



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed University u/s 3of UGC Act, 1956)

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Syllabus for D. M. (Cardiology)

{Approved as per BOM. 20/2011, dated 30.09.2011, Item 4.3 (1) (e), MGMIHS, Navi Mumbai}

CURRICULUM FOR DM COURSE

IN

CARDIOLOGY

MGM MEDICAL COLLEGE AND
HOSPITAL

KAMOTHE PANVEL

SECTION I.

STATEMENT OF GOALS & SPECIFICATION OF OBJECTIVES

A. Goal

The goal of DM Cardiology programme is to provide specialized training in Cardiology to produce competent superspecialists. 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, 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 (MD) in Internal Medicine & Pediatrics, in major areas of cardiology like clinical cardiology, coronary care, pediatric cardiology, electrophysiology, invasive diagnostic and therapeutic cardiac procedures and various noninvasive 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 this 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 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 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:

Non-invasive Techniques

The candidate would be given adequate training during the course so that he/she will be able to perform and interpret various non invasive techniques including:

1. Electrocardiography
2. Stress testing –ECG tread mill test, stress echocardiography and nuclear stress tests
- 3 Holter monitoring for arrhythmias and ischemic disorders
- 4 Echocardiography – M-mode, Two dimensional, Doppler, Color flow imaging, transesophageal echocardiography and echo directed hemodynamic studies.

Invasive Cardiology

The candidate would be given adequate training so that he/she will be able

- 1.To perform temporary pacemaker insertion, pericardiocentesis,central venous line insertions
- 2.To assist in various interventions including valvuloplasty, coronary and congenital interventions.
- 3.To perform cardiac catheterization and to calculate and interpret various homodynamic parameters
- 4.Right and left heart catheterization and coronary angiography procedures in adults and children
- 5.Electrophysiology: To interpret electrophysiological data and assist in electrophysiology procedures, permanent pacemaker implantation, AICD implantation.

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 behavior in accordance with social norms & expectations.

SECTION II.

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. 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 Cardiology

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. Tumors of heart
13. Pulmonary thromboembolism and pulmonary hypertension
14. Genetics, molecular biology and immunology related to cardiology
15. Geriatric 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 CT scan of the Heart

familiar with modalities

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), Holter monitoring for arrhythmias and ischemic disorders, Permanent pacemaker/AICD interrogation and analysis. Echocardiography (M-mode, Two dimensional, Doppler, Color flow imaging, transesophageal 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

SECTION III

TEACHING LEARNING METHODS AND ACTIVITIES

Learning in post graduate program shall be essentially "Autonomous & Self directed".

PG students are encouraged to largely carry out self learning. They are expected to seek knowledge & skill on their own initiative. Sound knowledge of Cardiology is to be acquired entirely by self study & 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 week. Each PG student should present minimum 6 journal clubs every year.
4. Clinico- Pathological Correlation meetings will be held monthly 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 dissertation: 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 & 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 be also involved in various clinical research work being undertaken in the

department by the faculty members. Each student is required to participate in at least one research project every year.

11. Intradepartmental postings

Every PG student will be posted by rotation in different sections of the Cardiology department like Out patient departments, Cardiology wards, 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

& tutorials. During their tenure, they will be working under faculty members on rotation basis as

per the allotment of the teaching schedule. The candidate will be regularly involved in teaching

of undergraduate medical, paramedical, & nursing students as well as pediatrics postgraduates

students. Their teaching skill will be assessed & 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.

1st Year –

Out patient, Inpatient care-(which includes ward duty, ICCU duty and attending referral calls).

Training in Stress test/Holter monitoring.

Literature search and plan for dissertation.

2nd Year – Outpatient and Inpatient Care

Training in echocardiography and catheterisation laboratory

Allied postings–Cardiovascular and thoracic surgery, Vascular intervention

Radiology, Nuclear medicine.

3rd Year – Outpatient and Inpatient Care

Echocardiography and Cath lab postings

Research projects finalization and preparing dissertation. *

Extramural rotation

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

The candidates can undertake up to 2 months elective rotation at parent or other institutions in the country centers 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

Research

i. The candidates will be required to submit a thesis during the course of DM programme. A subject for dissertation would be allotted to the P.G. within the first 6 months after joining. The emphasis on dissertation 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 dissertation should be preferably prospective. Analysis of less than 25 cases would not be permitted unless it is a rare disease. Progress on dissertation will be reviewed every semester and feedback given to the candidates. The candidates 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 6 months before the final examination. 4 copies of completed dissertation after appropriate certifications by the guide and co-guide should be submitted at the

end of the 2½ years (There will therefore be 2 complete years after submission of protocol and the final dissertation). At least 24 months should be spent in the research project undertaken.

ii. Two papers (pertaining to the thesis or otherwise) for publication in Indexed journal before appearing for the final DM exam.

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

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.

SECTION V.

EVALUATION SHALL CONSIST OF FORMATIVE AND SUMMATIVE ASSESSMENT.

A. Formative

- Ward work
- Case presentation
- PG lecture
- Journal Club
- General assessment of attitude
- Internal assessment

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 & 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 candidate. This would give an idea of the continued performance of the candidate during the three years of training to the external examiners, so that candidates 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 any one case.

Formative evaluation will be carried out over following activities of the P.G. resident.

(See Annexure)

- Ward work.
- Case presentation
- P.G. Lecture
- Journal club
- General assessment of affective function attitude by medical & paramedical staff.
- Internal Assessment

Candidates can appear for theory examination only after being certified on the basis of internal assessment. However, internal evaluation marks cannot directly be used for influencing the outcome of the summative assessment. It can not be used to fail a candidate who has otherwise done well in the final examination or to pass a candidate who has done consistently bad in summative assessment.

Continuous assessment will be done on an ongoing basis using a logbook covering day to day performance of the candidate.

SUMMATIVE ASSESSMENT

Summative assessment consists of two parts:

1. Evaluation of thesis/dissertation prepared by the candidates
2. Final examination

1. Thesis/dissertation

All candidates on admission will be allotted one of the department faculty 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-guides 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 feed back. The completed dissertation should be submitted no later than 6 months before final examination. The dissertation shall be evaluated independently by the internal examiners and two external examiners 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.

2. Final Examination

Eligibility

The candidate should have

1. Attendance of minimum 80% percentage
2. Satisfactory internal assessment
3. Approval of dissertation submitted

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

A. Theory examination

(As per Direction No. 01/2008 did. 26/05/2008 & practicals scheme is as per revised practical marksheet.)

Proformas for Internal Evaluation

Evaluation form for Postgraduates' continuous Evaluation of Dissertation Work

Name :

Date :

Points to be considered:

1. Interest shown in selecting a topic
2. Appropriate review
3. Discussion with guide and other faculty
4. Quality of protocol
5. Preparation of proforma
6. Regular collection of case material
7. Depth of analysis/discussion
8. Departmental presentation of findings
9. Quality of final output
10. Defence in Viva
11. Others:

Guidance for Scoring: 1 2 3 4 5
 Poor Below Average Above Very Good
 Avg. Avg.

Score : ()

Signature :

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, Assesment
- 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

RULES FOR EXAMINATION SCHEME FOR SUPER-SPECIALITY COURSES (DM/MCh)

SCHEME OF EXAMINATION AND PASSING HEADS:

“The examinations shall be organised on the basis of ‘Grading’ or ‘Marking system’ to evaluate and to certify candidate's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in ‘Theory’ as well as ‘Practical’ separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS, D.M., M.Ch shall be held at the end of 3rd academic year (After 6 terms). An academic term shall mean six month’s training period.”

1. EXAMINERS

- All the superspeciality examiners shall be recognised Post Graduate Teachers holding recognised Post Graduate qualifications in the subject concerned as defined by the Medical Council of India.
- For all superspeciality 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. Two sets of internal examiners may be appointed one for M.D./M.S. and one for diploma.
- Under exceptional circumstances, examinations may be held with 3 (three) examiners provided that at least two of them are external and Medical Council of India is intimated the justification of such action prior to publication of result. Under no circumstances, result shall be published in such cases without the approval of Medical Council of India.

2. NUMBER OF CANDIDATES

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

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 two examinations.

4. EXAMINATION PATTERN

The examination shall consist of: The Examination consists of: (i) Theory and (ii)

4.1 WRITTEN EXAMINATION:

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.

The general pattern of questions in each written paper will be as under:

➤ Five out of Six SAQ (Short Answer Questions) of 10 marks each	50
➤ Two LAQ (Long Answer Questions) of 25 marks each	50
Total	100

4.2 CLINICAL / PRACTICAL AND ORAL

Practical examination shall consist of carrying out special investigative techniques for Diagnosis and Therapy. M.Ch candidates shall also be examined in surgical procedures. 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.

D.M. (CARDIOLOGY)

Paper distribution

(PAPER – I Basic Medical Sciences related to plastic surgery)
(PAPER – II Principles and Practice of Plastic Surgery)
(PAPER – III Principles and Practice of Plastic Surgery)
(PAPER – IV Recent advances)

SCHEME OF PRACTICAL EXAMINATION

Sr. No.	Heads	Description	Marks	Preparation time	Assessment time
1	Long Cases (one)	Clinical case based	100	40 minutes	20 minutes
2	Short Cases (Two)	Clinical case based	100	Each Case 20 minutes	Each case 10 minutes
3	Viva-Voce (Four Tables)	Research publications & Recent advances	50		10 minutes
		Drugs & Equipments	50		10 minutes
		Non Invasive Cardiology	50		10 minutes
		Interventional cardiology	50		10 minutes
		TOTAL PRACTICAL MARKS	400		

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MARKLIST FOR PRACTICAL AND VIVA-VOCE EXAMINATION

EXAM CENTRE: _____ COURSE / EXAM : PG-

EXAMINATION FOR: **D.M. CARDIOLOGY**

DATE OF EXAMINATION: _____

Seat No	1 CLINICAL CASES				TOTAL	2 VIVA-VOCE				Practical Total 400 Marks (1+2)
	Long Case 1	Short Case 1	Short Case 2			Research publications & Recent advances	Drugs & Equipments	Non Invasive Cardiology	Interventional cardiology	
100		50	50		200	50	50	50	200	

NAME OF EXAMINER	COLLEGE	SIGNATURE WITH DATE
1.		
2.		
3.		
4.		

Resolution passed in BOM – 48/2017, dated 24/01/2017

Item No. 5.10: BOS (Superspeciality) dated 16.09.2016

- d) **Superspeciality residents should be deputed for a period of three months in other Institutions for training**

Resolution No. 5.10(d): Superspeciality residents can be deputed in hospitals under MGMIHS for additional training if needed for skill enhancement.

Resolution No. 3.9.2 of BOM-52/2018: Resolved to accept the following in all Superspeciality University Theory examinations, with effect from batch appearing in University August 2018 examination onwards:

- Paper – I (100 marks) :10 short notes out of 11 (10 marks each)
- Paper – II (100 marks) :10 short notes out of 11 (10 marks each)
- Paper – III (100 marks) :10 short notes out of 11 (10 marks each)
- The existing pattern for paper IV to be followed.

Resolution No. 3.9.3 of BOM-52/2018: Resolved to have following pattern in all Superspeciality University Practical examinations, with effect from batch appearing in University August 2018 examination onwards, while keeping the remaining pattern same:

Long case : 1X100 =100 marks

Short case : 4X25 = 100 marks

Resolution No. 4.5.4.2 of BOM-55/2018: Resolved to have 10 short notes out of 11 (10 marks each) in all the papers in university examination for PG courses including superspeciality. To be implemented from batch appearing in April/May 2019 examination onwards for MD/MS/Diploma and August/September 2019 examination onwards for superspeciality.

Resolution No. 4.13 of BOM-55/2018: Resolved as follows:-

- (i) Slow learners must be re-designated as potential learners.
- (ii) Students scoring less than 35% marks in a particular subjects/course in the 1st formative exam are to be listed as potential learners. These learners must be constantly encouraged to perform better with the help of various remedial measures.
- (iii) Students scoring more than 75% marks in a particular subjects/course in the 1st formative exam are to be listed as advanced learners. These learners must be constantly encouraged to participate in various scholarly activities.