in Transplant Surgeries:

- Practical training on the management of immunosuppressive drug regimens commonly used in transplant recipients, including drug interactions, dose adjustments, and monitoring of therapeutic levels.
- Simulation-based training on infection prevention strategies for transplant recipients, focusing on identifying and managing postoperative infectious complications.
- Role-playing exercises to simulate long-term follow-up care scenarios for transplant recipients, including monitoring graft function, managing complications, and promoting adherence to immunosuppressive therapies.

RMB.401: Research Methodology and Biostatistics (60 Hours)

Learning Objectives

The course's goal is to give learners a thorough understanding of research methodologies, their applications, and the necessity of expanding knowledge and solving issues. It discusses numerous research methodologies and their applications in various fields, as well as research ethics issues such as informed permission, confidentiality, and privacy. Students will also gain knowledge of research design, fundamental biostatistics principles, data kinds, research tools and data collection methods, sampling procedures, and formulating a research proposal.

The course also emphasizes the significance of ethical issues in research, such as informed consent, confidentiality, and privacy, as well as the significance of ethical rules and legislation. Students will also learn about different forms of data, data gathering methods, and the peer review and ethical approval procedure for research ideas.

After completing the course, students will be able to identify and formulate research problems and questions, evaluate ethical considerations, select appropriate research designs, apply basic biostatistics concepts, classify and handle different types of data in research analysis, effectively use various research tools and data collection methods, and develop a well-structured research report.

Research Methodology and Biostatistics

The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

- Introduction to research methods - 5 Hours
- Identifying research problem - 5 Hours
- Ethical issues in research - 5 Hours
- Research design - 10 Hours.
- Basic Concepts of Biostatistics - 10 Hours
- Types of Data - 5 Hours
- Research tools and Data collection methods - 5 Hours.
- Sampling methods - 5 Hour
- Developing a research proposal - 10 Hours

Seventh Semester

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in simulation and treatment delivery. Students will demonstrate competence in beginning, intermediate, and advanced procedures in both areas. Students will participate in advanced and specialized treatment procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The students are expected to work for minimum 8 hours per day and this may be more depending on the need and the healthcare setting.