

# Curriculum

## DrNB Super Specialty

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# Cardio Vascular & Thoracic Surgery (Direct 6 Year)

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- ◆ Syllabus
- ◆ Log Book
- ◆ Operative Work Load
- ◆ Rotational Posting
- ◆ Illustrative Study Material

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## I. INTRODUCTION

DNB Cardio-Thoracic is an integrated 6 year training programme in Cardio Vascular and Thoracic Surgery. The training includes reasonable exposure to general surgery and critical care management, pertinent with Cardio Vascular and Thoracic Surgery. After qualifying in the final examination of the NBE, the candidate shall practice the specialty of Cardio Vascular and Thoracic Surgery. He/she shall have thorough knowledge and requisite skills of the specialty. He/she should be reasonably acquainted with the recent advances and be able to perform basic operative procedures independently. He / She should be able to make decisions regarding patient management and adopt favourable attitudes. During this period, the candidate will also acquire skills in research methodology by writing a dissertation / thesis, presenting scientific papers and by writing scientific articles.

### (I) Duration of the Course:

Every candidate admitted to the 6 year training programme shall pursue a regular course of study (on whole time basis) in the concerned recognized institution under the guidance of recognized post graduate teacher / senior consultant cardio thoracic surgeon for the period of 6 years.

### (ii) Degree

Candidates declared successful in the examinations prescribed and fulfilling the eligibility criteria shall be conferred Diplomate of the National Board (DNB-Cardio Vascular and Thoracic Surgery).

## II. OBJECTIVES OF THE PROGRAMME

(A) **AIM:** The aim of the course is to develop human resources in the field of Cardio Vascular and Thoracic Surgery who shall:

1. Provide the health care to the patients needing Cardio Vascular and Thoracic Surgical care.
2. Teach and train future undergraduate and post graduate medical students and junior doctors in Cardio Vascular and Thoracic Surgery in Medical Colleges, Institutions, Hospitals and such educational initiatives including those for nursing and allied health workers.

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3. Carry out and guide research to improve the practice of the art and science of surgery.
  4. Have management capabilities to manage personnel and budgets to make health care cost-effective. Organize health teams to provide care during natural or man-made calamities.
  5. Develop further acumen and skills in the areas of their interest and / or specialize to practice existing or new specialties allied to surgery through further training programmes as required.
  6. Practice the art and science of surgery in his/her field of practice and seek and provide consultation as required. He/she will be able to provide comprehensive and good quality surgical care in Cardio Vascular and Thoracic Surgery including pre-operative and postoperative care.
  7. Conduct research and communicate the findings, result and conclusion to his fraternity.
  8. Keep abreast with the latest developments by self-learning and / or participating in continuing medical education programmes.
  9. Organize and manage administrative responsibilities for routine day to day work as well as situations including natural and / or man-made accidents / calamities.
  10. Manage situations calling for emergency interventions in the sphere of surgical specialties and also routine problems in their areas within the ambit of the surgeon.
  11. Develop his / her knowledge, skills and attitudes of his / her areas of interest and become specialist in allied specialties.
  12. Exhibit awareness of the importance of surgical audit and the need for considering
  13. cost-effectively in patient management.
  14. Be aware of one's professional limitations and be able to refer to appropriate centres at the optimum time, when required.
  15. Exhibit awareness of the need for accurate documentation in medical records including medico-legal cases.
  16. Adopt ethical procedures in the field of doctor-patient relationship.
  17. Exhibit professionalism, proper attitude in dealing with patients and relatives and be able to communicate with them effectively.

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**(B) EDUCATIONAL OBJECTIVES**

- 1) Acquire knowledge of structure and functions of human body as related to the practice of Cardio Vascular and Thoracic Surgery.
- 2) Acquire basic knowledge of general surgery, critical care management, Chest
- 3) Medicine, Cardiology & Imaging, related to Cardio Vascular and Thoracic Surgery.
- 4) Acquire knowledge of structure and functions of human body, causes thereof and of principles underlying the use of drugs and therapeutic procedures for restoring the deranged structures and functions to normancy.
- 5) Demonstrate the ability to critically evaluate recent medical literature from journals, update knowledge and adapt diagnostic and therapeutic procedures for based on this appraisal.
- 6) Demonstrate familiarity with such diagnostic skills and laboratory procedures as are relevant to the diagnosis and evaluation of patient under his/her care and able to conduct some of these procedures in case it becomes necessary to do so.
- 7) Demonstrate comprehensive knowledge of theoretical aspects of Cardio Vascular and Thoracic Surgery including recent advances
- 8) Demonstrate the knowledge of ethics and medico-legal aspects related to the practice of Cardio Vascular and Thoracic Surgery.
- 9) Special emphasis on the understanding of diseases prevalent in our country.
- 10) Adequate knowledge, skill and competence of diagnosis, treatment and prognosis of Cardio Vascular and Thoracic disorders.
- 11) Principles of management of accidents, trauma and other emergencies related to Cardio Vascular and Thoracic Surgery.
- 12) Adequate proficiency in pre-operative and post-operative management of patients.
- 13) Knowledge of basic principles, management of common conditions and emergencies in other specialties like Critical Care, Common Medical Disorders, Cardiac Disorders, Metabolic Disorders, Congenial malformations.
- 14) Familiarize with basic principles of anesthesiology and resuscitative measures.
- 15) Candidate should have adequate knowledge of basic science as applicable to Cardio Vascular and Thoracic Surgery.

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### III. SYLLABUS

#### A. The Aim:

- i) To establish a strong foundation in basic sciences in the field of Cardio Vascular and Thoracic Surgery before the candidate acquires knowledge and skills in clinical and surgical areas of the specialty.
- ii) To establish a foundation of general surgery and critical care medicine, related to Cardio Vascular and Thoracic Surgery

#### B. Syllabus for Part - I

During the first & second years candidate shall cover the following areas:

- i) Applied Anatomy: Chest wall, diaphragm, trachea, bronchi, lungs, mediastinum,
- ii) oesophagus, pericardium, heart & great vessels etc.
- iii) Applied physiology: Respiration, gas exchange, pulmonary function tests, assisted ventilation, Heart sounds, murmurs, cardiac cycle, regional circulation, cardiac metabolism, acid base as well as fluid and electrolyte balance, extra corporeal circulation, hypothermia, Oesophageal function and motility disorders including gastro oesophageal reflux.
- iv) Applied pathology: Thoracic trauma, chest wall tumors, mediastinal tumors, pleural disorders, disorders of trachea, Bronchus, disorders of lung: pulmonary suppuration, pulmonary tuberculosis, benign and malignant lesions of lung, benign and malignant lesions of oesophagus, diaphragmatic hernia, reflux oesophagitis, pericarditis, pericardial effusion, diseases of Heart and great vessels, pulmonary embolism.
- v) Applied microbiology: Pulmonary infections, infective endocarditis, infection following cardiovascular- thoracic surgery.
- vi) Pharmacology: Knowledge of medicines used in this specialty
- vii) Cardiovascular Engineering: Concept of flow, pressure, gradients, heart as a pump, Efficiency of heart and valves, haemodynamic assessment, prosthetic and bioprosthetic heart valves, extra corporeal circulation, hypothermia, IABP, ECMO, Ventricular assist devices, materials in cardiovascular application and bio compatibility, pacemakers, defibrillation, implantable cardioverter defibrillator,
- viii) Basics of General Surgery: Inflammation, Abscess, Cellulitis, Sepsis, Shock, Haemorrhage, Wound healing Tumors – Benign and Malignant, Systemic



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- General Surgery - Overview (Abdominal Wall, GI, Hepato -Biliary – Pancreatic, Genito – Urinary, Thyroid, Breast, regional lymph node, upper and lower limbs).
- ix) Critical Care Medicine : Cardiac arrest, Cardiopulmonary and cardio cerebral resuscitation, Ventilators, cardiac monitors, Swan - Ganz catheter and cardiac output measurement, Inotropes, Renal failure and dialysis.
  - x) Imaging: X-Ray, USG, CT, MRI , PET, etc. Nuclear Medicine
  - xi) Cardiology: Noninvasive – ECG, Echocardiography, Invasive - Cardiac Cath and Angiography.

### C. Syllabus for Part – Ii

During the 3rd, 4th & 5th years candidate shall cover the following areas:

- i) Cardiac Surgery: Congenital Cardiac Surgery, Heart Valve Surgery, Coronary artery bypass surgery, Pediatric and neonatal cardiac surgery, Re-Do cardiac surgery
- ii) General Thoracic Surgery: Surgery of chest wall, diaphragm, mediastinum, trachea and bronchus, pleura and lungs, Oesophagus, Chest Trauma, Neonatal cardiovascular–thoracic emergencies.
- iii) Inter costal drainage (ICD)
- iv) Vascular Surgery: Surgery of great vessel, Peripheral Vascular Surgery, Diseases of veins - Varicose veins, DVT, Vascular Trauma
- v) VATS (Video assisted thoracic surgery) Basics: Diagnostic and Therapeutic Procedures
- vi) Thoracic Endoscopies: Bronchoscopy (Rigid and Fibre optic), Oesophagoscopy (Rigid and Fibre optic), Mediastinoscopy
- vii) Pacing and Electrophysiology
- viii) Cardio thoracic anesthesia: Anesthesia techniques, Single lung anesthesia, Pediatric & Neonatal cardiac anesthesia, Peri operative analgesia and sedation, Intra operative TEE
- ix) Critical Care Management: Peri-operative low cardiac output, Peri operative fluid and electrolyte balance, Peri operative Arrhythmia management, Peri operative Nutrition, Peri operative Pharmacological management, Ventilatory management, Cardiopulmonary and cardio cerebral resuscitation;
- x) Allied specialties: Reasonable exposure of the following clinical areas: Clinical Cardiology, Pulmonary Medicine, Medical Oncology, Radiational oncology, Invasive Cardiology - Cardiac Cath and Angiography.

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## D. Practical Experience:

Confidence in the operating room by performing (Under supervision as well as independently) a minimum number of operations as stipulated here under:

<b>i) Cardiac Surgery</b>	
Closed heart operations	05
Open Heart operations	(50)
ASD	10
VSD	05
MVR	10
AVR	10
DVR	05
CABG	10
<b>ii) Thoracic Surgery (50)</b>	
Thoracotomies	25
Lung resections	10
Other General Thoracic Operations	15
<b>iii) Inter costal drainage</b>	50
<b>iv) Vascular Surgery</b>	(10)
Peripheral artery surgery	05
Peripheral Venous surgery	05
<b>v) VATS (Video assisted thoracic surgery)</b>	<b>(12)</b>
Diagnostic Procedures	10
Therapeutic Procedures	02
<b>vi) Thoracic Endoscopies</b>	<b>(50)</b>
Bronchoscopies Fibre optic	30
Rigid	05
Oesophago scopies Fibre optic	05
Rigid	05
Mediastinoscopy	05

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**vii) Pacing and Electrophysiology (12)**

Single chamber pacing	05
Dual chamber pacing	05
Bi - Ventricular Pacing	01
Electrophysiology	01

**viii) Cardiac Cath & Angiography (10)**

Cardiac Cath	05
Coronary Angiography	05

The number of operations in each category is subject to revision from time to time and if there are compelling reasons, the board of examiners can condone the deficiencies in the minimum requirements.

**E. Research Methodology:**

Internet and computer fundamentals- Gathering information, Medical literature search and review, Retrospective and prospective studies, Biomedical statistics

**A candidate shall be required to prepare:**

- i) A dissertation
  - ii) Publish at least 1 paper in an indexed / national / international journal
  - iii) Present 2 papers at national / international level conference of cardiovascular thoracic surgery.
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- He/she must have attended at least 3 zonal / national / international conferences of the specialty.
  - The candidate must also attend three CME programmes / workshops or wet labs during the training period.
  - Three copies of the dissertation, papers published and presented duly certified by the head of the department shall be submitted for evaluation at least 6 months before the commencement of the final examination.
  - Approval of the dissertation, full text of 1 published paper / presented paper are mandatory before a candidate is permitted to appear for the final examination.

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#### IV. LOG BOOK

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

This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

#### V. OPERATIVE WORK LOAD

The minimum number of operations performed per year by the department admitting up to 2 post graduate students in an year shall be as follows:

- i) Cardiac Surgery
  - Closed heart operations 50
  - Open Heart (including paed) operations 250
- ii) Thoracic Surgery 50
- iii) Vascular Surgery 10
- iv) VATS (Video assisted thoracic surgery) 20
- v) Thoracic Endoscopies 50

#### VI. ROTATIONAL POSTING:

##### Complete Scheme of training and examination

<b>ROTATIONAL POSTING</b> <b>Years : 1 &amp; 2</b>	Candidate shall be posted in the: A) General surgical department for nine months, B) Critical care department (post operative) attached to the Cardio-Thoracic unit for 3 months C) Non invasive cardiac lab for two months. D) Pediatric cardiology for two months. E) Nuclear medicine / radiological surgery/ lab for two months F) Pulmonary medicine for one month. G) Invasive cardiac lab in second year to learn routine procedures and techniques like temporary and permanent pacemakers surgical for two months. H) Emergency department for three months.
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<b>AT THE END OF 2 YEARS : SUMMATIVE ASSESSMENT –(FINAL EXAM) PART I</b>	
<b>ROTATIONAL POSTING Years : 3 to 5</b>	<p>A) Placement in Cardiac Vascular and Thoracic Surgery department. Following components must be covered: Operation Theatre, OPD, IPD, Pre operative patient care areas, Post operative Critical care areas</p> <p>B) Placement in Allied departments, Clinical Cardiology, Pulmonary Medicine, Medical Oncology, Radiational oncology, Invasive Cardiology - Cardiac Cath and Angiography.</p>
<b>AT THE END OF 5 : YEARS SUMMATIVE ASSESSMENT – (FINAL EXAM) PART II</b>	
<b>ROTATIONAL POSTING Year 6</b>	<p>A) Rotation to one or more hospitals of excellence for wider exposure and inter action.</p> <p>B) Rotation to one or more sub-specialty of Cardio Vascular and Throacic Surgery (maximum of six months in a sub specialty)</p> <p>i) Pediatric Cardiac Surgery,</p> <p>ii) CABG</p> <p>iii) Valve surgery</p> <p>iv) Thoracic Surgery</p> <p>v) VATS etc.</p>

## **VII. ILLUSTRATIVE STUDY MATERIAL**

### **A) Text Books and Journals of Cardio & Thoracic Surgery**

- i) Cardiac surgery – Kirklin and Barrat Boyes - 3rd edition – Churchill Livingstone New York NY
- ii) Glenn’s Thoracic & Cardiovascular surgery - 5th edition, Appleton Lange, Stamford, CT
- iii) Surgery of the chest – Sabiston & Spencer 8th edition - Saunders – Philadelphia PA
- iv) Pearson’s Thoracic and Esophageal Surgery 3rd Edition, Churchill & Livingstone New York NY
  - Heart disease in infants children and adolescents Moss & Adams, William & Wilkins Baltimore MD
  - Cardio pulmonary Bypass – principles and techniques of extra corporeal circulation MORA Springer Verlag New York, NY

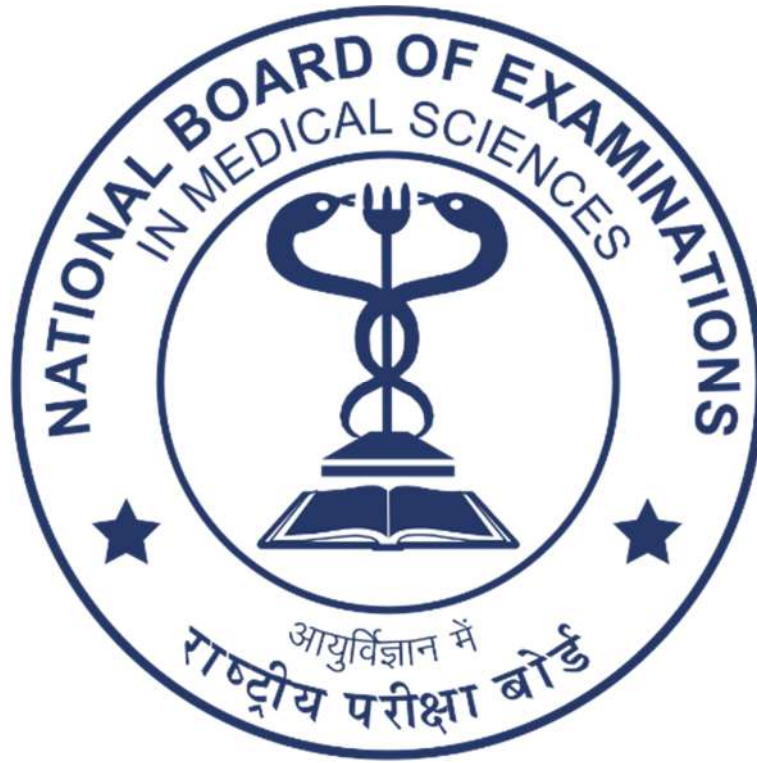
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**B) Journals**

- i) The Indian journal of Thoracic and Cardio Vascular Surgery
- ii) The journal of Thoracic and Cardio Vascular Surgery
- iii) The Annals of Thoracic Surgery –
- iv) European Journal of Cardio Thoracic Surgery
- v) The Asian Annals of Cardio Thoracic Surgery

**C) Internet Resources**

- i) [www.ctsnet.org](http://www.ctsnet.org)
- ii) [www.sts.org](http://www.sts.org)
- iii) [www.aats.org](http://www.aats.org)
- iv) [www.ejcts.ch.org](http://www.ejcts.ch.org)



**आयुर्विज्ञान में राष्ट्रीय परीक्षा बोर्ड**  
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