

Guidelines
for
Competency Based Training Programme
in
**DNB- Cardio Vascular and
Thoracic Surgery**
2011

RESTRICTED CIRCULATION TO DNB CANDIDATES AND COURSE COORDINATOR FOR THE PROGRAMME AT NBE ACCREDITED / INSTITUTIONS/ HOSPITALS



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CONTENTS

S.NO	TOPIC	PAGE NO.
I	INTRODUCTION	5
	a) Duration of The Course	
	b) Degree	
II	OBJECTIVES OF THE PROGRAMME	5-7
	a) Aim	5
	b) Educational Objective	6
III	SYLLABUS	7-10
	a) Aim	7
	b) Syllabus for Part-I	7-8
	c) Syllabus for Part-II	8
	d) Practical Experience	9-10
	e) Research Methodology	10
IV	THESIS / DISSERTATION	10-11
	a) Guidelines	10-11
	b) Rules for submission of the Thesis/Dissertation	11
V	LOG BOOK	12
VI	OPERATIVE WORK LOAD	12
VII	APPRAISAL	12-13
VII	LEAVE	13
VIII	ASSESSMENT/ EXAMINATION	13-14
	a) Formative Assessment	13
	b) Summative Assessment	13-14
IX	ROTATIONAL POSTING	15
X	ILLUSTRATIVE STUDY MATERIAL	16
	a) Text books and journals of cardio & thoracic surgery	16
	b) Journals	16
	c) Internet Resources	16



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.

(a) 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.

(b) 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.
- 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.



- 5) Organize health teams to provide care during natural or man-made calamities.
- 6) 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.
- 7) 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.
- 8) Conduct research and communicate the findings, result and conclusion to his fraternity.
- 9) Keep abreast with the latest developments by self-learning and / or participating in continuing medical education programmes.
- 10) Organize and manage administrative responsibilities for routine day to day work as well as situations including natural and / or man-made accidents / calamities.
- 11) 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.
- 12) Develop his / her knowledge, skills and attitudes of his / her areas of interest and become specialist in allied specialties.
- 13) Exhibit awareness of the importance of surgical audit and the need for considering 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.

(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 Medicine, Cardiology & Imaging, related to Cardio Vascular and Thoracic Surgery.
- 3) 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.
- 4) Demonstrate the ability to critically evaluate recent medical literature from journals, update knowledge and adapt diagnostic and therapeutic procedures for based on this appraisal.
- 5) 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.

- 6) Demonstrate comprehensive knowledge of theoretical aspects of Cardio Vascular and Thoracic Surgery including recent advances.
- 7) Demonstrate the knowledge of ethics and medico-legal aspects related to the practice of Cardio Vascular and Thoracic Surgery.
- 8) Special emphasis on the understanding of diseases prevalent in our country.
- 9) Adequate knowledge, skill and competence of diagnosis, treatment and prognosis of Cardio Vascular and Thoracic disorders.
- 10) Principles of management of accidents, trauma and other emergencies related to Cardio Vascular and Thoracic Surgery.
- 11) Adequate proficiency in pre-operative and post-operative management of patients.
- 12) Knowledge of basic principles, management of common conditions and emergencies in other specialties like Critical Care, Common Medical Disorders, Cardiac Disorders, Metabolic Disorders, Congenital malformations.
- 13) Familiarize with basic principles of anesthesiology and resuscitative measures.
- 14) Candidate should have adequate knowledge of basic science as applicable to Cardio Vascular and Thoracic Surgery.

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, oesophagus, pericardium, heart & great vessels etc.
- ii) **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.
- iii) **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.



- iv) **Applied microbiology:** Pulmonary infections, infective endocarditis, infection following cardiovascular- thoracic surgery.
- v) **Pharmacology :** Knowledge of medicines used in this specialty
- vi) **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 de-fibrillator,
- vii) **Basics of General Surgery:** Inflammation, Abscess, Cellulitis, Sepsis, Shock, Haemorrhage, Wound healing Tumors – Benign and Malignant, Systemic General Surgery - Overview (Abdominal Wall, GI, Hepato -Biliary – Pancreatic, Genito – Urinary, Thyroid, Breast, regional lymph node, upper and lower limbs).
- viii) **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.
- ix) **Imaging:** X-Ray, USG, CT , MRI , PET, etc. Nuclear Medicine
- x) **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.

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:

i) Cardiac Surgery

Closed heart operations	05
Open Heart operations	(50)
ASD	10
VSD	05
MVR	10
AVR	10
DVR	05
CABG	10

ii) Thoracic Surgery (50)

Thoracotomies	25
Lung resections	10
Other General Thoracic Operations	15

iii) Inter costal drainage

50

iv) Vascular Surgery

(10)

Peripheral artery surgery	05
Peripheral Venous surgery	05

v) VATS (Video assisted thoracic surgery)

(12)

Diagnostic Procedures	10
Therapeutic Procedures	02

vi) Thoracic Endoscopies

(50)

Bronchoscopies	Fibre optic	30
	Rigid	05
Oesophago scopes	Fibre optic	05
	Rigid	05
Mediastinoscopy		05

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.

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.

IV THESIS / DISSERTATION

Research shall form an integral part of the education programme of all the candidates registered for Diplomate of the National Board. The basic aim of requiring the candidates to write a dissertation is to familiarize him /her with research methodology.

The members of the faculty guiding the dissertation work for the candidate shall ensure that the subject matter selected for the dissertation is feasible and economical.

a) GUIDELINES:

1. The dissertation may be normally restricted to the size of 100 pages, to achieve this, following item may be kept in view :-
 - i. Only contemporary and relevant literature may be reviewed.
 - ii. The techniques may not be described in detail unless any modification / innovations of the standard techniques are used and reference may be given.
 - iii. Illustrative material may be restricted
 - iv. Since most of the difficulties faced by the residents related to the work in clinical subject or clinically oriented laboratory subjects the following steps are suggested :-

- a) The number of clinical cases to be included in the dissertation may be limited. No number is therefore, prescribed and it will vary from topic to topic.
- b) For prospective study, as far as possible the number of cases should be such that adequate material, judged from the hospital attendance, will be available and the candidate will be able to collect the case material within a period of 6-12 months so that he / she is in a position to complete the work within the stipulated time.
- c) The objective of the study should be limited and well defined.
- d) As far as possible, only clinical or laboratory data of investigations of patients or such other material easily accessible in the existing facilities should be used for the study
- e) The laboratory work required to be performed by the residents of clinical departments should be minimal. For this purpose technical assistance, wherever necessary, may be provided by the department concerned. The resident of one specialty taking up some problem related to some other specialty should have some basic knowledge about the subject and he/she should be able to perform the investigations independently. Wherever some specialized laboratory investigations are required, a co-guide may be co-opted from the concerned investigative department. The quantum of laboratory work to be carried out by the candidate should be decided by the guide and co-guide be mutual consultation.
- f) The clinical residents may not ordinarily be expected to undertake experimental work or clinical work involving new techniques not hitherto perfected or the use of chemicals or radio isotopes not readily available. They should however, be free to enlarge the scope of their studies or undertake experimental work on their own initiative but all such studies may be feasible within the existing facilities.
- g) The residents should be able to use freely the surgical pathology / autopsy data if it is restricted to diagnosis only. If however, detailed histological data are required the resident will have to study the case himself with the help of guide / co-guide. The same will apply in case of clinical data.

2. Statistical methods used for analyses will be described in detail.

b) RULES FOR THE SUBMISSION OF THE THESIS / DISSERTATION

- i) Thesis / Dissertation protocol should be submitted to the office of the NBE through the head of the institution within three months of registration of the candidates in medical College / University / NBE Accredited institutions.
- ii) The guide for these candidates can guide only two candidates at any point of time.
- iii) Guide will be recognized PG teacher in medical college or University or NBE accredited institution the teacher shall be having the experience of five years in the specialty after post graduate degree.
- iv) If the dissertation is rejected, the examiner will return the dissertation to the office with his suggestions in writing for improvement. The result of such candidate will be kept pending till the dissertation is re-written. Time for resubmission should not exceed 3 months.
- v) If any unethical practice is detected in the work of the theses, the same is liable to be rejected. Such candidate is also liable to face disciplinary action as may be decided by the board.



V 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.

VI 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

VII APPRAISAL

National Board of Examinations had taken a policy decision to improve the DNB training programmes by having Appraisal for all DNB trainees and accredited hospitals by Local / zonal Appraisers. Accordingly, the assessment of DNB trainees, review of their progress and appraisal of the infrastructure and facilities in all the accredited hospitals is being carried out. The hospital shall conduct periodic assessment tests of its DNB trainees in respective specialties as per the guidelines issued from time to time and other guidelines. The exams will be conducted by institutions under supervision of Appraisers. A panel of Appraisers, speciality wise will be appointed by the NBE. If it is found that an accredited institution is not getting its Periodic Appraisal done, the NBE may withdraw provisional accreditation granted to such an institution.

Appraisal should be done only from the NBE appointed expert. The NBE appoints appraiser from the NBE's own expert's database and from the accredited government medical colleges/ hospitals faculties.

After doing the appraisal, the expert appointed by the NBE is required to send his report to NBE's office. After receipt of expert's report, the NBE updates and analyzes the report and the deficiencies / remarks as pointed out in the experts report are sent to the concerned hospital / institution for their compliance under intimation to NBE.

VIII LEAVE

DNB trainee can avail leaves for 20 days in a calendar year, excluding weekly / post duty off. In addition, female trainee may be permitted Maternity leave, once during the entire duration of the course for a period not exceeding 90 days. A leave of 24 days across the period of training (5 years) shall be permissible for the candidates for attending CME etc.

IX ASSESSMENT / EXAMINATIONS

a) FORMATIVE ASSESSMENT –

TO BE CONDUCTED EVERY YEAR

(During the 1st Year, 2nd Year, 3rd Year, 4th Year and 5th Year)

These examinations will be conducted at the institutions / on zonal basis itself as per the scheme prescribed by NBE.

Following format will be followed in each examination:

- i) Theory – Two papers (100 marks each = 200 marks)
- ii) Clinical and practical (100 marks)
- iii) Viva – Voce (100 marks)

Candidates will be allowed to be promoted to the next year after Successfully completing the course of studies of the year and passing the examination with at least 50% marks in each component of the examination.

b) SUMMATIVE ASSESSMENT / FINAL EXAMINATION

TO BE CONDUCTED BY THE NBE IN TWO PARTS.

i) FINAL EXAMINATION PART – I : AT THE END OF 2 YEARS

ii) FINAL EXAMINATION PART – II : AT THE END OF 5 YEARS

- The Examinations for the degree of Diplomate of National Board (Cardio Vascular and Thoracic Surgery) shall as per dates notified by NBE
- The schedule of exam, eligibility criteria, scheme of exam, results etc. shall be notified by NBE by website/ information bulletin from time to time.



I DETAILS OF THE EXAMINATIONS WILL BE AS FOLLOWS:

i) FINAL EXAMINATION PART– I: AT THE END OF 2 YEARS

The examination will consist of three theory papers only:

Theory Papers: 3 papers (100 marks each)

Each paper will be of 3 hours duration

SYLLABUS FOR THEORY PAPERS:

Paper I: Applied Anatomy, Applied physiology, Applied pathology, Applied microbiology, Pharmacology,

Paper II: Cardiovascular Engineering, Imaging, Noninvasive Cardiology

Paper III: Basics of General Surgery, Critical Care Medicine

ii) FINAL EXAMINATION PART – II AT THE END OF 5 YEARS

The examination will consist of the following components: Theory, Clinical & Practical and Viva-Voce

DETAILS ARE AS FOLLOWS:

i) Theory : 3 papers (100 marks each)

Each paper will be of 3 hours duration

Syllabus for Theory Papers:

Paper I: Cardiac Surgery

Paper II: Thoracic and vascular surgery

Paper III: Recent advances

ii) Clinical & Practical: 300 marks

1. **Case discussion** : Consist of exhaustive discussion on not less than 4 patients (Cardiac – 3 , Thoracic & Vascular – 1)

In one or more of these patients, the candidate may be supplied with limited or all of the available information pertaining to given case.

In at least one case no investigation result will be supplied and the discussion will be based on clinical diagnosis.

2. **Wards rounds** of post operative or acutely ill patients.

3. **Operative surgery** – discussion on various operative / investigative procedures.

iii) Viva – Voce

Consist of discussion on wide range of subject including sub specialties, allied specialties, dissertation, published and presented scientific papers etc.

X ROTATIONAL POSTING:

Complete Scheme of training and examination

<p>ROTATIONAL POSTING Years : 1 & 2</p>	<p>Candidate shall be posted in the:</p> <ol style="list-style-type: none"> General surgical department for nine months, Critical care department (post operative) attached to the Cardio-Thoracic unit for 3 months Non invasive cardiac lab for two months. Pediatric cardiology for two months. Nuclear medicine / radiological surgery/ lab for two months Pulmonary medicine for one month. Invasive cardiac lab in second year to learn routine procedures and techniques like temporary and permanent pacemakers surgical for two months. Emergency department for three months.
<p>AT THE END OF 2 YEARS : SUMMATIVE ASSESSMENT –(FINAL EXAM) PART I</p>	
<p>ROTATIONAL POSTING Years : 3 to 5</p>	<ol style="list-style-type: none"> 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 Placement in Allied departments, Clinical Cardiology, Pulmonary Medicine, Medical Oncology, Radiational oncology, Invasive Cardiology - Cardiac Cath and Angiography.
<p>AT THE END OF 5 : YEARS SUMMATIVE ASSESSMENT – (FINAL EXAM) PART II</p>	
<p>ROTATIONAL POSTING Year 6</p>	<ol style="list-style-type: none"> Rotation to one or more hospitals of excellence for wider exposure and inter action. Rotation to one or more sub-specialty of Cardio Vascular and Throacic Surgery (maximum of six months in a sub specialty) <ol style="list-style-type: none"> Pediatric Cardiac Surgery, CABG Valve surgery Thoracic Surgery VATS etc.



XI ILLUSTRATIVE STUDY MATERIAL

a) TEXT BOOKS AND JOURNALS OF CARDIO & THORACIC SURGERY

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

b) JOURNALS

1. The Indian journal of Thoracic and Cardio Vascular Surgery
2. The journal of Thoracic and Cardio Vascular Surgery
3. The Annals of Thoracic Surgery –
4. European Journal of Cardio Thoracic Surgery
5. The Asian Annals of Cardio Thoracic Surgery

c) INTERNET RESOURCES

www.ctsnet.org

www.sts.org

www.aats.org

www.ejcts.ch.org