CURRICULUM

DM – CARDIOLOGY



ALL INDIA INSTITUTE OF MEDICAL SCIENCES PATNA

BASIC SUBJECTS

Teaching and attaining proficiency in applied Anatomy related to cardiovascular system (including embryology); basic Physiology and Pathology related to the cardiovascular system.

CLINICAL CARDIOLOGY

Etiopathology, hemodynamics, clinical evaluation, non-invasive and invasive evaluation and management strategies for the following disorders:

1. Coronary artery disease
2. Rheumatic heart disease
3. Congenital heart disease and other pediatrics cardiac disorders
4. Pericardial diseases
5. Cardiac arrhythmias
6. Heart failure
7. Peripheral vascular disorders
8. Pulmonary thromboembolism and pulmonary hypertension
9. Systemic hypertension
10. Systemic diseases involving heart
11. Heart muscle diseases
12. Traumatic heart disease
13. Tumors of heart
14. Genetics, molecular biology and immunology related to cardiology
15. Geriatric heart disease
16. General anesthesia and non-cardiac surgery in patients with heart disease
17. Pregnancy and heart disease
18. Epidemiology and preventive cardiology

Non-Invasive Techniques

To perform and interpret various non-invasive techniques including:

1. Electrocardiography
2. Radiology – routine X-Ray and specialized areas like cardiac CT and MRI
3. Stress testing – tread mill test, stress echocardiography, stress related and other nuclear techniques
4. Holter monitoring for arrhythmias and ischemic disorders
5. Echocardiography- M-mode, two dimensional, Doppler, color flow imaging, trans-esophageal echocardiography and related hemodynamic evaluations.

Invasive Cardiology

- Experience in cardiac catheterization to calculate and interpret various hemodynamic parameters.
- Right and left heart catheterization and coronary angiography, in adults and children
- To perform temporary pacemaker insertion
- To assist in various interventions including valvuloplasty, coronary and congenital interventions, advanced techniques like IVUS, OCT, atherectomy.
- Electrophysiology: To interpret electrophysiological data and assist in electrophysiology procedures, permanent pacemaker implantation, ICD implantations.

Biomedical Aspects

To understanding the functional principles of various equipments used in invasive and non-invasive cardiology.

Research Projects

Each DM student is supposed to complete preferably three research projects during the course (one in each year).

i. At least one of these projects must be prospective in nature (research / dissertation). In addition, one of the projects must be submitted for publication in an indexed journal before the final exit examination. Special credit should be given for additional published case reports, published articles.

ii. Scoping reviews would also be counted as these projects if published.

Academic

Journal club readings as per rotational academic program: Once a week

Seminar presentation: Once a week

Clinical Case presentation: Once a week

Cardiac cath discussion: Four days a week*

(*Two academic classes scheduled for Saturdays)

Clinical Work Requirements

Minimum No. of procedures assisted / done under supervision during entire DM training

Echocardiograms	-	≥1000
Trans-esophageal echocardiography	-	5-10
TMT procedures	-	≥ 300
Temporary pacemaker	-	≥ 30
Holter recording analysis	-	≥ 50
Permanent pacemakers	-	≥ 50
Diagnostic cardiac caths including coronary angiographies	-	≥ 300
Interventions	-	> 300

An electronic or physical logbook is to be maintained and certified by the supervising consultant and by the head of the department.

Duration of postings during the study program

OPD	8 months including specialty clinics – HF, pacemaker & arrhythmia, congenital heart disease)
Ward+CCU	6 months
Cath Lab	9 months
Echo (including pediatric)	9 months
TMT/ Holter	3 months
Cardiac Surgery	15 days

Nuclear Cardiology / Cardiac CT & MRI 15 days

(Duration of the training program 3 years i.e. - 36 months.)

FORMAL ASSESSMENT

- All examinations shall be conducted as per the rules and regulations stipulated by AIIMS Patna.
- The results of all examinations shall be confidential and would be communicated to the Registrar / CoE office.

A. INTERNAL ASSESSMENT:

1. Formal internal assessments will be conducted by eligible faculties of the department at the completion of 18 months' of training and then a pre-final assessment as per schedule declared by the Institute.
2. Candidates are supposed to maintain a log book showing record of the academic presentations, clinical work and non-invasive and invasive procedures assisted / done under supervision by them.

Marking pattern for internal assessment:

Maximum Marks							
First Internal Assessment Examination		Pre-final Examination		Total internal Assessment		Final Internal Assessment marks to be added	
Theory	Practical	Theory	Practical	Theory	Practical	Theory	Practical
50	50	150	100	200	150+50*	60	60

*50 marks from formative assessment based on logbook and periodic assessments/ departmental presentations.

B. FINAL EXAMINATION:

Eligibility for final examination: Candidate will be eligible to appear in the final examination after,

i. Successful completion of three years' training in the Institute and
ii. A duly approved dissertation. Credit would be given for publication (or at least submission) of research paper in an indexed journal based on one of his / her research project/s conducted during the D.M. course. The paper may not be necessarily related to the thesis / dissertation.

C. **Board of Examiners:** Four members comprising of two internals and two externals, all of whom would be cardiology faculty members from teaching institutes in India and should be fulfilling specific eligibility criteria set by the Institution.

D. Examination Pattern:

The examination will consist of:

i. Three theory papers of 3 hours duration each
ii. Practical / clinical examination
iii. Viva Voce

E. Theory Papers: There shall be three theory papers with the following titles and distribution of marks.

Theory Paper	Topic	Maximum Marks
Paper I	Basic sciences as related to cardiology	80
Paper II	Clinical cardiology	80
Paper III	Recent advances in cardiology	80
Total Maximum Marks for three theory papers		240
Internal assessment Maximum Marks		60
Total Theory Assessment Marks		300

F. Practical and Viva Voice: The examination pattern and marks distribution will be as follows.

Practical Heads	Maximum Marks
long case	100
1st Short case	50
2nd Short case	40
Grand Viva	50
Internal Assessment	60
Total Practical Assessment Marks	300

Cases will be given to the candidates and the discussion there-on would take place for approximately 30-45 min for each case. The candidates would also be given ECG, X-rays to be interpreted and their echocardiographic skills will be assessed practically.

Grand viva will be held after completion of presentations on all three cases and will be including but not limited to congenital cardiac catheterization tracings,

interpretation of angiograms, ECG / Holter tracings, X-rays, and discussions on different case scenarios.

G. Over-all maximum marks and passing marks for different components of examination:

Examination	Internal Assessment	Final Examination	Total	Passing Marks
Theory	60	240	300	150
Practical (Clinical + Viva Voce)	60	240	300	150
Total	120	480	600	300

- All candidates are required to obtain a minimum of 50% in Theory and a minimum of 50% in practicals /clinicals and Viva-Voce separately in order to be declared as successful/having passed the examination.
- Candidates securing less than 50% of marks either in theory or practical/clinical and viva-voce shall be declared as failed.
- Failed candidate has to appear in both theory and practical/clinical at the subsequent examination held by the institute.

H. Grading:

Grade	Percentage
Fail	**< 50%**
Pass percentage	**≥ 50%**
Second Class	**≥ 50% to < 60%**
First Class	**≤ 60% to < 75%**
Distinction	**≥ 75%**

GENERAL RULES AND SCHEDULE OF FINAL EXAMINATION AND DECLARATION OF RESULTS

I. Final examination:

1. Examinations (Theory & Practical) will be held twice in a year.
2. The list of eligible candidates for final examination shall be declared and displayed by the Registrar/CoE of the Institute.
3. The maximum number of candidates to be examined in Clinical/Practical and Oral on any day shall not exceed three for DM examinations.
4. Candidates falling short of attendance or skipped the scheduled exams or failed in the final examination need to appear in the subsequent examination.
5. If the candidate fails to attend the final examination due to any reason, he/she shall appear in the next subsequent examination which shall be conducted after six months.
6. There shall be no supplement examination for the failed candidate.
7. There shall be four examiners for the final DM Cardiology examination [two internal and two external examiners) who will assess and evaluate the examinee. The senior internal examiner shall act as the Chairman of the examiner panel.
8. The selection of the examiners shall be done from the list of panels of eligible examiners available with the CoE office by the Competent Authority / Dean. The Head of the department should send the list of eligible examiners for PG examination as approved by the departmental board of studies.
9. The external examiners shall be preferably from AIIMS or Institutes of National Importance.
10. Each examiner shall set and send one set [consisting of three theory papers) of question papers as per the format of AIIMS Patna.
11. The sets of papers shall be moderated by the Chairman of the Examiner Panel for proof reading/modifications.
12. The CoE/Registrar shall arrange random selection of one set of papers out of the four moderated sets by the hands of Director/Dean before the date of examination.
13. Each examiner appointed for final examination shall evaluate all theory answer sheets. Marks allotted by each examiner shall be computed for each theory answer sheet and the average of these marks shall be taken as final score for that theory paper.
14. The Practical, Clinical examinations and Viva-Voice shall be conducted by the Board of Examiners for an adequate length of time.
15. The final result signed by each examiner shall be submitted to the CoE/Registrar office in a sealed envelope by the Chairman of the examination panel.

II. Declaration of result:

1. The final examination result shall be declared by the CoE/Registrar office.
2. The result shall be finalised and subsequently signed by the CoE/Registrar, Dean, and the Competent Authority.
3. The result shall be declared for the theory and practical components only after it is accepted.

4. The result will be withheld in case thesis evaluation report is awaited.

III. Note:

- 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 rules and regulation of AIIMS Patna.
- An external examiner shall ordinarily be appointed for not more than two consecutive terms.
- The internal examiner in a subject, in the same batch examination, shall not accept external examinership for Institute/College from which external examiner is appointed in his departmental examination.
- The same set of examiners shall be ordinarily responsible for the theory, practical/clinical and viva-voce examination

Internal Assessment Examination:

- The topic/syllabus for examination shall be decided by the HoD and the faculty members of the department.
- The examiners shall be within the department and decided by the HoD.
- The signed result shall be submitted in sealed envelope to the office of the Registrar/CoE.

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