

CURRICULUM FOR DM COURSE

IN

CARDIOLOGY

**MAHARASHTRA UNIVERSITY OF HEALTH
SCIENCES
NASHIK**

CURRICULUM FOR DM COURSE IN CARDIOLOGY

Components of curriculum

- Section I. Statement of goals & specification of objectives.
- Section II. Selection & description of course contents (Syllabus)
- Section III. Recommended teaching learning methods and activities
- Section IV. Organization and scheduling of course
- Section V. Evaluation scheme
- Section VI. Recommended books and other learning resource materials.

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 mere 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

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 CT scan of the Heart

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.

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.

SECTION IV

ORGANIZATION OF COURSE:

Admission

Admission to the course will be through All India Common Entrance Test conducted under the aegis of DMER Maharashtra.

Number of students

Each year students will be enrolled maintaining a teacher/students ratio of 1:1

Eligibility

M.D. or D.N.B. (Medicine or Pediatrics)

Duration

Duration of course shall be of 3 completed years including the period of examination.

Attendance

All the candidates joining the PG training program shall work as Full Time Residents during the period of training. It is desirable that candidates should have 100% attendance to enable this objective to be achieved. However a minimum of at least 80% attendance and achievement of satisfactory standards in both theoretical and clinical Cardiology would be required before they are allowed to appear for the university 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 phasic manner starting with basic care progressing to advanced care management

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 continues 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) Appproved
- 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.Attedance 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 dtd. 26/05/2008 & practicals scheme is as per revised practical marksheet.)

SECTION VI.

SUGGESTED READING

A. Books

S.N.	NAME OF BOOK	EDITOR/AUTHOR	PUBLISHER
1	Heart Disease:A Text Book of Cardiovascular Medicine.Vol I&II	Eugene Braunwald	W.B. Saunders Company
2	Hurst'sTheHeart Vol I&II	Robert.c.Schlant R.Wayne Alexander	McGraw-Hill Inc.
3	Feigenbaum's Echocardiography	<u>Harvey Feigenbaum</u> ; <u>William Armstrong</u>	Lippincott Williams & Wilkins
4	Clinical definition of congenital heart diseases	Joseph.k.Perloff	W.B. Saunders Company
5	<u>Interventional Cardiac Catheterization Handbook</u>	'Morton J. Kern	Mosby-Year Book Inc
6	Introduction to Electrocardiography	Leo Schamroth	Blackwell Sciences
7	Chou's Electrocardiography in Clinical Practice: Adult and Pediatric	<u>Borys Surawicz</u> ; <u>Timothy Knilans</u>	W.B. Saunders Company
8	<u>The ECG in Emergency Decision Making</u>	Hein J. J. Wellens; Mary Boudreau Conover	W.B. Saunders Company
9.	Moss and Adams Heart Disease in Infants, Children and Adolescents	George C. Emmanouilides Thomas A Rimonschneider Hugh D. Allen Howard P. Gutgesell	Williams and Wilkins
10.	Cardiac surgery Vol.I&II	Kirklin J.W.Barratt- Boyes	Churchill Livingstone
11	Text Book of Valvular Heart disease	Joseph S Alpert James S Dalen	Lippincott Williams & Wilkins
12	<u>Heart Failure: A Companion to Braunwald's Heart Disease</u>	Douglas L. Mann	W.B. Saunders Company

13	<u>Cardiac Pacemakers Step by Step: An Illustrated Guide</u>	S. Serge Barold; Roland Stroobandt	Futura Publishing Co
14	Cardiac Electrophysiology from cell to cell to bedside	Zipes and Jalife	W.B. Saunders Company
15	Text book of Cardiovascular Medicine	Eric.J.Topol	Lippincott Williams & Wilkins
16	Clinical Pediatric Arrhythmias	Gillete and Garson	W.B. Saunders Company
17	Pathology of Congenital Heart Diseases	Anton.E.Beeker Robert.H.Anderson	Butterworths
18	Echocardiography Manual	Jae.K Oh, Jamil Tajik	Lippincott Williams & Wilkins
19	Stress Testing : Principles And Practice	Mervin.H.Ellestad	Oxford University Press Co
20	Text book of interventional cardiology	Eric.J.Topol	W.B. Saunders Company

B. Journals

1. Indian Heart Journal
2. Journal of American College of Cardiology
3. Circulation
4. Heart
5. European Heart Journal
6. NEJM
7. BMJ
8. Journal of Thoracic and Cardiovascular Cardiology

ANNEXURE

Proformas for Internal Evaluation

Evaluation form for Postgraduates' Clinical Work

(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:

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

Score : ()

Signature :

Proformas for Internal Evaluation

Evaluation form for Postgraduates' Postgraduate Seminar

Name :

Date :

Signature :

1. Presentation
2. Completeness of preparation
3. Cogency of presentation
4. Use of audiovisual aids
5. Understanding of subject
6. Ability to answer questions
7. Time scheduling
8. Consulted all relevant literature
9. Overall performance
10. Others :

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

Score : ()

Signature :

Proformas for Internal Evaluation

Evaluation form for Postgraduates: Clinical Meeting

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

Others

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

Score : ()

Signature :

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 :

Proformas for Internal Evaluation

Evaluation form for Postgraduates: 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:

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