

**Board of Studies: DM Cardiothoracic and
Vascular Anaesthesia (CTVA) Curriculum
& Syllabus (Batch 2021 onwards)**

CONTENTS

	Page Number
Aims & Objectives	3
Syllabus	6
Part I Paper 1 (Basic Section I) Internal Assessment Examination 1	7
Part I Paper 2 (Basic Section II) Internal Assessment Examination 2	8
Part II Paper 1 (Advanced Section I) Internal Assessment Examination 3	11
Part II Paper 2 (Advanced Section II) Internal Assessment Examination 4	14
Curriculum	17
Clinical Posting Schedule	17
Minimum number of procedures expected to be undertaken by the residents annually	18
Evaluation during 3-year training period	19
Part I and Part II Theory & Practical Examination Pattern	19
Internal Evaluation- E Portfolio Student Evaluation System	19
E Portfolio Modules	20
Clinical Performance Evaluation	21
Academic Performance Evaluation	21
Internal Assessment Examinations	23
Other Credit based Internal Evaluation	23
Logbook Format	25

AIMS AND OBJECTIVES

Super specialty-oriented Goals

The goals of 3-year DM degree course in Cardiothoracic and Vascular Anaesthesia would be to educate and train a doctor, who is already a qualified MD/DNB in Anaesthesia, and who after satisfactory completion of training will:

1. Practice independently the art and science of Cardiothoracic and Vascular Anaesthesia and perioperative care effectively and ethically, supported by scientific knowledge and skill base.
2. Undertake responsibilities in cardiothoracic and vascular surgical operation suites, postoperative intensive care units, and in working areas of other allied specialties like Cardiology and Cardiac Radiology of patients requiring perioperative or peri-procedural care.
3. Continue to demonstrate keen interest in continuous professional development and will be well-informed about the recent advances in the Cardiothoracic and Vascular Anaesthesia super-specialty.
4. Function as a dedicated, motivated teacher who is keen to train or to share his knowledge and skills with a colleague or junior or any learner.
5. Identify the health requirements of the community and society, and fulfill professional commitments ethically and will remain compliant with the objectives of national health policies.
6. Have acquired spirit of scientific inquiry and will be oriented to the principles of research methodology and epidemiology.

Super specialty-oriented Objectives

The objectives laid out to reach the goals of the DM program in Cardiothoracic and Vascular Anaesthesia may be categorized as follows:

1. Knowledge (Cognitive domain)
2. Skills (psychomotor domain)
3. Attitude, communication abilities, human values and ethical practice

A candidate registered for the DM program should achieve these objectives by the completion of training program. Thus, at the completion of training the candidate must be able to:

Knowledge

- Demonstrate understanding of the basic sciences relevant to Cardiothoracic and Vascular Anaesthesia
- Reveal comprehension of the anaesthetic management of common and uncommon surgical conditions related to cardiac, thoracic and vascular diseases, in patients belonging to all age groups, with a thorough knowledge of the etiology, pathophysiology and surgical treatment of the disease state.
- Describe theory, of the underlying etiology, mechanism and management of critical conditions requiring cardio-pulmonary-cerebral resuscitation.
- Demonstrate understanding of principles, pathophysiology, components, conduct, and complications of cardiopulmonary bypass and cardiac assist devices.
- Show understanding of the principles, pathophysiology and complications of major vascular surgery.
- Assimilate and practice principles of critical care in postoperative cardiac, thoracic and vascular surgical intensive care units and cardiology care units.
- Recognize the disease conditions beyond the area of his/ her competence and follow appropriate referral mechanism prior to subjecting the patients to anaesthesia.
- Advices regarding the anaesthetic management of cardiac, thoracic and vascular surgical cases and conduct this management effectively.
- Update himself/ herself regularly by self-study, and by attending CMEs, workshops, conferences, and seminars relevant to the specialty.
- Teach and guide his team colleagues, students, and paramedical staff.
- Reveal understanding of medicolegal aspects of cardiothoracic and vascular anaesthesia.
- Demonstrate knowledge of administrative aspects of Cardiothoracic and vascular operation suite complex.
- Undertake audit, use information technology media, and conduct research, both clinical and biomedical, with publishing the work and presenting at various scientific events.

Skills

- Evaluate patients scheduled for cardiac, thoracic and vascular surgery in the preoperative period by taking relevant history, examining the patient, ordering relevant investigations, and interpreting them to obtain additional information about surgical condition and or the associate medical condition, which necessitates modifications of the proposed anaesthetic management.
- Administer appropriate anaesthesia to the cardiac, thoracic and vascular surgical procedures independently.
- Perform invasive procedures necessary for optimal patient care during the perioperative period.
- Provide basic and advanced cardiac life support.
- Demonstrate intensive care skills necessary for management of patients in postoperative cardiac, thoracic and vascular surgical intensive care units and cardiology care units.
- Shoulder responsibility of patient monitoring in perioperative period.
- Attitude, communication abilities, human values and ethical practice
- Adapt ethical principles, professional honesty and integrity in all aspects of cardiothoracic and vascular anaesthesia practice.
- Deliver anaesthesia care in all need of the specialty, irrespective of the social status, caste, creed or religion of the patient.
- Develop communication abilities in explaining the various options available in the anaesthetic management, critical care, pain management, and to obtain true informed consent from patient.
- Provide leadership in the operating suite and get best out of the teamwork in a congenial working atmosphere.
- Apply high moral and ethical standards while carrying out human and animal research.
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed
- Respect patient's rights and privileges including right to information and right to seek a second opinion.

Competence expected at end of training

A clearly defined and modular clinical training program will be followed by the Cardiothoracic and Vascular Anaesthesia division. It has been designed to provide the candidate a comprehensive clinical and academic training in different aspects of Cardiothoracic and Vascular Anaesthesia. The primary objective of Cardiac anaesthesia modules – an essential part of Cardiac anaesthesia residency training - is to prepare a resident to follow the role of an independent consultant physician. Such a consultant should feel comfortable functioning as a specialist in Cardiothoracic and Vascular Anaesthesia at secondary and tertiary care hospitals in India. The operating room and intensive care unit is where most clinical training occurs. In addition to the clinical training, academic components of training process are focused toward transforming the trainee into a mature consultant.

SYLLABUS

It is desired that a DM resident builds the theoretical knowledge-base in the domain of Cardiothoracic and Vascular Anaesthesiology in a step ladder manner rather than stuffing the brain with literature in a haphazard way. Hence the Division of Cardiothoracic and Vascular Anaesthesia has split the entire program syllabus into four sections (two basic and two advanced) for part I & II examinations and internal assessment examinations and encourages a resident to focus on strengthening each component of a section over a certain time period.

The syllabus for DM Cardiothoracic and Vascular Anaesthesia program encompasses the knowledge that a candidate should acquire at 18 months training period (Part I examination: Basic Sections 1&2) and 36 months training period (Final or Part II examination - Advanced Sections 1&2). It focuses on the fulfillment of the overall aims and objectives of the training program.

Name of section	DM Exam (Part I & Part II)	Internal assessment exam
Basic section 1	Part -I exam (Paper 1) at 18 months training	1 st Internal assessment
Basic section 2	Part -I exam (Paper 2) at 18 months training	2 nd Internal assessment
Advanced section 1	Part -II exam (Paper 1) at 36 months training	3 rd Internal assessment
Advanced section 2	Part -II exam (Paper 2) at 36 months training	4 th Internal assessment

Details of the four sections of syllabus are as follows:

Basic Section 1 ([Syllabus for Part I Exam \(Paper 1\) & 1st Internal Assessment Exam](#))

- a) Applied anatomy
 - i. Basic and correlative cardiac, thoracic and vascular anatomy
 - ii. Embryological development of heart, great vessels and lung
- b) Applied physiology
 - i. Cardiac cycle, cardiac output, blood pressure, blood volume, cardiac contractility, preload, afterload, Frank-Starling Law, cardiac pressure waveforms, determinants of coronary circulation, autonomic control of heart and vasculature, cardiac reflexes, cardiac electrical conduction, ischaemic preconditioning, coronary steal.
 - ii. Pulmonary circulation, physiological function of lung, pulmonary function tests
 - iii. Perioperative physiology of kidney, brain and liver
 - iv. Blood Hemostasis (including coagulation cascade), vascular endothelial function.
- c) Applied pharmacology
 - i. Pharmacological principles: Pharmacokinetics, pharmacodynamics, drug distribution, bio-disposition, routes of administration, elimination, pharmacological actions and adverse reactions
 - ii. Cardiac glycosides, antihypertensives, diuretics, beta-blockers, calcium channel blockers, ACE inhibitors, angiotensin-receptor blockers, inotropes, vasopressors, vasodilators, antiarrhythmic agents, drugs for coronary artery disease, antianginal drugs, anticoagulants, antiplatelet agents, antifibrinolytics, Nitric oxide and Protamine.
 - iii. Drugs acting on tracheobronchial tree, pulmonary parenchyma and pulmonary circulation
 - iv. Inhalational and intravenous anaesthetic drugs, drugs acting on neuromuscular transmission, opioids, analgesics, sedatives and hypnotics, steroids, premedication drugs

- d) Physics
 - i. Gas laws; compressed gases; medical gas cylinders
 - ii. Fluid dynamics, laminar flow, turbulent flow, pressure gradients
 - iii. Physics of anaesthetic apparatus (including anaesthesia circuits and oxygen therapy),
 - iv. Principles of anaesthetic agent vaporization,
 - v. Physics of mechanical ventilators
 - vi. Physics related to pressure transducers and errors in measurement.
- e) Historical aspects of development of cardiopulmonary bypass.
- f) Medical statistics, Research methodology & Principles of Evidence based medicine:
 - i. Basic terminology, study designs, statistical analysis, statistical tests
 - ii. Evidence based medicine (including levels of evidence & grades of recommendation)

2. [Basic Section II \(Syllabus for Part I Exam \(Paper 2\) & 2nd Internal Assessment Exam\)](#)

- a) Pathophysiology and classification of cardiac diseases (if any)
 - i. Atherosclerosis
 - ii. Heart failure
 - iii. Rheumatic fever and rheumatic heart disease
 - iv. Infective endocarditis
 - v. Cardiac arrhythmias
 - vi. Systemic inflammatory response syndrome in cardiac surgery
 - vii. Aortic cross-clamping and unclamping
 - viii. Classification of congenital heart diseases
 - ix. Effects of chronic hypoxemia
 - x. Pulmonary hypertension
- b) Perioperative monitoring (excluding specific topics on echocardiography)
 - i. Perioperative ECG for diagnostic purpose, ST segment analysis
 - ii. Invasive arterial pressure monitoring
 - iii. Central venous pressure monitoring
 - iv. Methods of cardiac output measurement (invasive & non-invasive)

- v. Coagulation monitoring (including Thromboelastography / ROTEM)
 - vi. Respiratory gas monitoring, Capnography & Pulse oximetry
 - vii. Neurological monitoring in cardiac surgery
- c) Cardiopulmonary bypass
- i. Pathophysiology of CPB (including systemic response to extracorporeal circuit / cardiopulmonary bypass circuit)
 - ii. Parts of CPB (including CPB circuit and miniaturized CPB circuit)
 - iii. Conduct of CPB
 - iv. Drug disposition during CPB
 - v. Monitoring during CPB
 - vi. CPB Emergencies
 - vii. Organ protection during cardiopulmonary bypass
 - viii. Assessment of optimal perfusion during CPB
 - ix. Discontinuing CPB
 - x. Safety issues during CPB (including checklists before CPB institution and for weaning from CPB)
 - xi. Deep Hypothermic Circulatory arrest, Antegrade and retrograde cerebral perfusion techniques
 - xii. Ultrafiltration during CPB
 - xiii. Complications of CPB
 - xiv. CPB in pediatric and neonatal population
 - xv. CPB in a pregnant patient
- d) Principles of Myocardial protection
- i. Physiological basis of myocardial protection
 - ii. Adult vs Neonatal myocardial protection
 - iii. Functions of cardioplegia
 - iv. Cardioplegia delivery systems
 - v. Types of cardioplegia solutions (including merits and demerits)
 - vi. Crystalloid versus blood cardioplegia
 - vii. Methods of cardioplegia delivery

- e) Principles of Cardio-pulmonary & Cerebral resuscitation / Emergency care
 - i. CPR in adult and paediatric populations
 - ii. Acute coronary syndrome
 - iii. Resuscitation of cardiogenic shock
 - iv. CPR in Cardiac surgical ICU (after cardiac surgery)
- f) Blood gas analysis and acid-base disorders
- g) Blood management during cardiac surgery (including blood conservation strategies)
- h) Pacemakers, implantable cardioverter defibrillators and cardiac resynchronization therapy devices
- i) Basic interpretation of cardiac imaging modalities (including CT Angiography and coronary angiography)
- j) Procedures in Cardiothoracic and Vascular Anaesthesia (including USG guided techniques):
 - i. Arterial cannulation
 - ii. Central venous and pulmonary artery catheterization
 - iii. Lung isolation techniques (Double lumen endobronchial intubation and bronchial blockers) including selective lobar collapse using bronchial blockers
 - iv. Flexible Bronchoscopy
 - v. CSF drainage / Lumbar drainage for spinal cord protection
 - vi. Percutaneous tracheostomy
 - vii. Stellate ganglion block
 - viii. Regional anaesthesia
 - a. Epidural block
 - b. Paravertebral block
 - c. Caudal epidural block
 - d. Chest / Truncal nerve blocks for cardiothoracic surgeries
 - i. Erector spinae block,
 - ii. PECS I block & PECS II block
 - iii. Serratus anterior plane block
 - iv. Parasternal and transversus thoracic plane block
 - v. Intercostal block

3. Advanced Section I (Syllabus for Part II Exam (Paper1) & 3rd Internal Assessment Exam)

a) Echocardiography

- i. Physics of ultrasound
- ii. Knobology, image optimization, Doppler techniques, M-mode and their applications
- iii. Standard views of Transesophageal echocardiography, Transthoracic echocardiography, and Epicardial & Epiaortic echocardiography and their applications
- iv. Tissue Doppler imaging
- v. Artifacts and pitfalls during clinical echocardiography
- vi. Global and regional LV systolic function
- vii. Left ventricular diastolic dysfunction
- viii. RV systolic function and diastolic function
- ix. Hemodynamic assessment using TEE
- x. Valvular heart disease
 - a. Aortic stenosis, Aortic valve incompetence
 - b. Aorta, Aortic Aneurysm and Aortic Dissection
 - c. Mitral stenosis, Mitral valve regurgitation and Mitral valve prolapse (including Rheumatic, degenerative and ischaemic)
 - d. TEE for Mitral valve repair vs Mitral valve replacement
 - e. Perioperative evaluation of Prosthetic heart valve
 - f. Tricuspid valve regurgitation and tricuspid stenosis
- xi. Right ventricle and pulmonary arterial hypertension
- xii. Pericardium (Pericarditis – Constrictive & Restrictive, Pericardial effusion and Cardiac tamponade)
- xiii. TEE during CABG (including OPCABG)
- xiv. TEE for cardiac masses
- xv. Systematic sequential segmental analysis for congenital heart disease
- xvi. Acyanotic congenital heart diseases
- xvii. Cyanotic congenital heart diseases

- xviii. Obstructive congenital heart diseases
- xix. Stress echocardiography and Strain assessment
- xx. 3D echocardiography
- b) Preoperative evaluation, diagnosis, anaesthesia and perioperative care for Cardiothoracic & vascular surgeries
 - i. Risk assessment for adult and paediatric patients undergoing Cardiothoracic & Vascular procedures (including specific scoring systems & prognostication methods)
 - ii. CABG: OPCAB and on pump CABG
 - iii. Complications of Myocardial infarction and related cardiac surgeries
 - iv. Cardiac surgery in Infective endocarditis
 - v. Valvular heart diseases - Valve repair and replacement (including rheumatic and degenerative disease)
 - vi. Arrhythmia surgery
 - vii. Pulmonary thromboendarterectomy
 - viii. Surgery on aorta and major vessels: Aortic aneurysm, dissection, Coarctation of aorta (including brain and spinal cord protection)
 - ix. Surgery for peripheral vascular disease
 - x. Carotid artery surgery
 - xi. Thoracic surgery / procedures
 - a. Surgery for lung diseases
 - b. Video-assisted thoracoscopy
 - c. Surgery for mediastinal mass
- c) Principles of perioperative management of congenital anomalies (simple and complex congenital cardiac conditions) in pediatric & adult patients:
 - i. ASD, VSD, PDA, AP window
 - ii. Tetralogy of Fallot, TOF Pulmonary atresia and / or MAPCAs subsets, TOF Absent pulmonary valve syndrome
 - iii. Total anomalous pulmonary venous connection
 - iv. Transposition of great arteries
 - v. Atrioventricular canal defects / Endocardial cushion defects

- vi. Ebstein's anomaly
 - vii. Single ventricle physiology, stage-wise palliation (including BT shunt, Norwood procedure, Glenn bidirectional shunt, and total cavo-pulmonary connections)
 - viii. Duct dependent systemic and pulmonary circulation physiology, and the principles of Balancing the circulations (Qp:Qs)
 - ix. Grown-up congenital heart (GUCH) and late or reinterventions following pediatric congenital cardiac surgery
- d) Redo cardiac surgery
 - e) Emergency cardiac surgery – Indications, resuscitation and management
 - f) Pulmonary hypertension in cardiac patient (Perioperative management)
 - g) Pre-existing organ dysfunction (including renal dysfunction, stroke) and cardiac surgery
 - h) Cardiac surgery in patients with hematological disorders
 - i) Postoperative care in surgical ICU:
 - i. Fast-tracking & Enhanced recovery after cardiac surgery
 - ii. Postoperative bleeding
 - iii. Myocardial infarction after myocardial revascularization / Postoperative MI
 - iv. Low cardiac output syndrome (including vasoplegia)
 - v. Pulmonary embolism causing circulatory failure
 - vi. Postoperative Right ventricular dysfunction
 - vii. Mesenteric ischaemia
 - viii. Necrotizing enterocolitis
 - ix. Stroke or seizures after cardiac surgery
 - x. Postoperative atrial fibrillation after cardiac surgery and other arrhythmias
 - xi. Other postoperative complications (Cardiac, respiratory, neurological)
 - xii. Pain management after cardiac surgery
 - xiii. Management of sepsis
 - xiv. Antibiotic stewardship
 - xv. Acute Kidney Injury & Dialysis in cardiac ICU
 - xvi. Nutrition in ICU (including 'prehabilitation' before cardiac surgery)

- j) Ventilatory therapy
 - i. Ventilatory waveforms
 - ii. Modes of ventilation
 - iii. Principles of ventilatory therapy
 - iv. Newer modes of ventilation
 - v. Prediction of weaning failure after cardiac surgery
 - vi. Difficult weaning from ventilation – Evaluation and management
- k) Pregnancy and heart disease
 - i. Cardiac surgery during pregnancy
 - ii. Cath lab interventions during pregnancy for significant cardiac disease
 - iii. Obstetric anaesthesia for patients with significant cardiac disease
 - iv. Peripartum cardiomyopathy
- l) Non-cardiac surgery in patient with cardiac disease
 - i. Emergency non-cardiac surgery in a patient with significant cardiac disease
 - ii. Non-cardiac surgery in patient with operated / unoperated congenital heart disease
 - iii. Non-cardiac surgery in GUCH

4. [Advanced Section II \(Syllabus for Part II Exam \(Paper 2\) & 4th Internal Assessment Exam\)](#)

- a) Anaesthetic management in cardiology / radiology suite
 - i. Coronary angiography and Percutaneous coronary intervention
 - ii. Interventions for significant valvular heart disease
 - iii. Interventions for complications of MI (including device closure for VSR)
 - iv. Electrophysiological procedures (including emergency pacemaker insertion)
 - v. Perioperative Cath lab interventions (emergent/urgent) (including BAS, PDA stenting, RVOT stenting, MAPCA coiling)
 - vi. Elective Cath lab interventions (including device closure of cardiac defects, RVOT palliation, Cath study in single ventricle palliation pathway)
 - vii. CT scan in thoracic and vascular surgery and CT angiography
 - viii. Cardiac MRI and MR angiography in congenital cardiac conditions

- ix. Interventional radiology / Hybrid procedures (Staged aortic aneurysm repair
Ex: Carotid debranching followed by TEVAR)
- x. Resuscitation in non-operating room locations
- b) Anaesthesia related to advanced Cardiothoracic and Vascular Surgical procedures (including TEE)
 - i. Heart transplantation including assessment of donor heart, preservation and transport
 - ii. Lung transplantation including assessment of donor lung, preservation and transport
 - iii. Heart and Lung transplantation
 - iv. ECMO (including ECMO for lung transplant recipients)
 - v. Advanced heart failure (including various types of cardiomyopathies)
 - vi. Anesthesia and perioperative TEE for placement of Ventricular assist devices
 - vii. Robotic surgery
 - viii. Port-access surgery
 - ix. Hybrid operating room
 - x. Minimally invasive cardiothoracic and Vascular surgery
 - xi. Endovascular procedures
 - xii. Percutaneous valve interventions (Aortic-TAVR, Mitral, Pulmonary)
 - xiii. Left atrial appendage device closure
 - xiv. Mechanical circulatory support
 - a. Intra-aortic balloon pump, Impella, TandemHeart
 - b. Left and right ventricular assist devices
 - c. Total artificial heart
- c) Lung Ultrasound (in Cardiothoracic perioperative care)
- d) Point of care ultrasound in Cardiothoracic & Vascular Anaesthesiology
- e) Recent advances in last 5-10 years in Cardiothoracic & Vascular Anaesthesia
 - i. Landmark trials (RCT/Meta-analysis) related to Cardiothoracic and Vascular Anaesthesia and perioperative critical care and their practice implications
 - ii. Important original research articles and reviews from journals related to Cardiothoracic and Vascular Anaesthesia and Critical care

- iii. Practice guidelines published by international societies related to Cardiothoracic and Vascular sciences
- iv. Debatable issues (Pro and Con) related to Cardiothoracic and Vascular Anaesthesia and Critical care
- v. Recent advances in Pharmacology, Perfusion technology, Cardiac critical care and Echocardiography

Recommendations for Textbooks and Journals

Textbooks: A trainee is expected to gain the academic knowledge through standard textbooks related to the specialties like Cardiothoracic Vascular anaesthesia, Echocardiography, Critical care, Cardiothoracic & Vascular surgery and Cardiology.

Journals: A trainee is expected to upgrade his/her academic knowledge through published articles of various journals related to Cardiothoracic Vascular anaesthesia, Echocardiography, Critical care, Cardiothoracic & Vascular surgery and Cardiology.

CURRICULUM

The Clinical training modules (posting) and duration

Clinical Training	Duration
Adult Cardiothoracic and Vascular Anaesthesia	15 months
Pediatric Cardiac Anaesthesia	11 months
Adult Cardiac Surgical ICU	3 months
Paediatric Cardiac Surgical ICU & Cardiac Medical ICU	3 months
Cardiology Cath Labs (Diagnostic, Interventional & Electrophysiology)	2 months
Cardiac Radiology (MRI suite, CT room & DSA lab)	1 month
Advanced training in Cardiothoracic Vascular anaesthesia (LVAD, Heart/ Lung transplantation, ECMO, Robotic surgery & Thoracic trauma)	1 month
Bio Medical Technology and Bio Statistics	2 weeks

Minimum number of procedures expected to be undertaken annually by the residents

Procedures	Minimum Number
Insertion of arterial cannula	100
Insertion of central venous cannula	100
Ultrasound guided vascular cannulations	50
Endotracheal intubations using airway gadgets like video laryngoscope	20
Insertion of pulmonary artery catheter	2-5
Placement of double lumen endobronchial tube & Bronchial blocker	2-5
Fiberoptic bronchoscopy	5-10
Epidural catheterization	2-5
Caudal epidural, Paravertebral block	2-5
Percutaneous tracheostomy	1-3
Transesophageal Echo examinations	100
Transthoracic Echo examinations	50
Epicardial Echo examinations	10
Ultrasound guided regional blocks	10
Lung ultrasound	10
CSF drainage	2-5

EVALUATION DURING 3-YEAR TRAINING PERIOD

Part I & II Theory and Practical Examination Pattern

Part I Examination (at 18 months)

Theory examination Part I (Paper 1 & 2) = 200 marks

Part II Examination (at 36 months)

Theory examination Part II (Paper 1 & 2) = 200 marks

Practical examination Part II = 400 marks

Internal evaluation = 200 marks

Grand Total = 1000 marks

Practical examination part II (400 marks)

Long Case I = 100 marks

Short Case I = 50 marks

Short case II = 50 marks

Practical skills = 100 marks

Viva Voce = 100 marks

Internal evaluation (200 marks) E-Portfolio Student Evaluation System

Every clinical and academic activity of the candidate during the 3 years will be entered in the modules (14 numbers) in the E-Portfolio Student Evaluation System in intranet and assessed on a credit basis.

The distribution of marks will be as follows:

1st year (50 credit marks) + 2nd year (50 credit marks) + 3rd year (50+50 credit marks) =200

E Portfolio Modules

	Module name	Credits for			Total Credits	
		1st year	2nd year	3rd year		
Module 1	Preoperative Evaluation and Patient Preparation	5	5	5	15	
Module 2	Operation Room Performance					
	Operation Room Preparation	2	2	2	6	
	Procedure skills	2	2	2	6	
	Patient Anaesthesia Charting and TEE Reporting	2	2	2	6	
	Patient care and safety	2	2	2	6	
	Patient transfer and Hand over	2	2	2	6	
Module 3	Intensive Care Unit Management and ICU procedures	5	5	5	15	
Module 4	Catheterization labs and imaging suites Performance	5	5	5	15	
Module 5	Academic Presentations				0	
	Seminars	5	5	5	15	
	Journal Club	5	5	5	15	
	Case Presentations	5	5	5	15	
Module 6	Internal Assessment Examination (Theory)	10	10	10	30	
Total					150	
Module 7	Biostatistics Examination				5	
Module 8	BMT Wing Examination				3	
Module 9	Original articles submitted for publication				4	
Module 10	Thesis				20	
Module 11	Paper presented in Conferences/ Workshops				4	
Module 12	Award/ Recognitions/ Honors/ Publications				4	
Module 13	Attendance of Hospital work & Academics				5	
Module 14	Logbook				5	
	Total				50	50
Grand total					200	

Clinical performance evaluation (Modules 1-4)

The clinical performance of every trainee resident will be evaluated by faculty members from the division of Cardiothoracic & Vascular Anaesthesia on 12-monthly basis under four modules:

Module 1: Preoperative Evaluation and Patient Preparation

Module 2: Operation Room Performance (OR Preparation; Procedure Skills; Anaesthesia Charting & TEE Reporting; Patient Care & Safety; Patient Transfer & Handover)

Module 3: Intensive Care Unit Management and ICU procedures

Module 4: Catheterization labs and imaging suites Performance

Academic performance evaluation (Module 5)

Marks will be obtained in following academic activities

1. Evaluation of Seminar presentations
2. Evaluation of Journal presentations (Original articles; Pro & Con sessions; Practice Guidelines; Systematic Review; Meta-analysis; Best Evidence topics; Case reports)
3. Evaluation of Clinical case presentations & Problem Based Learning Discussion

The evaluation of academic performance of a trainee resident will be done by faculty members from Cardiothoracic & Vascular Anaesthesia division attending the sessions. Three faculty members attending an academic presentation will award marks against various academic performance parameters as charted below. All records will be maintained by the Program In-charge & Program Coordinator of the division.

Academic Presentation Evaluation Form

SL No	Type of Presentation	TOPIC	Presented by	MARKS (out of 100 each)			FINAL SCORE (out of 100)
				FACULTY			
				1	2	3	
1							
2							
3							
4.							
5.							
6.							

Note: Marks will be awarded by the faculties on the basis of following observations

Clinical Case Presentations	Journal Articles	Seminars
<ol style="list-style-type: none"> 1. Completeness of history 2. Accuracy of clinical signs 3. Assessment of problem and investigational plan 4. Anesthesia and perioperative care plan 5. Ability to defend perioperative management 6. Clarity of Presentation 7. Knowledge of the current and past literature 	<ol style="list-style-type: none"> 1. Extent of understanding of scope & objectives of the paper 2. To critically evaluate methods, analysis and interpretation of study 3. Whether cross reference have been consulted 4. Whether other relevant publications consulted 5. Ability to respond to questions on the paper/subject 6. Ability to defend the paper 7. Clarity of Presentation 8. Audio-Visual aids used 9. Ability to propose new research ideas based on study discussed 	<ol style="list-style-type: none"> 1. Whether all relevant publications consulted 2. Understanding of the subject 3. Completeness of the preparation 4. Clarity of presentation 5. Current concepts coverage 6. Ability to answer the questions 7. Time scheduling 8. Appropriate use of Audio-Visual aids 9. Overall Performance

Internal assessment examinations (Module 6)

Internal theory examinations will be conducted every year as per the following schedule.

First year internal examination (July/August): 10 credit marks

Second year internal examination (January): 10 credit marks

Third year internal examination

(i) January: 5 credit marks

(ii) July/August: 5 credit marks

Other Credit-based internal evaluation (Module 7-14)

These academic activities will be awarded 50 credit marks. The distribution of these credit marks will be as follows:

Module 7: Biostatistics course and examination: 5 credit marks

Module 8: BMT wing posting and examination: 3 credit marks

Module 9: Original article submitted for publication: 4 credit marks

Module 10: Thesis evaluation: 20 credit marks

The senior resident in Cardiothoracic & Vascular Anaesthesia Division should complete a thesis consisting of prospective study preferably. The thesis will be evaluated by an external examiner. Thesis should be submitted for evaluation within 30 months after joining the training program.

Module 11: Presenting a paper in national or regional conference/workshop: 4 credit marks

Module 12: Awards/ Recognitions/ Honors/ Publications: 4 credit marks

Module 13: Attendance of Hospital work & Academics: 5 credit marks

Module 14: Logbook: 5 credit marks

Summary of Internal Evaluation of 3 Years

SI No.	MODULES	MAXIMUM MARKS
1.	Clinical performance	75
2.	Academic presentations	45
3.	Internal assessment examinations	30
4.	Thesis	20
5.	Other academic achievements (Publications, Conference presentations, Awards etc.)	17
6..	BMT posting	3
4.	Biostatistics	5
5.	Logbook	5
Total 200		

The academic activities of the resident to be entered in the E-Portfolio in the intranet in the same week. The scores for the same will be entered by the program coordinator and validated by program in charge. The above overall assessment will form the basis for certifying satisfactory completion of course of study, in addition to the attendance requirement.

LOGBOOK FORMAT

A Logbook should be maintained by every resident in the format compliant to the BOS guidelines.

The draft format of the contents of log book is given below:

YEARLY POSTING SCHEDULE
ACADEMIC ACTIVITIES
ACADEMIC CLASSES ATTENDED
ACADEMIC CLASSES PRESENTED
CONFERENCES, CMEs AND WORKSHOPS ATTENDED
PRESENTATION IN CONFERENCES
THESIS / STUDY PROJECTS
JOURNAL PUBLICATIONS

ACADEMIC CLASSES ATTENDED

Date	Topics	Presenter

ACADEMIC PRESENTATIONS BY RESIDENT

Date	Topic	Presenter

CONFERENCES AND WORKSHOPS ATTENDED

Date	Conference/CME/Workshops	Organized by

PRESENTATION IN CONFERENCES

DATE	CONFERENCE	POSTER/ PODIUM	TITLE

THESIS / STUDY PROJECTS

Title:

Investigators:

Ethics committee approval:

Aims and Objectives:

Methods:

Results:

Conclusion:

INVASIVE / NON-INVASIVE PROCEDURES PERFORMED

Sl no	Procedures	No of Procedures done under supervision	No of Procedures done independently
1.	Invasive Arterial Line		
2.	Central Venous Line		
3.	Ultrasound guided Vascular Cannulations		
4.	Trans Esophageal Echocardiography		
5.	Transthoracic Echocardiography		
6.	Epicardial Echocardiography		
7.	Ultrasound guided Regional Nerve Blocks		
8.			
9.			
10.			
11.			
12.			