

Course details

Goals: This course aims to train postgraduates in the specialized management of critically ill cardiac patients through:

- Comprehensive understanding of cardiac pathophysiology and hemodynamics
- Proficiency in advanced monitoring and ventilatory management
- Familiarity with postoperative care following cardiac surgery
- Skills in managing arrhythmias, shock, and multi-organ dysfunction
- Competence in mechanical circulatory support devices
- Application of evidence-based protocols for infection control, sedation, nutrition, and weaning
- Adherence to ethical, communication, and patient safety standards
- Basic and advanced principles of cardiac ultrasound via transesophageal route
- Cardiac anatomy and hemodynamics through echocardiography
- Safe insertion, manipulation, and operation of the TEE probe
- Image acquisition, interpretation, and reporting
- Use of TEE in perioperative, ICU, and diagnostic settings
- Recognition and management of TEE-related complications

Equipments & Facilities available: Yes

Duration and schedule of The Course: 6 Months

A. Didactic Teaching

- Total teaching hours: ~60 hrs
- Weekly academic sessions: 2 hrs/week
- Includes case-based discussions, journal reviews, simulation training and video-based training.

B. Clinical Postings

- Rotations in cardiac OT, cath lab, and ICU
- Supervised management of preoperative, postoperative, and emergency cardiac cases
- Focus on intraoperative and critical care TEE
- Supervised hands-on TEE examinations

C. Skill Lab / Simulation

- Hemodynamic monitoring modules
- Airway management and ventilator workshops
- Simulation for cardiac arrest, shock management, and ECMO scenarios
- Probe handling and image acquisition using TEE simulators
- Orientation to 20 standard TEE views

- Interpretation exercises and pathology recognition modules

D. Case Logbook Requirements

Each trainee must maintain a verified logbook with:

- Minimum 100 cardiac ICU cases managed
- At least 25 mechanical ventilation cases
- 10 arrhythmia and cardiac arrest cases
- 10 hemodynamic monitoring procedures (e.g., PA catheter, arterial line)
- 5 mechanical circulatory support cases (IABP/ECMO)
- Minimum 100 supervised TEE studies (40 independently performed)
- At least 10 intraoperative TEE assessments
- Minimum 5 TEE-guided hemodynamic management cases
- Documentation of findings, complications, and supervisor certification

Eligibility:

- MD/DNB/DA Anesthesiology
- MD Medicine
- DM/Fellowship in Critical Care
- Equivalent recognized qualification

Attendance and leave rules: Minimum 80%

Duties and Responsibilities of fellows: As per University Norms

Evaluation Process:

Formative

- Monthly case presentations
- Performance evaluations
- Logbook review and supervisor feedback

Summative

- **Theory Exam** (2 Papers):
 - Paper 1: Principles of Cardiac Critical Care & Monitoring
 - Paper 2: Clinical Management & Case-based Scenarios
- **Viva Voce:** ICU cases and TEE/Echo findings, Discussion on recorded TEE Studies
- **Practical Exam:** One critical care procedure (e.g., ventilator adjustment, arrhythmia management) & Real-time TEE image acquisition and interpretation

Passing Criteria: $\geq 50\%$ in each component

Course Content (Curriculum):

A) Core Topics

- Cardiac physiology and perioperative hemodynamics
- Invasive and non-invasive monitoring in cardiac ICU
- Post-cardiac surgery care (CABG, valve, congenital repairs)
- Ventilator strategies for cardiac patients
- Inotropes, vasopressors, and antiarrhythmics
- Acute coronary syndrome and post-MI complications
- Heart failure, cardiogenic shock, and ECMO basics
- Renal replacement therapy and fluid balance
- Sepsis and infection prevention
- Weaning, extubation, and recovery protocols
- Physics and principles of echocardiography
- Ultrasound machine settings and image optimization
- Anatomy and standard 20 TEE views
- Ventricular function and wall motion assessment
- Valve anatomy and pathology (mitral, aortic, tricuspid, pulmonary)
- Hemodynamic monitoring and Doppler quantification
- Evaluation of congenital lesions and prosthetic valves
- TEE in non-cardiac surgery and ICU applications
- Complications and safety in TEE use
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B) Cross-cutting Topics

- Sedation, analgesia, and delirium management
- Nutrition and metabolic support
- ACLS/BCLS and resuscitation protocols
- Point-of-care ultrasound (POCUS) and bedside echocardiography
- Blood transfusion and coagulation management
- Documentation, communication, and ethical decision-making
- Indications, contraindications, and patient preparation
- Sedation and airway safety during TEE
- Probe disinfection and infection control
- Data archiving and reporting formats
- Clinical integration with hemodynamic data
- Medico-legal and ethical aspects

End-of-life care and family counseling