

CHETTINAD ACADEMY OF RESEARCH AND EDUCATION

(Deemed to be University under section 3 of the U.G.C. Act 1956)



REGULATIONS & SYLLABUS

M.Ch. Cardio Vascular and Thoracic Surgery

2013-14 onwards

CHETTINAD ACADEMY OF RESEARCH AND EDUCATION
REGULATIONS FOR M.Ch. PROGRAMS
2013 - 14

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CHETTINAD ACADEMY OF RESEARCH & EDUCATION

Regulations for M.Ch.(Master of Chirurgiae) Post Graduate Superspecialty Programs

In exercise of the powers conferred by Rule 12(IV) of Memorandum of Association and Chapter III of Bye-laws of Chettinad Academic of Research and Education, the Academic Council of the University hereby makes the following Regulations;

1. SHORT TITLE AND COMMENCEMENT

- a. These Regulations may be called M.Ch Master of Chirurgiae Postgraduate super speciality program Regulations 2013
- b. They shall come into force from the Academic Year 2013-14
- c. These Regulations are subject to modification as may be approved by the Academic Council from time to time.

2. GOALS AND GENERAL OBJECTIVES OF M.Ch POSTGRADUATE SUPER SPECIALITY PROGRAMME TO BE OBSERVED BY POSTGRADUATE TEACHING INSTITUTION

The goal of postgraduate medical education shall be to produce competent specialists and/or Medical teachers.

- a. who shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy.
- b. who shall have mastered most of the competencies, pertaining to the speciality, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;
- c. who shall be aware of the contemporary advance and developments in the discipline concerned;
- d. who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology
- e. who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

3. GENERAL OBJECTIVES OF POST-GRADUATE TRAINING EXPECTED FROM STUDENTS AT THE END OF POST-GRADUATE TRAINING.

At the end of the postgraduate super speciality training in the discipline concerned the student shall be able to;

- a. Recognize the importance to the concerned speciality in the context of the health needs of the community and the national priorities in the health section.
- b. Practice the speciality concerned ethically and in step with the principles of primary health Care.
- c. Demonstrate sufficient understanding of the basic sciences relevant to the concerned speciality. Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and primitive measure/strategies.
- d. Diagnose and manage majority of the conditions in the speciality concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.

- e. Plan and advise measures for the prevention and rehabilitation of patients suffering from disease and disability related to the speciality.
- f. Demonstrate skills in documentation of individual case details as well as morbidity and mortality rate relevant to the assigned situation.
- g. Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectations.
- h. Play the assigned role in the implementation of national health programme, effectively and responsibly.
- i. Organize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.
- j. Develop skills as a self-directed learner, recognize continuing education needs; select and use appropriate learning resources.
- k. Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyze relevant published research literature.
- l. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
- m. Function as an effective leader of a health team engaged in health care, research or training.

4. COMPONENTS OF THE POSTGRADUATE CURRICULUM:

The major components of the Postgraduate curriculum shall be:

- a. Theoretical knowledge
- b. Practical and clinical skills
- c. Writing Thesis / Research articles
- d. Attitudes including communication skills.
- e. Training in research methodology, Medical Ethics and Medico legal aspects.

5 . NOMENCLATURE OF PG COURSE IN M.Ch SUPER SPECIALITY COURSES

The nomenclature of PG degree super speciality course should be as laid down in the PG Medical Education regulations prescribed by the Medical Council of India.

6. ELIGIBILITY FOR ADMISSION

- i) M.Ch (Master of Chirurgy) for which Candidates must possess recognised degree of MS (or its equivalent recognised degree) in the subject shown against them.
- ii) A person possessing DNB in the concerned board-specialty, is eligible for admission in the Super-Speciality /High course (M.Ch.)

Sl.No.	Area of Specialisation	Prior Requirement
01	Cardio Vascular & Thoracic Surgery	MS (General Surgery)
02	Urology	MS (General Surgery)
03.	Neuro Surgery	MS (General Surgery)
04	Paediatric Surgery	MS (General Surgery)

05.	Plastic & Reconstructive Surgery	MS (General Surgery)
06.	Surgical Gastroenterology	MS (General Surgery)
07.	Surgical Oncology	MS (General Surgery) MS (ENT) MS (Orthopaedics) MS (Obstetrics & Gynae)
08.	Endocrine Surgery	MS (General Surgery)
09.	Gynaecological Oncology	MD/MS (Obst. & Gynae)

He/she having qualified for the Post-graduate degree of this University or any other Universities recognised as equivalent thereto by the authority of this University and the Indian Medical Council and obtained permanent registration from any of the State Medical Councils.

- a. The admitting authorities of the Institutions will strictly ensure that every candidate admitted to the M.Ch Post-Graduate Higher Speciality Degree courses has obtained permanent registration certificates (both for M.B.B.S. and Post-graduate Degree) from any one of the State Medical Councils.
- b. Provided that in the case of a foreign national, the Medical Council of India may on payment of the prescribed fee for registration, grant temporary registration, for the duration of the post graduate course limited to the medical college/ institution to which the candidate is admitted for the time being exclusively for pursuing post graduate studies.
- c. Provided further the temporary registration to such foreign national shall be subject to the condition that such person is duly registered with appropriate registering authority in his own country where from he has obtained his basic medical qualification, and his duly recognized by the corresponding Medical Council or concerned authority.

d. RECOGNITION FEE AND ELIGIBILITY CERTIFICATE:

Candidates who have passed the M.S. Degree Examination other than that conducted by Chettinad University shall obtain Eligibility Certificate from this University at the time of admission and also remit recognition fee as prescribed.

e. REGISTRATION:

A candidate admitted to the Post Graduate Super Speciality Course shall register with the University by submitting the prescribed application form for registration, duly filled in along with the prescribed fee, through the Head of the Institution.

f. DURATION OF THE COURSE

The period of training for obtaining the degree shall be three completed years (including the examination period) after obtaining MS / Degree or equivalent/recognised qualifications in the required subject.

g. ADMISSION AND COMMENCEMENT OF COURSES

On the basis of academic merit as determined based on the competitive All India Common Entrance Examination conducted by the Chettinad Academic of Research & Education.

Time schedule for the completion of admission process for super speciality courses is as per statutory norms prevalent at that point of time.

h. SYLLABUS

The Syllabus for the course shall be as specified in the annexure to these regulations.

i. MEDIUM OF INSTRUCTION:

English shall be the medium of instruction for M. Ch Super Speciality Courses.

j. WORKING DAYS/ATTENDANCE:

All candidates joining the Super Speciality Course shall work as full time residents during the period of training, attending not less than 80% (Eighty percent) of the training during each academic year, and given full time responsibility, assignments assessed full time responsibilities and participation in all facets of the educational process.

It is desirable that the candidates should have 100 per cent attendance to enable their objective to be achieved. However, a minimum of at least 80 per cent attendance and achievement of satisfactory standards in both theoretical and clinical would be required for every academic year before they are allowed to appear for the University Examination.

The Attendance details may be submitted to the Controller of Examinations at the end of every academic year. The student should also be intimated quarterly regarding the lack of attendance.

13. (a) STIPEND AND GRANT OF LEAVE

The Post Graduate students undergoing Post Graduate Degree / Diploma/Super-Specialty course shall be paid stipend on par with the stipend being paid to the Post Graduate students of State Government Medical Institutions/Central Government Medical Institutions, in the State /Union Territory where the institution is located. Similarly, the matter of grant of leave to Post Graduate students shall be regulated as per the respective State Government rules.

14. CONDONATION FOR LACK OF ATTENDANCE

There shall be no condonation for lack of attendance.

15. MIGRATION

Under no circumstances, Migration/ Transfer of student in super speciality course shall be permitted by the University.

16. TRAINING PROGRAMME

The training given with due care to the Post Graduate students in the recognised institutions for the award of various Post Graduate medical degrees / super speciality degrees shall determine the expertise of the specialist and / or medical teachers produced as a result of the educational programme during the period of stay in the institution.

- (a) Every institution undertaking Post Graduate training programme shall set up an Academic cell or a curriculum committee, under the chairmanship of a senior faculty member, which shall work out the details of the training programme in each speciality in consultation with other department faculty staff and also coordinate and monitor the implementation of these training Programmes.
- (b) The training programmes shall be updated as and when required. The structured training programme shall be written up and strictly followed, to enable the examiners to determine the training undergone by the candidates and the Medical Council of India inspectors to assess the same at the time of inspection.

During the training for Super Speciality Courses to be awarded in clinical disciplines, there shall be proper training in basic medical sciences related to the disciplines concerned; during the training for the degree to be awarded in basic medical sciences, there shall be training in applied aspects of the subject; and there shall be training in allied subjects related to the disciplines concerned. In all Post Graduate training programmes, both clinical and basic medical sciences, emphasis is to be laid on preventive and social aspects and emergency care facilities for autopsies, biopsies, cytopsies, endoscopic and imaging etc. also be made available for training purposes.

The Post Graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

Training in Medical Audit, Management, Health Economics, Health Information System, basics of statistics, exposure to human behaviour studies, knowledge of pharmaco – economics and introduction to non- linear mathematics shall be imparted to the Post Graduate students.

Implementation of the training programmes for the award of various Post Graduate Super Speciality Degree shall include the following:

Basic Medical Sciences

- (i) Lectures, Seminars, Journal Clubs, Group Discussions, Participation in laboratory and experimental work, and involvement in research studies in the concerned speciality and exposure to the applied aspects of the subject relevant to clinical specialities.

Clinical disciplines

- (ii) In service training, with the students being given graded responsibility in the management and treatment of patients entrusted to their care; participation in Seminars, Journal clubs, Group Discussions, Clinical Meetings, Grand rounds, and Clinico - Pathological Conferences; practical training in Diagnosis and medical and Surgical treatment; training in the Basic Medical Sciences, as well as in allied clinical specialities.

The training programme shall be on the same pattern as for M.D. / M.S. in clinical disciplines; practical training including advanced Diagnostic, Therapeutic and Laboratory

techniques, relevant to the subject of specialisation. For M.Ch. Candidates, there shall be participation in surgical operations.

17. MAINTENANCE OF LOG BOOK

- a) Every Post Graduate student shall maintain a record (Log) book containing skills, the candidate has acquired during the training period certified by the various heads of department where the candidate has undergone training including outside the institution.
- b) The students shall maintain a Record Book (Log Book) of the work carried out by them & training program undergone during the period of training including details of procedures carried out independently or assisted by the candidate. The log book will be checked by the faculty members imparting the training.
- c) At the end of the course, the candidate should summarise the contents and get the record (Log) book certified by the Head of the Department.
- d) The record (Log) book should be submitted at the time of practical examination for the scrutiny of the Board of Examiners.
- e) It would be the constant endeavour of the faculty to develop desirable attitudes in the PG trainees during the course by personal examples, interaction and group discussion. Constant watch will be maintained during their work in the wards to ensure that this objective is being met. Although there will be no formal evaluation of attitude, some aspects of this domain would be covered during the formative evaluation as noted below for continued internal assessment. Formative evaluation will be carried out over following activities of the P.G. resident.
 - i) Ward work
 - ii) Case presentation
 - iii) P.G. Lecture
 - iv) Journal club
 - v) General assessment of affective function attitude by medical & paramedical staff;
 - vi) Internal Assessment

Candidates can appear for theory examination only after being certified on the basis of Internal assessment.

18. THESIS / DISSERTATION AND EVALUATION

- a) All Candidates admitted to undergo M.Ch super speciality courses shall be assigned a topic for dissertation / thesis by the Head of the concerned unit and the title of the topic assigned to the candidates be intimated to the Controller of Examination of the University by the Head of the Department through the Head of the Institution before end of the First year.
- b) The dissertation / thesis shall be a bound volume of minimum 50 pages not exceeding 75 pages of typed matter (double line spacing and on one side only) excluding certification, acknowledgements, annexure and bibliography.

- c) Four copies of dissertation shall be submitted six months prior to the commencement of the examination on the prescribed date to the controller of examination of the University.
- d) Two copies are to be submitted as an electronic version of the entire dissertation in a standard C.D. format mentioning the details and technicalities used in the C.D. format.
- e) The concerned Professors / Readers are to supervise and to see that the dissertations are done properly utilising the clinical materials of their own department / institution. The students must learn the design and interpretation of research studies, responsible use of informed consent and research methodology and interpretation of data and statistical analysis. They should seek the help of qualified staff members in the conduct of research. They must learn to use library and the computer-based research. This training will help them to develop skills in planning, designing and conduct of research studies.
- f) All candidates on admission will be allotted one of the department faculties who have fulfilled the requirement to be guides for purposes of guiding Dissertation/thesis. The topic for dissertation shall be finalized and discussed in the departmental faculty meeting and allotted to the individual candidates before the completion of 3 months after admission. The purpose of dissertation is to develop in the candidate the ability to perform an independent study keeping the principles and research methodology in mind. The candidate will therefore work on the prospective problem either within the department or in collaboration with other departments. There will be continuous monitoring of the dissertation work by the guides and co-guide and by the other department staff throughout the course. The candidate will present the progress of the dissertation to the faculty on the completion of 1 ½ years for monitoring and feedback. The completed dissertation should be submitted not later than 6 months before final examination.
- g) The theory examinations shall be held sufficiently earlier than the Clinical and Practical examination, so that the answer books can be assessed and evaluated well before the commencement of the Clinical/Practical and Oral examination.
- h) The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical. A candidate shall appear for Theory & Clinical examination only after the acceptance of thesis by the examiners. The thesis shall be evaluated under the following heading:
 - 1) Approved
 - 2) Not Approved

In all cases the approval shall be given before 3 months of the date of appearing for the examination and this will be essential before the candidate is allowed to appear for the written examination.

19. SCHEDULE OF EXAMINATIONS

The examination for M.Ch. courses shall be held at the end of 3rd Academic year. An Academic term shall mean six month's training period.

* 20. SCHEME OF EXAMINATIONS

Post graduate examinations shall consist of Dissertation / Thesis, Written Papers (Theory), Clinical and Viva voce.

The examinations shall be organised on the basis of "Grading" or "Marking system" to evaluate and certify candidate's level of knowledge, skill and competence at the end of the training.

- a. Dissertation / Thesis: Every candidate shall carry out and submit a Dissertation / Thesis as explained and approval of Dissertation / Thesis shall be precondition for a candidate to appear for the final year examination.
- b. students admitted to this course would be required to present one poster presentation to read one paper at a national / state conference and to present one research paper which should be published / accepted for publication / sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate super speciality degree examination as prescribed in the Postgraduate Medical Education Regulations.
- c. **Theory:** A Written Examination shall consist of four theory papers each of three hours duration. Each paper carries 100 marks (Total 400 marks). Out of these one shall be of Basic Medical Sciences and one shall be of recent advances.
- d. **Clinical Examination:** Clinical examination for the subjects in Clinical Sciences shall be conducted to test the knowledge and competence of the candidates for undertaking independent work as a specialist/Teacher, for which candidates shall examine a minimum one long case and two short cases.
- e. **Oral Examination:** The Oral examination shall be thorough and shall aim at assessing the candidate knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the speciality, which form a part of the examination.

PASSING MINIMUM

Marks Distribution	
No. of Theory Papers	4
Marks for each Theory Paper	100*
Total marks for Theory Papers	400
Passing Minimum for Theory Papers	200/400
Total Marks for Clinical	300
Passing Minimum for Clinical	150/300
Viva voce	100

Passing minimum for Clinical including Viva voce	200/400
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(i) If any candidate fails even under one head, he/she has to re-appear for whole examinations.

(ii) Theory paper consists of 2 essay questions of 25 marks each (2 X 25 = 50) & 5 short notes of 10 marks each (5 X 10 = 50). Total = 100 marks each.

- **Sl.No.20(ii) Amended vide XVIII meeting of Academic Council dated 15.04.2014.*
- *Resolved to approve 2 Essay Questions (2 x 20 marks) and 10 short notes (10 x 6 marks) for each theory paper in D.M. /M.Ch courses which will take effect from 2013-14 batch .*
- Resolved to approve 2 essays (2 x 20 marks) and 6 short notes (6 x 10 marks) for theory paper in all M.Ch. Courses by the Academic Council in its XX meeting held on 25.03.2015
- **Resolved to approve that an examinee should obtain minimum 40% marks in each theory*
- *paper and not less than 50% marks cumulatively in all the four papers in P.G. degree*
- *examination to be cleared as passed which will be implemented prospectively. (Academic Council in its XX meeting held on 25.03.2015).*

21. EXAMINERS

(a) All the Post Graduate Examiners for super speciality courses shall be recognised super speciality Post Graduate Teachers holding recognised Post Graduate qualifications in the subject concerned.

(b) For all Post Graduate Examinations, the minimum number of Examiners shall be four, out of which at least two (50%) shall be External Examiners, who shall be invited from other recognised universities from outside the State/outside University. The remaining two will be internal examiners. The qualification and teaching experience for appointment of examiners shall be as laid down by the guidelines of Medical Council of India in force from time to time.

(c) 'No person shall be appointed as an internal examiner in any subject unless he/she has three years experience as recognized PG teacher in the concerned subject. For external examiners, he/she should have minimum six years of experience as recognized PG teacher in the concerned subject'. "An examiner shall ordinarily be appointed for not more than two consecutive terms"

(d) Under exceptional circumstances, examinations may be held with 3 (three) examiners provided two of them are external and Medical Council of India is intimated the justification of such action prior to publication of result for approval. Under no circumstances, result shall be published in such cases without the approval of Medical Council of India.

22. NUMBER OF CANDIDATES

The maximum number of candidates to be examined in Clinical / practical and Oral on any day shall not exceed three for M. Ch examinations.

23. * NUMBER OF EXAMINATIONS

The University shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations. The examination shall be conducted in September and March.

*** SI. No.23 Amended in XXI meeting of Academic Council dated 22.07.2015
Resolved to approve the commencement of M.Ch. University examination
in August (for Regular Batch) and February (for Supplementary Batch).**

24. REVALUATION.

There is no revaluation of answer papers. However, re-totalling is allowed in the failed subject with the payment of required fees fixed by the University (from time to time) within 15 days from the date of receipt of statement of marks.

SYLLABUS for M. Ch (CARDIO VASCULAR & THORACIC SURGERY)

GOAL

The overall goal of the training program is to produce a specialist who can serve as a tertiary care physician capable of carrying out effective treatment for cardiac, vascular and thoracic surgical problems. The M.Ch. course in Cardio-Vascular and Thoracic surgery will aim at inculcating a rational approach in treatment of patients by imparting sound knowledge of the subject and by teaching surgical skills to the post-graduate student.

Objectives: The following should be fulfilled to achieve the goal of the training program.

Cognitive Domain:

- 1) Diagnose cardiac, vascular and thoracic surgical problems based on clinical methods.
- 2) To interpret relevant laboratory, radiological and cardio logical investigations for the purpose of diagnosis
- 3) To arrive at a treatment plan/s based on 1 & 2 and discuss the pros and cons with the patient and his family.
- 4) Be able to carry out emergent surgical management for cardiac/vascular and thoracic surgical emergencies after quickly assessing the patient and synthesizing available clinical and investigational information.
- 5) To keep abreast of the current knowledge and recent advances in the field.
- 6) To attend continuing education programme for updating the knowledge.
- 7) To carry out research and publications in the field
- 8) To teach the undergraduate medical students and nursing, physiotherapy, occupational therapy and perfusion students.

Skills:

- 1) To perform diagnostic and therapeutic procedures such as pleural tapping, insertion of Intercostals drains.
- 2) To perform emergency surgical procedures for trauma, vascular emboli.
- 3) To perform and assist planned open and closed cardiac procedures. To perform and assist for vascular and thoracic surgical procedures.
- 4) To effectively manage the patients in post-operative intensive care.

- 5) To manage the preoperative workup of patients undergoing planned surgery.
- 6) Evaluation of the PG student by tests and surgical procedures once in 15 days.

COURSE OF STUDY

The course of study shall include:

- i) A wide coverage of Basic Sciences like Anatomy, Physiology, Biochemistry, Pathology, Microbiology, Pharmacology and Immunology pertaining to the Cardiovascular and Respiratory systems and the Chest and its contents;
- ii) a thorough knowledge, theoretical as well as practical, of the various investigative procedures Invasive and non-invasive - including biochemical, radiological and ultra-sonographic investigations, radioisotope scanning and dynamic function studies such as pulmonary function tests, cardiac catheterisation and oesophageal manometry;
- iii) a detailed knowledge of and practical experience in clinical and operative paediatric and adult cardiac surgery, surgery of great vessels and peripheral arteries and general thoracic surgery, Including surgery of the chest wall, diaphragm, oesophagus, mediastinum, trachea, lungs and pleura; and
- iv) MCh (PG) student is expected to go to Anatomy theatre once in 15 days to know Cardiovascular and Thoracic Anatomy (b) He/She should attend Radiology Meeting (c) He/She should attend Cardiology Cath Lab, Angiography Meeting.
- v) abroad knowledge or Cardiology, Respiratory Medicine and other medical problems relating to Cardiovascular-thoracic Surgery, as well as of Computer application.

The course of study shall include the theory and applied aspect of:

Anatomy and Embryology

- Applied anatomy of the heart including cardiac valves, skeleton of heart, muscle arrangement, blood supply, venous drainage, nerve supply, morphology of cardiac chambers and septae, structure of cardiac muscle, aorta, major branches, arteries involved in collateral supply in chest, arteries used as conduits, vena cave and their tributaries, trachea, bronchi and lungs; pulmonary arteries mediastinum
- and mediastinal structures thoracic oesophagus diaphragm structure and function of a gene
- rest all the anatomy related to heart, lungs and systemic blood vessels.

Physiology:

- The Heart: basic physics of membrane potential, action potential myocardial action potential, energy for contraction of cardiac muscle, cardiac cycle regulation of cardiac function rhythmic excitation of heart, Myocardial metabolism, under various conditions (full /empty beating, fibrillating, cold, arrested state skeletal & smooth muscle contraction, difference from the myocardium Circulation: Physics of blood, blood flow and pressure Physical characteristics of the systemic circulation and function of large and small arteries, arterioles, capillaries and veins.

- Control of blood flow to individual organs (brain, heart, kidneys) arterial pressure control: rapid and long-term control cardiac output, venous return & their regulation Pulmonary circulation coronary circulation cardiac failure and circulatory shock.

Respiration` :

Mechanism of pulmonary ventilation, pulmonary volumes and capacity functions of respiratory Passageways physical principle of gas exchange & diffusion of O₂ & CO₂. transport of O₂ & CO₂ in blood. regulation of respiration Body fluids, Kidneys and Acid base balance Metabolism.

CNS:

Brain waves, thoracic autonomic system.
Basic characteristics of sympathetic and parasympathetic function

Hypothermia:

- Core temperature and surface temperature, Insulator system of body, heat transfer from body core, heat production and loss, regulation of body temperature, isotherms and poikilotherms.
- Effect on Metabolic rate, heart, circulation, blood viscosity, ions, hormone release, solubility of blood gases, pH changes, SVR/PVR.

Bacteriology, Virology, Parasitology & immunology:

- Streptococci, Staphylococci, Common gram-negative bacteria
- Mycobacteria, Aspergillosis and fungi affecting heart and cardiac valves.
- Immunology relevant to heart and lung transplantation life cycle of Echinococcus IV virus.

Pathology:

General pathology required to understand specific pathology: degeneration, infarction, necrosis, stunning, hibernation gross and microscopic pathology of

- 1) Rheumatic heart disease
- 2) Syphilitic heart disease
- 3) Tuberculous heart disease
- 4) Atherosclerotic cardio vascular disease
- 5) cardiac myxoma
- 6) suppurative lung diseases
- 7) hydatid disease of lung
- 8) pulmonary tuberculosis
- 9) benign tumours of lung
- 10) carcinoma of lung
- 11) Mediastinal tumours and Thymic hyperplasia and Thymomas.
- 12) CHD: (including the anomalies and variants associated with) ASD, VSD, AV canal, PDA, AP window, RASOV, TOF, Pulmonary atresia, TAPVC, Tric.atresia, Single

- Ventricle physiologies, Transposition complexes, Truncus arteriosus Ebstein's anomaly, Pulmonary stenosis, aortic stenosis, coarctation of aorta,
- 13) HIV related infections
 - 14) Burger's disease
 - 15) specific and nonspecific aorto arteritis gross and microscopic features of valvular heart diseases not covered above
 - 16) cardiomyopathies
 - 17) benign and malignant diseases of pleura
 - 18) benign and malignant tracheal tumours
 - 19) benign and malignant tumours of oesophagus
 - 20) cardiac tumours other than myxoma
 - 21) CHD: not covered in the above list

Pharmacology:

- 1) Antibiotics, Antitubercular, antifungal and antiviral drugs
- 2) Pharmacology of drugs used in the treatment of congestive cardiac failure, hypertension, angina pectoris, peripheral vascular disease, acid base imbalance supra ventricular and ventricular arrhythmia, chemotherapy of carcinoma lung
- 3) Pharmacology of drugs used as oral and parenteral anti coagulants, antiplatelet
- 4) agents, fibrinolytic agents, and their antidotes, bronchodilators, mucolytics, systemic and pulmonary vasodilators conduit dilators for bypass grafts vasoconstrictors diuretics
- 5) Others: adenosine, antifibrinolytics, serine protease inhibitors, constituents of cardioplegia , Free radical Oxygen Scavengers immunosuppressants used in heart lung trans plant drugs used in pre-anaesthetic medication and anaesthesia.

Cardio – Thoracic Surgery

- 1) Function of the gas Exchange System and its Evaluation
- 2) Anaesthesia for Cardiothoracic surgery.
- 3) Postoperative Care and complications in Cardiothoracic surgery.
- 4) Ventilatory assistance and support. Respiratory support in infants
- 5) shock: types, diagnosis, management. Cardio pulmonary resuscitation.
- 6) Use of Antibiotics in Cardiac and Thoracic Surgery
- 7) Computer Application in Cardio thoracic Surgery.
- 8) Thoracic Incisions, complications of incision including sternal dehiscence
- 9) Thoracic trauma.
- 10) Pulmonary resection Anatomy and Techniques.
- 11) Thoracic Imaging.
- 12) Esophagoscopy
- 13) Bronchoscopy: trans bronchial biopsy and bronchoalveolar lavage.
- 14) Thoracoscopy: general principles, diagnostic & therapeutic procedures
- 15) Developmental Abnormalities of the airways and lungs
- 16) sequestration of lung,
- 17) Surgical treatment of the Bullous Emphysema.
- 18) Diagnosis of Benign, diffuse Pulmonary Disease.

- 19) Pneumonia, Bronchiectasis, and lung abscess.
- 20) Thoracic infections caused by Actinomycetes, Fungi, Opportunistic organisms, and Echinococcus.
- 21) Surgical treatment of tuberculosis
- 22) Molecular biology and immunology of lung and esophageal cancer.
- 23) Benign tumors of the lower respiratory tract.
- 24) Lung carcinoma: diagnosis, staging, surgery for limited pulmonary resection, bronchoplastic techniques for
- 25) Multimodality Therapy of Carcinoma of the Lung: Irradiation, Chemotherapy and Immunotherapy.
- 26) Indications for Resection of Pulmonary Metastases.
- 27) Thoracic disorders in an immune compromised host
- 28) Pulmonary embolism acute & chronic
- 29) Pulmonary AV fistula
- 30) Lung Transplantation.
- 31) Benign & Malignant Disorders of Pleura
- 32) Pleural Space Problems & Thoracoplasty
- 33) Thoracic Outlet Syndrome
- 34) Chest wall & sternal abnormalities & management of chest wall tumours
- 35) Diaphragm: developmental, traumatic, neoplastic disorders, dysfunction & pacing
- 36) Mediastinal tumours, Thymic tumors and management of myasthenia gravis
- 37) Trachea: tumors, strictures, tracheomalacia, tracheal resections & reconstructions.
- 38) The Esophagus: Anatomy & Functional Evaluation.
- 39) Esophageal injuries
- 40) Medical & Surgical Treatment of Hiatal Hernia
- 41) Barrett's Oesophagus.
- 42) Nissen Fundoplication
- 43) Hill Procedure
- 44) Belsey Mark IV Procedure.
- 45) Benign Strictures of Oesophagus
- 46) Paraesophageal Hiatal Hernia
- 47) Oesophageal Dysmotility.
- 48) Treatment of Achalasia & Gastroesophageal Reflux.
- 49) Thoracoscopic Oesophageal Surgery
- 50) Carcinoma of Oesophagus, surgical options Resection, Reconstruction, Palliative treatment of Carcinoma of the Oesophagus.
- 51) special diagnostic and therapeutic procedures in cardiac surgery: Echocardiography, Cardiac catheterization, angiography and interventional techniques, PTCA & stenting, Fibrinolytic therapy in the management of acute myocardial infarction, Role of CT scan, MRI radionucleotide imaging in Cardiovascular Diagnosis.
- 52) Normal & Abnormal Development of the Heart.
- 53) Peri operative care of the paediatric cardiac patient.
- 54) Anaesthesia for Paediatric Cardiac Surgery.
- 55) Management of Cardiopulmonary Bypass in adults, infants & children. Pump oxygenators, fitters, Tubing, cannule, ultrafiltration for CPB.
- 56) Deep Hypothermia & Total Circulatory Arrest.

- 57) Myocardial Protection & cardioplegia: rational of various constituents, common cardioplegic solutions. Constitution of cardioplegia used at the candidate's institute.
- 58) Palliative Procedures in Congenital Heart Disease
- 59) Tracheoesophageal Compressive Syndromes of Vascular Origin: Rings & Slings.
- 60) Anomalous Pulmonary and Systemic Venous Connections.
- 61) Atrial Septal Defects and Cor Triatriatum.
- 62) Ventricular Septal Defect.
- 63) Patent Ductus Arteriosus and Aortopulmonary Window.
- 64) Atrioventricular Septal Defects.
- 65) Tetralogy of Fallot and related physiological complexes
- 66) Complex of Functional Single Ventricle.
- 67) Truncus Arteriosus.
- 68) Congenital Malformations of the Aortic Valve and LV outflow tract.
- 69) Coarctation of Aorta and Interrupted Aortic Arch.
- 70) Hypoplastic Left Heart Syndrome.
- 71) Pulmonary Stenosis with intact IVS
- 72) Pulmonary Atresia with intact IVS
- 73) Transposition of Great Arteries
- 74) Congenitally Corrected Transposition of the Great Arteries.
- 75) Double Outlet Right Ventricle and Double Outlet Left Ventricle.
- 76) Tricuspid Atresia.
- 77) Ebstein's Anomaly
- 78) Congenital Abnormalities of the Mitral Valve.
- 79) Heart & heart – lung transplantation in children
- 80) Circulatory Support in Infants and Children
- 81) Anomalies of the Coronary Vessels
- 82) Haemorrhagic and Thrombotic Complications of Cardiac Surgery.
- 83) Intra-aortic Balloon Counter pulsation, Ventricular Assist Pumping,
- 84) Artificial Heart.
- 85) Preservation of Intrathoracic Organs for Transplantation.
- 86) Heart & heart-lung Transplantation.
- 87) Cardiomyoplasty, surgical treatment for congestive cardiomyopathies.
- 88) Surgery for Bacterial Endocarditis.
- 89) Acquired Disease of the Tricuspid Valve.
- 90) Acquired Disease of the Mitral Valve.
- 91) Acquired Aortic Valve Disease
- 92) Surgical management of Hypertrophic Cardiomyopathies
- 93) Homografts and Auto grafts
- 94) Cardiac Valvular Prostheses: design, selection, complications of
- 95) Coronary Revascularization: nonsurgical techniques, surgical indications, direct and indirect Surgical interventions, conduit selection & harvesting, surgical management of complications of MI, combined Coronary and carotid artery disease.
- 96) Surgery for supraventricular & ventricular Arrhythmias. Pacemaker therapy.
- 97) Aneurysms of the ascending arch and descending thoracic aorta
- 98) Dissections of the Aorta.
- 99) Constrictive pericarditis, cardiac tamponade

- 100) Other diseases of pericardium.
- 101) Cardiac myxoma
- 102) Cardiac Tumors.
- 103) History of
 - a) heart, lung and vascular surgery (outline)
 - b) prosthetic valves
 - c) Cardiopulmonary Bypass & cardioplegia
 - d) ASD closure
 - e) coronary surgery
 - f) Cardiovascular & Thoracic (CVT) surgery in India, Mumbai and at the candidate's institution
- 104) Legends in CVT surgery
- 105) Prosthetic material (biological / artificial) in Cardio, vascular and thoracic surgery
- 106) Sutures in CVT Surgery: physical properties of sutures, needle types, recent advances in suture materials.

Vascular

- 1. Physiologic assessment of peripheral arterial occlusive disease
- 2. vascular imaging techniques
- 3. Burger's disease
- 4. Takayasu's disease, Nonspecific aortoarteritis
- 5. Management of arterial aneurysms
- 6. Fibro dysplasia
- 7. Uncommon arteriopathy
- 8. Antithrombotic therapy
- 9. Angioplasties and endovascular techniques
- 10. Basic vascular surgical technique, Fogarty thrombectomy, endarterectomy
- 11. Vascular grafts
- 12. Complications of vascular surgery and interventions
- 13. Management of acute ischemia of limbs
- 14. Management of chronic ischemia of limbs and viscera
- 15. Management of thoracic outlet syndrome
- 16. Other neurovascular conditions involving the upper extremity
- 17. Congenital vascular malformations
- 18. Management of renovascular hypertension
- 19. Management of extracranial cerebrovascular disease
- 20. Management of deep venous thrombosis legend:
 - Must Know topic
 - Better Know topic
 - Nice to Know topic

Importance of a topic is decided depending up how frequently a student is likely to encounter it in day today practice.

: very uncommon = nice to know

: very common = must know

QUANTUM OF TRAINING

i) The quantum of training shall be sufficient so that at the end of the training period, a candidate

will be able to:

- a) Identify the problem in a given patient.
 - b) interpret the results of investigations.
 - c) perform necessary special procedures / operations pertaining to this super-specialty.
 - d) take care of any exigency / complication following the special procedure /operation.
 - e) offer appropriate therapy on his/her own in a set up far withdrawn from his/her training centre.
- ii) In order to achieve the above objectives, a candidate shall be apportioned graded responsibility in patient care under supervision.
- iii) A candidate at the end of the training period must have acquired

- a) capability in conducting cardiopulmonary bypass;
- b) competence in the intensive care management of patients with cardiac, vascular and thoracic surgical problems
- c) confidence in the operating room by performing under supervision as well as independently. It would be desirable that a minimum number of Surgical procedures as stipulated hereunder be performed by the trainee during his training period :

Nature of Operation	Number of operations performed	
	Assisted by a Faculty	Independently (under De jure supervision)
Lung resections	5	3
General Thoracic Operations (other than lung resections)	5	2
Operations on Oesophagus / Diaphragm	3	-
Closed Heart Operations	5	3
Open Heart Operations	25	15
Vascular Operations	5	2
Minimum total	48	25

(The number of operations under each category is subject to revision from time to time and if there are compelling reasons then the Board of Examiners can condone deviations from these stipulated minimum numbers).

iv) A candidate shall be required to spend four weeks in the Department of Cardiology /Chest Diseases and six weeks as an Exchange Visitor at one or two other reputed centres within the City or anywhere in the country. If there are compelling reasons then the Board of Examiners can condone deviations from these stipulations. If possible, candidates be allowed to go abroad UK & US for at least 45 to 60 days to know and update the latest.

v) A candidate shall maintain a Log Book of the Special Procedures / Operations performed by him / her during the training period and its authenticity shall be certified by the concerned Post graduate Teacher / Head of the Department.

vi) A candidate shall be required to prepare a Dissertation.

vii) Three copies of the Dissertation should be submitted to the University at the stipulated time for evaluation.

viii) The Log Book of Special Procedures / Operations performed by a candidate shall be made available to the Board of Examiners for their perusal at the time of his / her appearing at the Final Examinations.

PATTERN OF EXAMINATION

Paper I: Basic Sciences related to Cardiothoracic and Vascular Surgery - 100
Paper II: Clinical & Operative Cardiac Surgery - 100
Paper III: Clinical & Operative Thoracic & Cardio Vascular Surgery - 100
Paper IV: Recent Advances in Cardiothoracic & Vascular Surgery - 100

SUGGESTED READING

A. Books:

S.No	Name of the Book	Editor / Author	Publisher
1	Cardiac Surgery Vol. I & II	Kirklin J.W. Barratt - Boyes	Churchill Livingstone
2	Thoracic and Cardiovascular Surgery	Glenn W.W.L.	Appleton Century Croft
3	General Thoracic Surgery	Thomas W. Shields	Willian & Wikins
4	Vascular Surgery Vol. I & II	Robert B. Rutherford	W.B. Saunders & Company

5	Surgical Anatomy of the Heart	Benson Wilcox	
6	Hurst's The Heart Vol. I & II	Robert C. Schlant R. Wayne Alexandar	McGraw-Hill Inc.
7	Paediatric Cardiac Surgery	Mavroudis C. Backer C.L.	Moseby
8	Pathology of Congenital Heart Disease	Anton E. Beeker Robert H. Anderson	Butterworths
9	Gibbon's Surgery of the Chest	David C. Sabiston	W.B. Saunders & Company
10	Heart Disease: A Text Book of Cardiovascular Medicine Vol.I & II	Eugene Braunwald	W.B. Saunders & Company
11	Moss and Adams Heart Disease in Inf Children and Adolescents	George C. Emkmanouillideas Thomas A Rimonschneider Hugh D. Allen Howard P. Gulgeseli	Williams and Wilkins

B. Journals

1. Journal of Thoracic and Cardiovascular Surgery
2. Annals of Thoracic Surgery
3. Indian Journal of Thoracic and Cardiovascular Surgery
4. Asian Cardiovascular and Thoracic Annals
5. European Journal of Cardiothoracic Surgery
6. Thorax
7. Indian Heart Journal
8. Journal of American College of Cardiology
9. Circulation

Structured Training Programme Scheme

1st Year – Out patient, Inpatient care

- Introduction to intensive care
- Familiarization with use of computers for data storage and acquisition.
- Literature search and plan for dissertation
- Assisting in surgeries including emergencies.

2nd Year – Outpatient and Inpatient Care

- Independent performance of surgical procedures and assisting at operations
- Rotations – Cardiology
- Vascular Interventional Radiology
- Chest Medicine

- Thoracic Oncology
- **3rd Year – Outpatient and Inpatient Care**
- Assisting and performing major surgical procedures
- Research projects finalization and preparing dissertation
- Research Training
- The candidate will be trained in the ability to
- frame a research question
- plan a study to answer the question
- collect the relevant information and
- evaluate appropriately the collected data to arrive at an informed conclusion
- The candidate should become conversant with the reporting of these results as a research paper in journals and as a presentation in conferences.

The activities would consist of

- a) Planning and organising relevant animal/clinical studies to be submitted as a dissertation at the end of the course for evaluation and defence.
- b) Presentation of at least 2 papers in National/International Conferences is desirable and
- c) Attendance at least one National/Regional Conference per year is desirable If possible - the candidate may publish his research work in indexed journals.
- d) Training in Medical Audit, Management, Health Economics and Health Information System: This shall be imparted by conducting common institutional programs.

PRACTICAL SCHEME FOR M.Ch. CARDIO VASCULAR & THORACIC SURGERY

SL.NO.	PARTICULARS	MARKS
01	Long Case - 1 (1 x 100)	100
02	Short Case - 2 (2 x 50)	100
03	Ward Rounds OSCE - 10 stations (10 x 5)= 50 Ward rounds = 50	100
04	<u>Viva Voce</u> Procedures - 50 Instruments - 25 Radiology - 25	100
	Total	400

Distribution of marks for Clinical examination is approved by the Academic Council in its XXIII Meeting held on 10.05.2016