



DM Cardiology

Curriculum and Syllabus 2011

Branch Code: 71

SRM Medical College Hospital & Research Centre

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S.NO	CONTENT	PAGE NO
1	GOALS AND OBJECTIVES	04
2	COURSE CONTENT (SYLLABUS).....	06
3	COURSE OVERVIEW.....	09
4	MAINTENANCE OF LOG BOOK.....	11
5	THESIS	13
6	SCHEME OF EXAMINATION	19
7	EXAMINATION AND EVALUATION.....	20
8	MODEL QUESTION PAPER	23
9	RECOMMENDED BOOKS & JOURNALS	27

DM CARDIOLOGY

STATEMENT OF GOALS and SPECIFICATION OF OBJECTIVES

A. Goal

The goal of DM Cardiology program is to provide specialized training in Cardiology to produce competent super specialists. These specialists will be capable of providing care of the highest order to the cardiac patients in the community as well as clinical tertiary care centres.

They would subsequently serve as teachers, trainers, consultants, researchers and leaders in the field of Cardiology. They shall recognize the health needs of the community, carry out professional obligations ethically, in keeping with the objectives of the National Health Policy.

B. Learning Objectives

In general, the course is designed to train post graduates in DM (Cardiology) in major areas of cardiology like clinical cardiology, coronary care, Paediatric cardiology, electrophysiology, invasive diagnostic and therapeutic cardiac procedures and various non invasive diagnostic techniques and research activities.

The aim of the course is to impart thorough and comprehensive training to the candidate in the various aspects of cardiology so that at the end of the course he/she shall be able to perform the following

Cognitive Domain:

1. To diagnose cardiovascular diseases based on clinical methods.
2. To interpret relevant laboratory, radiological and cardiac investigations for the purpose of diagnosis.
3. To arrive at a treatment plans based on 1 & 2 and discuss the pros and cons with the patient and his family.
4. Be able to carry out efficient management of all types of cardiovascular Emergencies after quickly assessing the patient and synthesizing available clinical and investigational information. To keep abreast of the current knowledge and recent advances in the field by self learning and /or participating in Continuing Medical Education Programmes.
5. To deliver preventive and rehabilitative care.
6. To organize and manage administrative responsibilities for routine day to day work as well as emergent / urgent situations.
7. To understand the functional principles of various biomedical equipments used in invasive and non invasive cardiology.
8. To carry out research and publications in the field.
9. To teach the medical and other paramedical students/staff and develop learning resource material for them.

Skills

The student would be given adequate training during the course so that he/she will be able to perform and interpret various non-invasive and invasive techniques as outlined below:

Non - invasive :

1. Electrocardiography
2. Stress ECG
3. Ambulatory ECG
4. Echocardiography – M-mode, Two dimensional, Doppler, Colour flow imaging, Transoesophageal echocardiography and stress echocardiography.
5. Ambulatory BP monitoring.

Invasive :

1. To perform temporary pacemaker insertion and pericardiocentesis.
2. To perform left and right heart catheterization, to calculate and interpret various hemodynamic parameters.
3. To assist in various interventions including Valvuloplasty, coronary and congenital interventions.
4. To interpret electrophysiological data and assist in electrophysiology procedures, permanent pacemaker implantation and AICD implantation.

Minimum No. of Procedures for competency

1. Trans thoracic Echocardiography	400
2. Transoesophageal Echocardiography.....	25
3. Stress ECG... ..	100
4. Temporary Pacemaker	20
5. Ambulatory ECG's analysed	50
6. Permanent pacemaker Implantation's assisted	5
7. Cardiovascular Catheterization.....	100
8. Percutaneous Cardiovascular Intervention's assisted	10

(The Head of the department should certify this)

Affective Domain :

1. To adopt ethical practices in dealing with patients, colleagues, subordinates superiors and health care workers.
2. To promote cordial interpersonal relation
3. To perform as a team
4. To learn to be a leader when the need arises.
5. To learn to order investigations and prescribe drugs rationally.
6. To be aware of ethical issues in human and animal research.
7. Take rationale decision in the face of ethical dilemmas in cardiac diseases.

Demonstrate sympathy & Humane approach towards patients & their families & exhibit interpersonal behaviour in accordance with social norms & expectations.

COURSE CONTENT :

Since the students are trained with the aim of practicing as independent specialists, this course content will be merely a guideline. They have to manage all types of cases and situations and seek and provide consultation as per the clinical need. The emphasis shall therefore be more on the practical management of the problem of the individual cases and the community within the available resources.

In general the course of the study shall include.

GENERAL TOPICS

A) Basic Sciences :

Applied basic sciences relevant to the field of Cardiology - Anatomy, Physiology, Biochemistry, Pathology, Microbiology, Pharmacology and Immunology pertaining to the Cardiovascular system

B) Clinical Sciences :

Etiopathology, Hemodynamics, clinical evaluation, investigative modalities and treatment details of

1. Coronary artery disease.
2. Rheumatic heart disease.
3. Congenital heart disease and other paediatric cardiac disorders.
4. Cardiac arrhythmias.
5. Heart failure.
6. Peripheral vascular disorders.
7. Systemic hypertension.
8. Systemic diseases involving heart.
9. Heart muscle diseases.
10. Pericardial diseases.
11. Cardiac trauma.
12. Tumours of heart.
13. Pulmonary thromboembolism and pulmonary hypertension.
14. Genetics, molecular biology and immunology related to cardiology.
15. Geriatric heart disease.
16. General anaesthesia and non cardiac surgery in patients with heart disease.
17. Pregnancy and heart disease.
18. Epidemiology and preventive cardiology.
19. Other general cardiology topics including principles and basics of drug therapy, care of patients with end stage heart disease, Nuclear cardiology, Cardiovascular Magnetic resonance and Cardiovascular Computed Tomography.

The course in general aims to provide in addition to the basic theoretical knowledge.

- I. A thorough knowledge , theoretical as well as practical, of the various investigative procedures - invasive and non-invasive - including electrocardiography, Stress test testing (tread mill test, stress related and other nuclear techniques), Ambulatory BP monitoring, Holter monitoring for arrhythmias and ischemic disorders, Permanent pacemaker/AICD interrogation and analysis. Echocardiography (M-mode, Two dimensional, Doppler, Colour flow imaging, Transoesophageal echocardiography and echo directed hemodynamic studies), cardiac catheterization and to perform and analyze basic electro physiologic data.
- II. A detailed knowledge of and practical experience of performing temporary pacemaker insertion, pericardiocentesis, Right and left heart catheterization and coronary angiography procedures in adults and children and also experience in various interventions including Valvuloplasty, Coronary and congenital interventions, electrophysiology procedures and permanent pacemaker/AICD implantation.
- III. A basic knowledge of Cardiovascular-thoracic Surgery.

TEACHING LEARNING METHODS AND ACTIVITIES

Learning in post graduate program shall be essentially “Autonomous and Self directed”. PG students are encouraged to largely carry out self learning. They are expected to seek knowledge and skill on their own initiative. Sound knowledge of Cardiology 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

1. Case presentation & case management in OPD & Indoor wards: The PG 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.
2. PG lectures, Seminars, symposia, panel discussions of suitable topics: These will be held once a week. Topics of common interest to PGs will be covered in the program. Each PG student should present minimum 6 seminars every year.
3. Journal clubs: These will be held once a month. Each PG student should present minimum 6 journal clubs every year.

4. Clinico - Pathological Correlation meetings will be held once with Pathology Department.
5. Medical audit / fatality case discussions. PG student is expected to analyze & discuss the cases allotted to him/her.
6. Intramural and extramural training programs.
7. Interdepartmental meetings will be organized with Cardiovascular Thoracic Surgery and Pathology departments as required. PG student should actively participate in the meetings & discuss the cases or topics allotted.
8. Preparation and presentation of a Thesis: Every PG student will be required to carry out the research work under the supervision of his guide in the field of Cardiology. 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.
9. Participation in conferences, workshops, field visits, camps, etc. and share knowledge and experience with others.
10. **Departmental clinical work:** PG 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 PG 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.
11. **Intradepartmental postings :** Every PG student will be posted by rotation in different sections of the Cardiology department like Out patient departments, Cardiology wards (Inpatient), Intensive Coronary Care Unit, Stress test unit, Echocardiography lab and Cardiac Catheterisation lab. A record of the observation made & lessons learnt should be maintained by the students.
12. **Teaching experience:** The PG 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 Paediatrics postgraduates students. Their teaching skill will be assessed and shall form part of the internal assessment.

13. **Community Cardiology :** The training of PG students will involve learning experience “Derived from” or “Targeted to” the needs of the community. It shall therefore be necessary to expose the students to community based activities. Throughout the course of training the emphasis shall be on acquiring knowledge, skill and attitudes through first hand experiences as far as possible. The emphasis will be on self learning rather than on didactic lectures.

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

COURSE OVERVIEW

Duration of the Course

The period of certified study and training for the Post-Graduate DM CARDIOLOGY shall be Three Academic years.

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 postgraduate 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 program. The students are expected to learn in phased manner starting with basic care progressing to advanced care management

1st Year :

- Outpatient, Inpatient care (includes ward duty, CCU duty and attending referral calls).
- Training in Stress test/Holter monitoring
- Literature search and plan for thesis.

2nd Year :

- Outpatient and Inpatient Care.
- Echocardiography and Cath lab postings.
- Allied postings-Cardiovascular and thoracic surgery.
- Nuclear Cardiology.

3rd Year :

- Outpatient and Inpatient Care.
- Echocardiography and Cath lab postings.
- Research projects finalization and preparing thesis.
- Extramural rotation

Extramural rotations or elective rotations for a maximum period of two (2) months will be possible during end of the 2nd year of training.

The candidates can undertake up to two (2) months elective rotation at parent or other institutions in the country approved by the department.

There will be a continuous interaction between the Cardiology department and the allied departments to ensure that the students achieve these skills during their peripheral postings.

Cumulative duration of the study program

S.No.	Places	Duration
1.	Ward + CCU	12 months
2.	Echo	8 months
3.	TMT / Holter	3 months
4.	Cathlab	8 months
5.	Cardiac Surgery	1 month
6.	Nuclear Cardiology	1 month
7.	Paediatric Cardiology	1 month
8.	Elective Postings	2 months

Research :

- i. The students will be required to submit a thesis during the course of DM programme. A subject for thesis would be allotted to the P.G. within the first six (6) months after joining. The emphasis on thesis work would be on review of literature, maintaining a record of references, preparation of a plan of study, documentation of aims, planning the methodology, collection, documentation and analysis of data, comparison of data obtained with others in literature, drawing conclusions and writing a summary.

The subject of thesis should be preferably prospective. Analysis of less than 25 cases would not be permitted unless it is a rare disease. Progress on thesis will be reviewed every six months and feedback given to the candidates.

The student will make at least three formal presentations to the department i) protocol ii) midcourse progress and iii) final report. The thesis should be submitted to the university six (6) months before the final examination. four (4) copies of completed thesis after appropriate certifications by the guide and co-guide should be submitted at the end of the 2½ years (There will therefore be two complete years after submission of protocol and the final thesis). At least 24 months should be spent in the research project undertaken.

- ii. The student must attend continuing education symposia, workshops, and conferences including meeting of the Cardiological Society of India, workshops on Echocardiography, Electrophysiology, and Cardiac Catheterisation etc.

MAINTENANCE LOG BOOK :

The post graduate 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. Development of attitude is an very important part of management of cardiac patients. 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 per the enclosed proforma for continued internal assessment.

EVALUATION SHALL CONSIST OF FORMATIVE
and
SUMMATIVE ASSESSMENT

A. Formative :

- Ward work.
- Clinical Case presentation.
- Journal Club.
- ECG and ECHO club.
- Cath Conference.
- General assessment of attitude.

B. Summative :

- Thesis.
- Final examination.

A. FORMATIVE ASSESSMENT

The purpose of continuous course assessment is mainly

1. To ensure the habits of regularity, punctuality and disciplined working amongst PG students.
2. To give periodic feedback regarding their performance during the medical course and to enable them to take corrective steps to enhance their learning in various areas mentioned. eg. Patient care, research, teaching, administration etc.
3. To monitor attainment of clinical and technical skills to ensure adequacy of training.
4. To make it available to the internal examiner at the time of final examination to discount the possibility of a single adverse performance influencing the pass or fail situation of the student. This would give an idea of the continued performance of the student during the three years of training to the external examiners, so that student who have otherwise been rated as satisfactory in their internal evaluation can be given more chances in the final examinations to more questions and overcome the adverse effects of doing badly in one particular day.

B.SUMMATIVE ASSESSMENT

Summative assessment consists of two parts:

- Evaluation of thesis prepared by the candidates.
- Final examination.

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

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 appear for the final examination.

EVALUATION OF THESIS :

ACCEPTED / NOT ACCEPTED

No marks will be given

Final Examination :

Eligibility :

The candidate should have

1. Attendance of minimum 80% percentage.
2. Approval of thesis submitted.

ANNEXURE

A) Performa's for Internal Evaluation	Clinical work
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Guidance for Scoring : 1 2 3 4 5

 Poor Below Average Average Above Average Good

(To be completed once in 6 months by respective Unit Heads)

Name :

Date :

Points to be considered :

1. Punctuality.
2. Regularity of attendance.
3. Quality of Ward Work.
4. Maintenance of case records.
5. Presentation of cases during rounds.
6. Investigations work-up.
7. Bedside manners.
8. Rapport with patients.
9. Undergraduate teaching (if applicable)
10. Others :

Signature :

2) Evaluation form : Clinical Case Presentation

Name :

Date :

Points to be considered :

1. Completeness of history.
2. Whether all relevant points elicited.
3. Cogency of presentation.
4. Logical order.
5. Mentioned all positive and negative points of importance.
6. Accuracy of general physical examination.
7. Whether all physical signs missed or misinterpreted.
8. Whether any major signs missed or misinterpreted.
9. Diagnosis: whether it follows logically from history and findings.
10. Investigations required
 - complete list.
 - relevant order.
 - interpretation of investigations
11. Overall
 - Ability to react to questioning - Whether answers relevant and complete.
 - Ability to defend diagnosis.
 - Ability to justify differential; diagnosis Confidence
12. Others.

Signature :

3) Evaluation form : Journal Club

Name :

Date :

Points to be considered :

1. Choice of articles.
2. Cogency of presentation.
3. Whether he has understood the purpose of the article.
4. How well did he defend the article.
5. Whether cross references have been consulted.
6. Whether other relevant publications have been consulted.
7. His Overall impression of articles.
If good - reasons :
If poor - reasons:
8. Audiovisual aids.
9. Response to questioning.
10. Overall presentation.
11. Others

Signature :

B) Proforma for Internal Evaluation – Invasive and Non-invasive Skills

Guidance for Scoring : 1 2 3 4 5

Poor Below Average Average Above Average Good

NON - INVASIVE :

1) ECHOCARDIOGRAPHY	1) Interacts appropriately with patient. 2) Understands basic instrumentation and can optimise controls. 3) Can obtain standard views. 4) Can appropriately use M-Mode, 2D, Colour Doppler, Pulse and continuous wave Doppler. 5) Interprets & report images appropriately.
2) STRESS ECG	1) Familiarity with all protocols 2) Ability to interpret and report appropriately
3) HOLTER	1) Familiarity with Holter analysis 2) Ability to recognize and interpret Brady and Tachy Arrhythmias 3) Ability to recommend appropriate treatment plan

INVASIVE:

CARDIOVASCULAR CATHETERIZATION:

1. Aseptic technique.
2. Gaining vascular access.
3. Acquisition of images.
4. Selection of appropriate catheters and their safe and effective manipulation.
5. Consideration of radiation exposure to patient, staff and self.
6. Sheath removal and groin management.
7. Understand and plan for Right Heart Catheterization.
8. Selection of appropriate Coronary guide wires, Balloons and Stents.
9. Understand and plan for Balloon Valvotomies.
10. Understand and plan for Permanent Pacemaker Implantation.

C) LOG BOOK

Log book (Performance record book) :

Maintenance of performance record Log book is mandatory. Certified and assessed copy should be made available at the time of practical examination for review by examiners.

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 contain authentic record of work done and assessment for last 3 years.
2. Record of training :
 - Name of the trainee.
 - Name of the Hospital.
 - Training period.
 - Name of teacher.
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. Death Audit / C P C: Date, Case discussed, Assessment & Signature.
10. Procedures: Date, Name of patient, Type, Complications observed.
11. Teaching activity: Date, Topic, Class.
12. Participation in Research Activity: Name of project, Duration.
13. Conferences / Workshop attended paper presentation / Publications.

SCHEME OF EXAMINATION

D) PATTERN OF EXAMINATION

I. THEORY EXAMINATION :

4 papers, 100 Marks each

Duration : Three Hours

Paper I : Basic Sciences - Cardiology (100)

Paper II : Clinical Cardiology (100)

Paper III : Hemodynamics Therapeutics and Intervention (100)

Paper IV : Recent Advances (100)

QUESTIONS	NO	MARKS
Essays	(2x20)	40
Short notes	(10x6)	60
Total		100

I. Over all marks in Theory :

4 x 100 = 400

II. CLINICAL EXAMINATION :

QUESTIONS	NO	DURATION	MARKS
LONG CASE	One x 100	One Hour	100
SHORT CASE	Two x 50	One Hour	100
WARD ROUNDS	Four	One Hour	100
Total			300

III. VIVA VOCE EXAMINATION

100

GRAND TOTAL (II + III)

400

MARKS QUALIFYING FOR A PASS		
	Maximum Marks	Qualifying for a pass 50% Marks
Theory	400	200
Clinical and Viva Voce	400	200

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 voce 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

(1) EXAMINERS

(a) All the Post Graduate Examiners shall be recognised 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 and other two will be internal examiners for D.M.

(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 centres 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 recognised 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/she may be reappointed after an interval of two years.
4. The internal examiner in a subject shall not accept external examinership 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. In the event of there being more than one centre in one city, the external examiners at all the centres in the city shall be the same.
7. There shall be a Chairman of the Board of paper – setters who shall be an external examiner and shall moderate the question papers.
8. Where there is more than one centre of examination, there shall be Co-ordinator appointed by the University who shall supervise and Co-ordinate the examination on behalf of the University with independent authority.
9. The Head of the Department of the institution concerned shall ordinarily be one of the internal examiners and second internal examiner shall rotate after every two year.

(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 D.M. degree examination.

3) 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 examinations.

II. Doctor of Medicine (D.M.) Cardiology

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 on 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 examination shall consist of carrying out special investigative techniques 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 will 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 scripts shall be valued by the third examiner. The average of the nearest two marks shall be considered as the final mark.

SAMPLE QUESTION PAPERS
D.M. DEGREE EXAMINATION
(HIGHER SPECIALITIES)
BRANCH II - CARDIOLOGY
Paper I - BASIC SCIENCES - CARDIOLOGY
Answer ALL questions
Draw suitable diagrams wherever necessary.

Time: Three hours

Maximum Marks: 100

I. Essays: (2 x 20 = 40)

1. Discuss "Foetal Circulation"
2. Discuss "Cono - Truncal anomalies".

II. Write short notes on: (10 x 6 = 60)

1. Third heart sound (S3).
2. Fick's principles.
3. Lipoprotein - A (LP (a)).
4. Pulmonary Vascular Resistance (PVR).
5. Anti-factor Xa compounds.
6. Ivabradine.
7. Pulsus paradoxus.
8. Q-T interval on ECG.
9. Hypercalcemia.
10. Right ventricle.

**D.M. DEGREE EXAMINATION
(HIGHER SPECIALITIES)
BRANCH II - CARDIOLOGY
Paper II - CLINICAL CARDIOLOGY
Answer ALL questions**

Draw suitable diagrams wherever necessary.

Time: Three hours

Maximum Mark: 100

I. Essays: (2 x 20 = 40)

1. Discuss in detail the viability testing of the myocardium
2. Discuss in detail RV (Right Ventricle) Function assessment.

II. Write short notes on: (10 x 6 = 60)

1. Masked Hypertension.
2. Criteria for the diagnosis of Myocarditis.
3. Alcohol septal ablations.
4. Visceral heterotaxy.
5. Post operative TOF repair follow up.
6. Fontan sequela.
7. Statins for aortic stenosis.
8. Pulmonary Hypertension – classification.
9. Rheumatic tricuspid regurgitation – Management.
10. Infective endocarditis prophylaxis.

**D.M. DEGREE EXAMINATION
(HIGHER SPECIALITIES)
BRANCH II - CARDIOLOGY
Paper III – HAEMODYNAMICS THERAPEUTICS AND
INTERVENTION**

Answer ALL questions

Draw suitable diagrams wherever necessary.

Time: Three hours

Maximum Marks: 100

III. Essays: (2 x 20 = 40)

1. Discuss in detail the Haemodynamics of Constrictive pericarditis.
2. Non invasive assessment of LV end diastolic Pressure.

II. Write short notes on: (10 x 6 = 60)

1. Prasugrel
2. Nebivolol
3. Lytic protocols for pulmonary embolism
4. Treatment of prosthetic valve thrombosis.
5. Loop recorders.
6. Non surgical closure of ductus.
7. Endovascular stenting for dissection of aorta.
8. Role of stents in acute STEMI.
9. Left main stenting.
10. Balloon atrial septostomy.

**D.M. DEGREE EXAMINATION
(HIGHER SPECIALITIES)
BRANCH II - CARDIOLOGY
Paper IV - RECENT ADVANCES**

Answer ALL questions

Draw suitable diagrams wherever necessary.

Time: Three hours

Maximum Marks: 100

I. Essays: (2 x 20 = 40)

1. Classification and pathogenesis of stent Thrombosis.
2. Discuss in detail the current status of pharmaco - Invasive therapy for STEMI

II. Write short notes on: (10 x 6 = 60)

1. SYNTAX - Trial.
2. WATCH MAN device.
3. New Stent technologies.
4. Cardio cerebral resuscitation (CCR).
5. Multi site pacing.
6. Preventive options for contrast nephropathy.
7. Triple anti-platelet therapy.
8. β blockers for aortic regurgitation.
9. Percutaneous aortic valve implantation.
10. Speckle tracking.

RECOMMENDED BOOKS AND JOURNALS :

S.N. Name of Book Editor/ Author/ Edition & Year (All up to date latest versions)

1. Braunwald's Heart Disease - A textbook of Cardiovascular Medicine - 9th Edition, Elsevier, 2012
2. Hurst's The Heart - Vol. I&II Fuster, Valentin; Walsh, Richard., McGraw-Hill, Inc 13th Edition., 2011.
3. Cardiology - An Illustrated Colour text. Newby, David E, 1st Edition, Elsevier, 2005.
4. Cardiac Emergencies - Peacock, Frank W, 1st Edition, McGraw Hill, 2006.
5. Women and Heart Disease - Wenger Kass Nanette, 2nd Edition, Taylor & Francis, 2005.
6. Atlas of Valvular Heart Disease: Clinical and Pathologic Aspects Willerson, James T, 1st Edition, Churchill Livingstone. 1998.
7. Cardiovascular Therapeutics: A Companion to Braunwald's Heart Disease Antman, Elliott M, 4th Edition, Elsevier, 2013.
8. Physiology of The Heart - Katz, Arnold M, 4th Edition, Lippincott, 2006.
9. Pericardial Diseases: Clinical Diagnostic Imaging Atlas Hutchison, Stuart. J, 1st Edition, Saunders, 2009.
10. Congenital Heart Disease in Adults Perloff, Joseph.k, 3rd Edition, Saunders, 2009.
11. Pathology of Congenital Heart Disease - Vol I & II Bharati, Saroja, 1st Edition, Futura Publishing, 1996.
12. Moss and Adams Heart Disease in infants, Children and Adolescents: Including the Fetus and the Young Adult. Allen, Hugh. D (ED) (ETAL) Vol-I 8th Edition, Lippincott, 2013.
13. Nadas Paediatric Cardiology Keane, John. F, 2nd Ed., 2007.
14. The Clinical Recognition of Congenital Heart Disease Perloff, Joseph.K, 5th Edition, Elsevier, 2003.
15. Clinical Electrocardiography - Review & Study Guide Zimmerman, Franklin. 2nd Edition, McGraw Hill, 2005.

16. Cardiac Electrophysiology Zipes, Douglas. P, 5th Edition, Saunders, 2009.
17. Exercise and the Heart Froelicher, Victor.F, 5th Edition, Elsevier, 2006.
18. Atlas of Transoesophageal Echocardiography Nanda, Navin.C, 2nd Edition, Lippincott 2007.
19. Atlas of Trans - Oesophageal Echocardiography: An Anaesthesiologists perspective Tempe, Deepak K, 1st Edition, BI publication, 2004.
20. CT and MR Angiography: Comprehensive Vascular Assessment Rubin, Geoffrey. D, 1st Edition, Lippincott, 2009.
21. Textbook of Clinical Hemodynamics Ragosta, Michael, 1st Edition, Saunders, 2008.
22. Techniques in Coronary Artery Disease Colombo Antonio, 1st Edition, Martin Dunitz, 2001.
23. Abrams Angiography Interventional Radiology - Baum, Stanley 2nd Edition, Lippincott 2006.
24. Grossmans Cardiac Catheterization, Angiography, and Intervention Baim, Donald S 7th Edition, Lippincott, 2006.
25. Essentials Cardiac Catheterization' Butler, Rob, 1st Edition, Hodder Arnold, 2007.
26. Textbook of Interventional Cardiology Topol, Eric.j, 6th Edition, Elsevier, 2008.
27. Cardiovascular Therapeutics: Companion to Braunwalds Heart Disease - 4th Edition. Antman, Elliott.M,. Elsevier, 2013.

B. Journals:

1. Indian Heart Journal.
2. Journal of American College of Cardiology.
3. Circulation.
4. Heart.
5. European Heart Journal.
6. New England Journal of Medicine.
7. British Medical Journal.
8. Journal of Thoracic and Cardiovascular Surgery.

There is no elevator to success you have to take the stairs
- Winston Churchill