M.Ch Cardiothoracic and Vascular Surgery
Curriculum and Syllabus 2013
Branch Code: 401

SRM Medical College Hospital & Research Centre
SRM University
SRM Nagar, Kattankulathur
Kancheepuram (Dt). 603 203
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M.Ch CARDIO THORACIC AND VASCULAR SURGERY

1. A. GOAL

The Goal of this course is to develop a competent Cardio Thoracic and Vascular surgeon who shall:

i. Provide the health care to patients needing Cardiothoracic Surgical care

ii. Teach & train future undergraduate and postgraduate medical students in Medical Colleges, Institutions, Hospitals including those for Nursing and Allied Health Workers

iii. Conduct and guide research to improve the practice the art and Science of Surgery.

iv. Manage personnel & cost effective health care

v. Organize health teams to provide care during natural or manmade calamities

vi. Develop further acumen & skills in the area of their interest

vii. Provide comprehensive and good quality surgical care including pre-operative and postoperative care

viii. Conduct research and communicate the findings, results and conclusions to his fraternity

ix. Keep pace with the latest developments by self-learning and/or participating in continuing medical education programmes.

x. Organize & manage administrative responsibilities for routine day to day work as well as situations including natural and/or man-made accidents

xi. Manage emergency interventions in the sphere of surgical specialties and also routine problems in their areas.

xii. Develop his/her knowledge, skills and attitudes of his/her areas of interest and become specialist in Allied Specialties.

xiii. Exhibit awareness of the importance of surgical audit and the need for considering cost-effective patient management.

xiv. Be aware of one’s professional limitation and able to refer to appropriate centers at the optimum time

xv. Exhibit awareness of the need for accurate documentation in medical records including Medico-legal cases.

xvi. Adopt ethical procedures in the field of Doctor-patient relations
B. EDUCATIONAL OBJECTIVES

1) Acquire basic knowledge of Anatomy & Physiology related to the practice of Cardio Thoracic and Vascular surgery.

2) Acquire basic knowledge of Cardiology, Chest medicine, Critical care Management & Imaging technology related to Cardio Thoracic and Vascular surgery.

3) Acquire knowledge of causes and principles underlying the uses of drugs & therapeutic procedures for restoring the deranged structures and functions to normalcy.

4) Demonstrate the ability to critically evaluate recent Medical literature from journals, update knowledge & adopt diagnostic and therapeutic procedures.

5) Develop familiarity with diagnostic skills & laboratory procedures relevant to the diagnosis & evaluation of the patient under his / her care and able to conduct some of these procedures in case it becomes necessary to do so.

6) Develop comprehensive knowledge of theoretical aspects of Cardio Thoracic and Vascular surgery including recent advances.

7) Acquire the knowledge of Ethics and Medico-legal aspects related to the practice of CT surgery.

8) Special Emphasis on diseases prevalent in our Country

9) Adequate knowledge, skills and competence of Diagnosis, Treatment and prognosis of Cardio Thoracic and Vascular surgery disorders.

10) Principles of management of Cardiothoracic Emergencies and trauma

11) Adequate proficiency in management of pre-operative and postoperative patients.

12) Knowledge of basic principles, management of common & emergencies in other specialties like critical care, common medical disorders, metabolic disorders, Cardiac problems & congenital malformations.

13) Familiarize with basic principles of Anesthesiology & Resuscitative measures.
2. COURSE OVERVIEW

Duration of the course:
The period of certified study and training for the Post Graduate M.Ch in Cardiothoracic Surgery shall be Three Academic years. (Six Academic Terms). The academic terms shall mean six months training period.

Commencement of Academic Session:
The academic session for the Post Graduate shall commence from August/September of the Academic year.

Date of Examination:
The candidates admitted up to 30th September of the academic year shall be registered for that academic year and shall take up their Final Third Year regular examination in August/September of the due year and February/March of the academic year after completion of three (3) years.

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 four (4) and not more than six (6) months between the two examinations.

Attendance:
All students joining the Post Graduate training programme shall work as full time Residents during the period of training, attending not less than 80% (eighty percent) of the training during each calendar year, and will be given full time responsibility, assignments and participation in all facets of the educational process.
The period of training for obtaining the degree shall be three completed years including the period of examination.

Leave: Residents would be entitled to 30 days leave in the first year and 36 days each in the second and third years of residency.

Postings/Rotations:
There will be structured training programme. The students are expected to learn in phased manner starting with basic care progressing to advanced care management.
3. COURSE CONTENT
TEACHING PROGRAMME

1. General Principles

- Acquisition of practical competencies being the keystone of postgraduate medical education postgraduate training is skills oriented.

- Learning in postgraduate program is essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

2. TEACHING, LEARNING METHODS AND ACTIVITIES

Post Graduate learning Program is essentially “Autonomous and Self Directed”. They are expected to seek knowledge and skill on their own initiative. Sound knowledge of Cardio – Thoracic Surgery is to be acquired entirely by self study and by participating in various teaching activities of the department.

The following organized learning experiences should be provided to the students. Time table for these programs will be drawn every six months.

a. Operation theatre training:

The student is expected to know & prepare every details of the pre-operative case before entering the theatre. He / she shall be guided in the operative room by the consultant. He / she is also expected to intensively monitor the patient in the post operative period as well until discharge. During this stage, the trainee will gain competence in a number of technical skills and procedures. He should gain experience in the practical applications of cardiopulmonary bypass, myocardial protection and circulatory support. To understand the science and technology that underpins these disciplines. He should learn Saphenous vein harvest, Median sternotomy, Surgical re-explorations for bleeding or tamponade and heart valve replacement. He should also get exposure of the thoracic and vascular procedures.

b. Case presentation and cases management in OPD and Indoor wards: The Post Graduate student will present cases daily on clinical rounds to the faculty members of the department. The students shall be provided facilities to manage cases of higher and greater complexity by allowing them graded responsibility as the course program.

c. Post Graduate, Seminars, and symposia, panel discussions of suitable topics: These will be held once a week. Topics of common interest to PG’s will be covered in the program. Each PG student should present minimum 6 seminars every year.
d. **Journal clubs:** These will be held once a month. Each PG student should present minimum 6 journal clubs every year.

e. Clinico – Pathological Correlation meetings will be held once in three months with Pathology Department.

f. Medical audit /Fatality case discussions: PG student is expected to analyze and discuss the cases allotted to him / her

g. Intramural and extramural training programs.

h. Interdepartmental meetings will be organized with Cardiology and Pathology departments as required. PG student should actively participate in the meeting and discuss the cases or topics allotted.

i. **Preparation and presentation of a Thesis:** Every PG student will be required to carry out the research work under the supervision of the guide in the field of Cardio Thoracic and Vascular Surgery. The thesis work can be carried out by student jointly with other departments and the faculty from other departments can be opted as co – guides.

j. Participation in conferences, workshops, field visits, camps, etc. and share knowledge and experience with others.

k. **Departmental Clinical work:-** Post Graduate students shall also be allowed to perform procedures under supervision and / or delegated authority depending on the experience and proficiency gained. The heads of units and other consultants and guides shall be in- charge of the supervision and delegation of authority and responsibility to work. The Post Graduate student will also be involved in

Various clinical Research works being undertaken in the department by the faculty members. The student is required to participate in at least one research project of the department.

l. **Teaching Experience:** The Post Graduate students are to participate in all aspects of teaching specially practicals, Demonstration and tutorials, during their tenure; they will be working under faculty members on rotation basis as per the allotment of the teaching schedule.
The student will be regularly involved in teaching of undergraduate medical, paramedical and nursing students as well as General Surgery postgraduate students. Their teaching skills will be assessed and shall form part of the internal assessment.

The entire period shall be `in service’ training programme based on the concept of `learn as you work’ principle.

Schedule of work:

1. Daily surgical work
2. Bedside clinical case presentation - once a week
3. Seminar / Journal club - once a week
4. Grand rounds - once a week
5. Cath conference - once a week
6. Session on ECG’s/ X-ray’s / CT Scan/MRI - Once a month
7. Session on Histopathology Reports - Once a month
8. Session on echocardiography / TMT/ Holter - Once a month
9. There should be 3 teaching sessions at least - Once a week of one hour per week duration.
10. The rounds should include bedside case discussions, file rounds (documentation of case history and examination, progress notes, round discussions, investigations and management plan), interesting and difficult case unit discussions.
11. Central hospital teaching sessions will be conducted regularly and M.Ch residents would present interesting cases, seminars and take part in clinico-pathological case discussions.

12. Conferences & Papers

   A resident must attend at least one conference per year.
   
   One paper must be presented in at least 3 years.

13. Ward & OPD Duties:

    Duties should include diagnostic case workup and day to day management of pre & post operative cases. The resident should acquire the experience in the management of post surgical patients on the critical care, high dependency and post operative wards and to be able to manage such patients with appropriate supervision.
14. CT/ICU Duties:

To gain experience in aspects of the management of surgical patients, the resident should learn prompt diagnosis and management of cardiac emergencies. He should fortify the skills of hemodynamic monitoring in emergency situations and should learn procedures like arterial line insertion, temporary venous pacing, central line insertion, pericardiocentesis, intraaortic balloon pump insertion, timing and management. Swan Ganz catheter insertion, use of defibrillator and should learn to do the tracheostomy, chest aspiration, chest drain insertion and management.

Routine Programmes

1. Weekly Journal Clubs: Discussion of preview articles
2. Saturday Grand rounds – ICU and Wards
3. To attend CME Programmes & Conferences

Schedule of the week activities:

- Monday - Cath Conference surgery schedule for the proposed week
- Tuesday - Fibre-optic Bronchoscopy - after noon
- Wednesday – Case Discussion
- Thursday - Case discussion of the week
- Friday – Journal club
- Saturday – Out Patient Department

Daily Schedule

<table>
<thead>
<tr>
<th>Days</th>
<th>Time (8am – 2pm)</th>
<th>Time (2pm -4pm)</th>
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<tbody>
<tr>
<td>Monday</td>
<td>Surgery/OR attendance</td>
<td>Lecture Class</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Surgery</td>
<td>Lecture Class</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Surgery</td>
<td>Lecture Class</td>
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<tr>
<td>Thursday</td>
<td>Surgery</td>
<td>Lecture Class</td>
</tr>
<tr>
<td>Friday</td>
<td>Surgery</td>
<td>Lecture Class</td>
</tr>
<tr>
<td>Saturday</td>
<td>OPD/Review cases</td>
<td>Lecture Class</td>
</tr>
</tbody>
</table>

ICU Roster (Monthly schedules) – alternate day duties
4. SYLLABUS

1. AIM:
   a) To establish a strong foundation in basic sciences in the field of Cardio Thoracic & Vascular surgery

2. THEORY:
   During the Three years candidate shall cover the following areas:

- **Applied Anatomy and Developmental Anatomy** of the chest wall Diaphragm, Pleura, Lungs, Mediastinum, Oesophagus, Heart, Pericardium, Great Vessel and its branches

- **Applied Physiology** – Respiration, gas exchange, Pulmonary function tests, ventilation, Cardiac cycle, Cardiac output, heart sounds and murmurs, regional circulation, Extracorporeal Circulation Hypothermia, cardiac metabolism, Acid base balance, Fluid Electrolyte Balance, Gastro Oesophageal reflux.

- **Applied Pathology** Thoracic injuries, Chest wall tumours, mediastinal tumours. Pleural diseases, disorders of Trachea, Bronchus & lung / Pulmonary suppuration, pulmonary tuberculosis, benign & malignant lesions of lungs, benign and malignant lesions of Oesophagus, strictures & motility disorders of Oesophagus, Diaphragmatic hernia, diseases of Heart and great vessels, pulmonary embolism

- **Applied Microbiology** – pulmonary infections, infective endocarditis; infections following cardiac & thoracic surgery.

- **Pharmacology**: Knowledge of medicines used in this specialty.

- **Cardiovascular Engineering**: Concept of flow, pressure gradients, heart as a pump, efficiency of heart and valves, hemodynamic assessment, prosthetic and bioprosthetic heart valves, extra corporeal circulation, hypothermia, IABP, ECMO, Ventricular assist devices, materials in cardiovascular application and biocompatibility, pacemakers, defibrillation, Automated Implantable Cardiovertor Defibrillator (AICD).

- **Critical Care Medicine**: Cardiac arrest, Cardiopulmonary and cardio cerebral resuscitation, Ventilators, cardiac monitors, Swan-Ganz catheter and cardiac output measurement, lonotropes, renal failure and dialysis.

- **Imaging**: X- Ray, USG, CT Scan, MRI, CT- Angio, PET. Nuclear Medicine, Perfusion scan etc.
**Cardiac surgery** - Congenital cardiac surgery, Heart valve surgery, coronary artery bypass surgery, paediatric and neonatal cardiac surgery, Re-Do cardiac surgery.

**General thoracic surgery** – Surgery of chest wall Diaphragm, Mediastinum, trachea and bronchus, pleura and lungs, Oesophagus, chest trauma, neonatal cardio vascular - thoracic emergencies.

**Vascular surgery** – Surgery of great vessel, peripheral vascular surgery, disease of veins – varicose veins, DVT, vascular trauma.

**Thoracic endoscopies** – Bronchoscopy (Rigid and Fibre optic), Oesophagoscopy (Rigid and Fibre optic), Mediastinoscopy.

**Cardio thoracic Anaesthesia** - Anaesthesia techniques, single lung anaesthesia, Paediatric and neonatal cardiac anaesthesia, Perioperative analgesia and sedation, intra operative TEE.

**Cardiology:** Noninvasive – ECG, Echocardiography, Invasive – Cardiac Cath and Angiography.


- Video assisted Thoracic Surgery - Principle, Indications, Techniques and Complications

3. **PRACTICAL EXPERIENCE:**

- The Resident should fortify the skills of haemodynamic monitoring in emergency situations and should learn procedures like arterial line insertion, temporary venous pacing, central line insertion, pericardiocentesis, re-exploration for bleeding, intra aortic balloon pump insertion, Swan Ganz catheter insertion, knowledge of ventilators etc.

- The Resident should assist in procedures like Coronary Artery Bypass grafting, Valve Replacements, Congenital heart Surgeries, Aortic surgeries, Thoracic surgeries and closed procedures etc.

- Other CTVS procedures like Peripheral Vascular Surgeries & Trauma

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 Surgery 05
Open Heart Surgery (25)
  ASD 05
  VSD 03
  MVR 03
  AVR 02
  DVR 02
  CABG 10

II. Thoracic surgery (25)

Thoracotomies 13
Lung resections 05
Other General thoracic operations 07

III. Inter costal drainage (50)

IV. Vascular surgery 06

Peripheral artery surgery 03
Peripheral venous surgery 03

V. VATS (Video Assisted Thoracic Surgery) (06)

Diagnostic procedures 05
Therapeutic procedures 01

VI. Thoracic Endoscopies (27)

Bronchoscopies
  Fibreoptic 15
  Rigid 03

Oesophago scopies
  Fibreoptic 03
  Rigid 03

Mediastinoscopy 03

VII. Pacing and Electrophysiology (08)

Single chamber pacing 03
Dual chamber pacing 03
Bi- Ventricular pacing 01
Electrophysiology 01
VIII). Cardiac cath & Angiography

Cardiac cath 03
Coronary angiography 03

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.

(The Head of the Department should certify this)

RESEARCH METHODOLOGY:

Internet and computer fundamentals – Gathering information, Medical literature, learn and review, Retrospective and prospective studies, Biomedical statistics.

A Candidate shall be required to prepare:

1. A Thesis
2. Publish at least one paper in an indexed / national/ international journal
3. Present two papers at national / international level conference of cardiovascular thoracic surgery.

He / she must have attended at least three zonal / national / international conferences of the specialty

The candidate must also attend three CME programmes / workshops or wet labs during the training period.
5. MAINTENANCE OF LOG BOOK

The student will maintain a log book of all the operations assisted / or performed during the training period certified by the Head of the Department.

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

Log book should contain:

1. Certificate duly signed by teacher, Head of Department, Head of Institute stating Dr……………….. has worked in department from -----------to -----------for a period of 3 years. This performance record book contains authentic record of work done and assessment for last 3 years.

2. Record of training:
   a). Name of the trainee
   b). Name of the Hospital
   c). Training period
   d). Name of teacher / unit Head

3. Posting

4. Working schedule

5. Teaching programme

6. Presentation at Journal club: Date, Article Name, Assessment.

7. Seminars: Date, Topic / Subject, Assessment.

8. Case presentations: Date, Case, Teacher’s signature.

9. Details of surgery assisted / done

10. Death Audit / CPC: Date, Case discussed, Assessment and signature.

11. Surgical procedures: Date, Name of patient, Type, Surgery – assisted / done, complication observed.

12. Teaching activity: Date, Topic, Class.

13. Participation in Research Activity: Name of project, Duration.

14. Conferences / Workshop attended paper presentation / Publication.
OPERATIVE WORK LOAD:

The minimum number of operations performed per year by the department admitting up to 1 postgraduate student in a year shall be as follows:

1) Cardiac Surgery
   - Closed heart operations: 25
   - Open Heart operations (Including Paediatric): 200

2) Thoracic Surgery: 25

3) VATS: 10

4) Thoracic Endoscopies: 25

6. THESIS

Every student registered as post graduate shall carry out work on an assigned research project under the guidance of a recognized post graduate teacher, the result of which shall be written up and submitted in the form of a thesis.

Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the students to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the theoretical and clinical / practical examination.

The thesis shall be a bound volume of a minimum of 50 pages and not exceeding 75 pages of typed matter (Double line spacing and on one side only) excluding certification, acknowledgements, annexure and bibliography.

Thesis should consist of
(a) Introduction
(b) Review of literature
(c) Aims and objectives
(d) Material and methods
(e) Result
(f) Discussion
(g) Summary and conclusion
(h) Tables
(i) Annexure
(j) Bibliography
(k) Ethics committee clearance certificate
Four copies of thesis shall be submitted six months prior to the commencement of the theory examinations on the date prescribed by the Controller of Examinations of this University. The thesis should be approved by the Professor of that branch and the same has to be forwarded to the Controller of Examinations, by the head of the department through the Dean of the college.

Two copies in addition are to be submitted as an electronic version of the entire thesis in a standard C.D. format by mentioning the details and technicalities used in the C.D. format.

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; and on the acceptance of the thesis by two examiners, the candidate shall be allowed to appear for the final examination.

**EVALUATION OF THESIS**: ACCEPTED / NOT ACCEPTED

No marks will be given

**7. SCHEME OF EXAMINATION**

**PATTERN OF EXAMINATION**

**A. THEORY EXAMINATION:**

*Duration:* Three Hours

4 papers, 100 Marks each

<table>
<thead>
<tr>
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<th>Title</th>
<th>Marks</th>
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<tbody>
<tr>
<td>I</td>
<td>Applied Basic Sciences</td>
<td>100</td>
</tr>
<tr>
<td>II</td>
<td>Thoracic and Adult Cardiovascular Surgery –I</td>
<td>100</td>
</tr>
<tr>
<td>III</td>
<td>Congenital &amp; Thoracic Surgery –II</td>
<td>100</td>
</tr>
<tr>
<td>IV</td>
<td>Recent Advance in Thoracic and Cardio Vascular Surgery</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>400</strong></td>
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**DISTRIBUTION OF MARKS**

<table>
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<tr>
<th>QUESTIONS</th>
<th>NO</th>
<th>MARKS</th>
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<tbody>
<tr>
<td>Essay</td>
<td>(2x20)</td>
<td>40</td>
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<tr>
<td>short notes</td>
<td>(10x6)</td>
<td>60</td>
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<td><strong>TOTAL</strong></td>
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I. Over all marks in theory  

4x100=400

**PRACTICAL/CLINICAL AND ORAL EXAMINATION**

<table>
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<th>DURATION</th>
<th>MARKS</th>
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<tbody>
<tr>
<td>LONG CASE</td>
<td>Onex100</td>
<td>one hour</td>
<td>100</td>
</tr>
<tr>
<td>SHORT CASE</td>
<td>Twox50</td>
<td>One hour</td>
<td>100</td>
</tr>
<tr>
<td>WARD ROUNDS</td>
<td>Four</td>
<td>One hour</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>300</td>
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X–rays – Pathological Specimens Instrumental  
Oral / Viva Examination  

**TOTAL** practical and oral  

400

THESIS: Approved / not approved (No Marks)

<table>
<thead>
<tr>
<th>Maximum marks</th>
<th>Qualifying for a pass 50% marks</th>
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<tbody>
<tr>
<td>Theory</td>
<td>400</td>
</tr>
<tr>
<td>Clinical &amp; Oral / Viva</td>
<td>400</td>
</tr>
</tbody>
</table>

A student shall secure not less than 50% marks in each head of passing, which shall include 1. Theory 2. Practical including clinical and viva voice examination.

*“The postgraduate medical students are required to pass theory and practical examinations separately. An examinee should obtain minimum 40% marks in each theory paper and not less than 50% marks cumulatively in all the four papers for Degree examination to be cleared as “Passed” at the said Degree examination”

*As per Medical Council of India notification date 03.09.2014 and the same approved in the 28th Academic council meet of SRM University held on 23/03/2015.*
8. EXAMINATION AND EVALUATION

APPRAISAL:

To Improve the M.Ch Training Programme by having appraisal for Postgraduate trainees.

Accordingly, the assessment of the postgraduate, review of the progress and appraisal infrastructure and facilities will be carried out.

The Department shall conduct periodic assessment tests of the Postgraduate student as per the guidelines issued from time to time.

At the end of 3 years the appraisal report will be submitted.

(1) EXAMINERS

(a) All the post graduate examiners shall be recognized post graduate teachers holding recognized 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 recognized universities from outside the State and other two will be internal examiners for M.Ch.

(c) 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.

(d) In the event of there being more than one centre in one city, the external examiners at all the centers in that city shall be the same. Where there is more than one centre of examination, the University shall appoint a Supervisor to coordinate the examination on its behalf.

(e) The guidelines regarding appointment of examiners are as follows:

1. No person shall be appointed as an examiner in any subject unless he/she fulfils the minimum requirements for recognition as a Post Graduate teacher as laid down by the Medical Council of India and has teaching experience of 8 (Eight) years as a Lecturer / Assistant Professor out of which he/she has not less than 5 (five) years teaching experience after obtaining Post Graduate degree. For external examiners, he/she should have minimum three years experience of examinership for Post Graduate diploma in the concerned subject. Out of internal examiners, one examiner shall be a professor or Head of Department.
2. There shall be at least four examiners in each subject at an examination out of which at least 50% (Fifty percent) shall be external examiners. The external examiner who fulfils the condition laid down in clause – 1 above shall ordinarily be invited from another recognized university, from outside the State: provided that in exceptional circumstances examinations may be held with 3 (three) examiners if two of them are external and Medical council of India is intimated with the justification of such examination and the result shall be published in such a case with the approval of Medical council of India.

3. An external examiner may be ordinarily been appointed for not more than three years consecutively. Thereafter he may be reappointed after an interval of two years.

4. The internal examiner in a subject shall not accept external examiner ship for a college from which external examiner is appointed in his/her subject.

5. The same set of examiners shall ordinarily be responsible for the written, practical or part of examination

6. There shall be a Chairman of the Board of paper – setters who shall be an external examiner and shall moderate the question papers.

7. Where there is more than one centre of examination, there shall be Coordinator appointed by the University who shall supervise and Co - ordinate the examination on behalf of the University with independent authority.

(2). 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 degree examination.

(3). Number of examination: -
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 examinations.

Master of Chirurgery (M.Ch) Cardio Thoracic and Vascular Surgery.
The examination shall consist of: Theory and Clinical /Practical and Oral.

(a). Theory
There shall be four theory papers; one paper out of these shall be in Basic Medical Sciences, and another paper on Recent Advances. The theory examination will be held sufficiently earlier than the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the start of the clinical / Practical and Oral examination.
(b). Clinical / Practical and Oral

Practical / clinical examination shall consist of carrying out special investigation technique for Diagnosis and Therapy. Oral examination shall be comprehensive to test the candidate’s overall knowledge of the subject.

A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory (2) practical including clinical and viva voce examination.

Evaluation of Answer Scripts

The answer books shall be valued by two examiners. One of the two examiners will be from this university and the other will be from any other university. The average of the two marks secured by the candidate will be taken into account. If the difference between two marks exceeds 20%, the answer script shall be valued by the third examiner. The average of the nearest two marks shall be considered as the final marks.
9. MODEL QUESTION PAPERS

M.Ch (Cardio Thoracic and Vascular Surgery)

Paper I – Applied Basic Sciences

Time: Three hours
Maximum Marks: 100

Answer ALL questions
Draw suitable diagrams wherever necessary.

I. ESSAYS (2 x 20 = 40)

1. Discuss the Pathophysiology of Cardiopulmonary bypass

2. Discuss in detail about fiberous skeleton of the heart

II. WRITE SHORT NOTES ON (10 x 6 = 60)

1. Inter Atrial Septum Development

2. Segmental & sequential analysis of PFT

3. Bronchopulmonary segments

4. Development of Diaphragm

5. Anticoagulants – update

6. Antiarrhythmic drugs

7. Ficks principle

8. Conduction system

9. Coronary Circulation

10. Jones criteria - for Rheumatic fever
M.Ch (Cardio Thoracic and Vascular Surgery)

Paper II - Thoracic and Adult cardiovascular surgery - I

Time: Three hours

Maximum Marks: 100

Answer ALL questions

Draw suitable diagrams wherever necessary.

I. ESSAYS

(2 x 20 = 40)

1. Classification of VSD and surgical Management
2. Carcinoma of Lung - Surgical management

II. WRITE SHORT NOTES ON

(10 x 6 = 60)

1. Diaphragmatic hernias
2. Infective Endocarditis
3. PDA
4. Mitral Valve Repair Techniques
5. Lung volume reduction surgery
6. Achalasia cardia
7. Segmental resection of lung
8. Thymoma
9. Mediastinal tumors
10. Pericarditis - Surgical Management
M.Ch (Cardio Thoracic and Vascular Surgery)

Paper III - Congenital & Thoracic surgery-II

Time: Three hours                                Maximum Marks: 100
Answer ALL questions
Draw suitable diagrams wherever necessary.

I.       ESSAYS  ( 2 x 20 = 40)

1. Surgical Management of Tricuspid atresia
2. Surgical Management of Transposition of Great vessels

II. WRITE SHORT NOTES ON  ( 10 x 6 = 60)

1. Coronary AV Fistula
2. Norwood procedure
3. Unifocalisation
4. Aorta Pulmonary Shunts
5. Common AV Canal defects
6. Rastelli’s Operation
7. Schmitar’s syndrome
8. Conduits
9. Coarctation of Aorta
10. ECMO
M.Ch (Cardio Thoracic and Vascular Surgery)

Paper IV - Recent Advance in Thoracic and Cardio Vascular Surgery

Time: Three hours

Answer ALL questions
Draw suitable diagrams wherever necessary.

I. ESSAYS

1. Discuss about Aortic root Enlargement
2. Surgical management of Cardiac failure

II. WRITE SHORT NOTES ON

1. Stem cell Therapy
2. Ventricular Assist devices
3. TAVI
4. Tracheal implants
5. Cardiac transplantation
6. VATS
7. Trans Myocardial Revascularisation
8. Hybrid procedures
9. Surgical management of Atrial Fibrillation
10. Robotics in Cardiac surgery
## 10. RECOMMENDED BOOKS AND JOURNALS

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Book</th>
<th>Editor / Author / Edition &amp; Year /Publisher/ Publication (All up to date latest version)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Synopasis of Diseases of the Chest</td>
<td>Richard S. Fraser, MD, CM, Elsevier, 2005</td>
</tr>
</tbody>
</table>

B. JOURNALS

- European Journal of Cardiothoracic Surgery
- Journal of Thoracic & Cardiovascular Surgery
- Asian Cardiovascular & Thoracic Annals
- Seminars in Thoracic and Cardiovascular Surgery
- Circulation

Internet Resources:

www.ctsnet.org
www.aats.org
www.ejcts.ch.org