

KRISHNA INSTITUTE OF MEDICAL SCIENCES "DEEMED TO BE UNIVERSITY",

KARAD

Accredited By NAAC With 'A' Grade



***D.M. Cardiology
Curriculum***

Programme code : 1404.

Course code; 1404-11 to 14

DM - Cardiology

GOALS:

- ❖ Recognizes the health needs of patients and carries out professional obligations in keeping the principles of National Health policy and professional ethics
- ❖ Has acquired the competencies pertaining to cardiology that are required to be practiced in the community and at all levels of health care system
- ❖ Has acquired skills in effectively communicating with the patients, family and the community
- ❖ Is aware of the contemporary advances and developments in medical sciences
- ❖ Acquires a spirit of scientific enquiry and is oriented to principles of research methodology
- ❖ Has acquired skills in educating medical and paramedical professionals

OBJECTIVES:

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The objectives may be considered under the subheadings.

1. Knowledge
2. Skills
3. Human values, ethical practice and communications skills.

1. Knowledge :

At the end of the DM course in Cardiology, the student should be able to:

- ❖ Recognize the key importance of medical problems in the context in the health priority of the country;
- ❖ Practice the specialty of cardiology in keeping with the principles of professional ethics.
- ❖ Identify social, economic, environmental, biological and emotional determinants of adult cardiovascular diseases and know the therapeutic, rehabilitative, preventive and promotion measures to provide holistic care to all patients.
- ❖ Take detailed history, perform full physical examination and make a clinical diagnosis.
- ❖ Perform and interpret relevant investigations (Imaging and Laboratory).
- ❖ Perform and interpret important diagnostic procedures.
- ❖ Diagnose cardiovascular illnesses based on the analysis of history, physical examination and investigative work up;
- ❖ Plan and deliver comprehensive treatment for illness using principles of rational drug therapy.
- ❖ Plan and advice measures for the prevention of cardiovascular diseases.
- ❖ Plan rehabilitation of adults suffering from chronic illness, and those with special needs;
- ❖ Manage cardio logical emergencies efficiently;

2. Skills

- Should be well acquainted with the current literature on relevant aspects of the basic, investigative, clinical and operative .
- Should have learned the indications and performance skills of common neurosurgical operations.
- Should have acquired performance skills and ability to interpret relevant clinical investigations.
- Should be able to diagnose, plan investigations and treat common conditions in the speciality by relevant current therapeutic methods.
- Should be acquainted with allied and general clinical disciplines to ensure appropriate and timely referral.
- Should be capable of imparting basic cardiac training.
- Demonstrate skills in documentation of case details, and of morbidity and mortality data relevant to the assigned situation;
- Demonstrate empathy and human approach towards patients and their families and respect their sensibilities;
- Demonstrate communication skills of a high order in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities.
- Develop skills as a self- directed learner, recognize continuing educational needs; use appropriate learning resources, and critically analyze published literature in order to practice evidence-based medicine;
- Demonstrate competence in basic concepts of research methodology and epidemiology;
- Facilitate learning on MD residents, medical/nursing students, practicing physicians, paramedical health workers and other providers as a teacher-trainer;
- Play and assigned role in the implementation of national health programs, effectively and responsibly;
- Organize and supervise the desired managerial and leadership skills;
- Function as a productive member of a team engaged in health care, research and education.

3. Human values, ethical practice and communications skills

- Adopt ethical principles in all aspects of his / her practice; professional honesty and integrity are to be fostered. Care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.
- Provide leadership and get the best out of his / her team in a congenial working atmosphere.
- Apply high moral and ethical standard while carrying out human or animal research.
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed,
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

COURSE CONTENTS:

- **THEORY:**

The syllabus should include the cardinal manifestations, definition, epidemiology, etiopathogenesis, genetics, clinical presentation, complications, differential diagnosis, investigations, treatment and prevention and prognosis of all cardio-vascular diseases. In addition the candidate should be well versed with all the common and important pediatric cardiological diseases. It should also cover the recent advances that have occurred in the field of cardiology.

- ♦ **Fundamentals of Cardiovascular Disease**

1. Global Burden of Cardiovascular Disease,
2. Heart Disease in Varied Populations,
3. Economics and Cardiovascular Disease,
4. Clinical Decision-Making in Cardiology,
5. Measurement and Improvement of Quality of Cardiovascular Care,
6. The Principles of Drug Therapy.

- ♦ **Molecular Biology and Genetics**

1. Molecular Biology,
2. Genomics and Proteomics in Cardiovascular Disease,
3. Genetics and Cardiovascular Disease,
4. Genetics of Cardiac Arrhythmias,
5. Genetics of Myocardial Disease.

- ♦ **Evaluation of the Patient**

1. The History and Physical Examination: An Evidence-Based Approach,
2. Electrocardiography,
3. Exercise Stress Testing,
4. Echocardiography,
5. Genetics of Myocardial Disease,
6. Genetics of Myocardial Disease,
7. The Chest Radiograph in Cardiovascular Disease,
8. Nuclear Cardiology,
9. Cardiovascular Magnetic Resonance,
10. Computed Tomography of the Heart,
11. Cardiac Catheterization,
12. Coronary Angiography and Intravascular Ultrasound Imaging.

❖ **Heart Failure**

1. Mechanisms of Cardiac Contraction and Relaxation,
2. Pathophysiology of Heart Failure,
3. Clinical assessment,
4. Acute Heart Failure,
5. Systolic Heart Failure,
6. Heart Failure w/Preserved Systolic Fx,
7. Surgical management of Heart Failure,
8. Assisted Circulation in the treatment of Heart Failure,
9. Emerging therapies for Heart Failure,
10. Care of Patients with End-Stage Heart Disease.

❖ **Arrhythmias, Sudden Death, and Syncope**

1. Genesis of Cardiac Arrhythmias:
2. Electrophysiological Considerations,
3. Diagnosis of Cardiac Arrhythmias,
4. Therapy for Cardiac Arrhythmias,
5. Cardiac Pacemakers and Cardioverter-Defibrillators,
6. Specific Arrhythmias: Diagnosis and Treatment, Cardiac Arrest and Sudden
7. Cardiac Death, Hypotension and Syncope.

❖ **Preventive Cardiology**

1. The Vascular Biology of Atherosclerosis,
2. Risk Factors for Atherothrombotic Disease,
3. Systemic Hypertension: Mechanisms and Diagnosis,
4. Systemic Hypertension: Therapy, Lipoprotein Disorders and Cardiovascular Disease,
5. The Metabolic Syndrome,
6. Diabetes Mellitus, and Atherosclerotic Vascular Disease,
7. Nutrition and Cardiovascular Disease,
8. Primary and Secondary Prevention of Coronary Heart Disease,
9. Comprehensive Rehabilitation of Patients with Cardiovascular Disease,
10. Complementary and Alternative Approaches to Management.

❖ **Atherosclerotic Cardiovascular Disease**

1. Coronary Blood Flow and Myocardial Ischemia,
2. Approach to the Patient with Chest Pain,
3. ST-Elevation Myocardial Infarction: Pathology, Pathophysiology, and Clinical Features,
4. ST-Elevation Myocardial Infarction: Management, Primary Percutaneous

- Coronary Intervention in the Management of Acute Myocardial Infarction,
- 5. Unstable Angina and Non-ST Elevation Myocardial Infarction,
- 6. Chronic Coronary Artery Disease,
- 7. Percutaneous Coronary and Valvular Intervention,
- 8. Diseases of the Aorta Peripheral Arterial Diseases,
- 9. Prevention and Management of Stroke,
- 10. Endovascular Treatment of Noncoronary Obstructive Vascular Disease,
- 11. Diabetes and Heart Disease.

❖ **Diseases of the Heart, Pericardium, and Pulmonary Vasculature Bed**

- 1. Congenital Heart Disease,
- 2. Valvular Heart Disease,
- 3. Infective Endocarditis,
- 4. The Dilated, Infiltrative and Restrictive Cardiomyopathies,
- 5. Hypertrophic Cardiomyopathies, Myocarditis,
- 6. Cardiovascular Abnormalities in HIV-Infected Individuals,
- 7. Toxins and the Heart,
- 8. Primary Tumors of the Heart,
- 9. Pericardial Diseases,
- 10. Traumatic Heart Disease,
- 11. Pulmonary Embolism,
- 12. Pulmonary Hypertension,
- 13. Sleep Disorders and Cardiovascular Disease.

❖ **Cardiovascular Disease in Special Populations**

- 1. Cardiovascular Disease in the Elderly,
- 2. Cardiovascular Disease in Women,
- 3. Pregnancy and Cardiovascular Disease,
- 4. Sports Cardiology,
- 5. Medical Management of the Patient Undergoing Cardiac Surgery,
- 6. Anesthesia and No cardiac Surgery in Patients with Heart Disease.

❖ **Cardiovascular Disease and Disorders of Other Organs**

- 1. Endocrine Disorders and Cardiovascular Disease,
- 2. Homeostasis,
- 3. Thrombosis,
- 4. Fibrinolysis, and Cardiovascular Disease,
- 5. Rheumatic Fever, Rheumatic Diseases and the Cardiovascular System,
- 6. The Patient with Cardiovascular Disease and Cancer,
- 7. Psychiatric Behavioral Aspects of Cardiovascular Disease,
- 8. Neurological Disorders and Cardiovascular Disease,
- 9. Interface Between Renal Disease and Cardiovascular Illness,
- 10. Cardiovascular Manifestations of Autonomic Disorders.

Research Project:

- ❖ Every candidate shall carry out work on an assigned research project under the guidance of a recognized postgraduate teacher, the project shall be written and submitted in the form of a Project.
- ❖ Every candidate shall submit project plan to university within time frame set by university
- ❖ Thesis shall be submitted to the University within 9 months of joining the course.
- ❖ The student will (i) identify a relevant research problem, (ii) conduct a critical review of literature, (iii) formulate a hypothesis, (iv) determine the most suitable study design, (v) state the objectives of the study, (vi) prepare a study protocol, (vii) undertake a study according to the protocol, (viii) analyze and interpret research data, and draw conclusion, (ix) write a research paper

• Practical and oral examination :

1. History taking should include the background information, presenting complaints and the history of present illness, history of previous illness, family history, social and occupational history and treatment history.
2. Detailed physical examination should include general physical and CVS examination
3. Skills in writing up notes, maintaining problem-oriented medical records (POMR), progress notes, and presentation of cases during ward rounds, planning investigation and making a treatment plan should be taught.
4. The resident should fortify the skills of hemodynamic monitoring in emergency situations and should learn procedures like arterial line insertion, temporary venous pacing, central line insertion, pericardiocentesis, intra aortic balloon pump insertion, swan ganz catheter insertion etc.
5. The resident should assist and perform procedures like coronary angiography, percutaneous coronary angioplasty, balloon valvuloplasty, cardiac catheterization of congenital heart disease patients, temporary pacemaker, permanent pacemaker, Electrophysiological diagnosis and management of arrhythmias, AICD, Bi-ventricular pacemaker, IABP insertion etc.
6. Ability to perform echo-cardiograms of adults, adolescents and infants under direct supervision. He should observe transesophageal echo's and should also master the skills of performing and interpreting stress tests and holter monitoring.

- **TEACHING AND LEARNING ACTIVITIES:**

A) Theoretical Teaching:

- 1. Lecture:** Lectures are to be kept to a minimum. Certain selected topics can be taken as Lectures may be didactic or integrated.
- 2. Journal clubs:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book the relevant details. The presentations would be evaluated using check lists and would carry Weightage for internal assessment. A timetable with names of the students and the moderator should be announced in advance.
- 3. Subject Seminars:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book the relevant details. The presentations would be evaluated using check lists and would carry Weightage for internal assessment. A timetable with names of the students and the moderator should be announced in advance.
- 4. Case Discussion:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book the relevant details. The presentations would be evaluated using check lists and would carry Weightage for internal assessment. A timetable with names of the students and the moderator should be announced in advance.
- 5. Ward Rounds:** Ward rounds may be service or teaching rounds.
 - a) Service Rounds:** Postgraduate students should do service rounds every day for the care of patients. Newly admitted patients should be worked up by the post graduate students and presented to the faculty members the following day.
 - b) Teaching Round:** Every unit should have 'grand rounds' for teaching purpose at the bed side. A diary should be maintained for day-to-day activities by the post-graduate students. Entries of (a) and (b) should be made in the Log book.
- 6. Inter-Departmental Meetings:** Recommended particularly with departments of Neurology, Pathology and Radio-Diagnosis at least once a month. These meetings should be attended by post-graduate students and relevant entries must be made in the log Book. Radio-diagnosis: Interesting cases and the imaging modalities should be discussed. Emphasis should be given for the radiological differential diagnosis.
- 7. Mortality Meeting:** The mortality meeting should be conducted in the department every month. The post graduate student should prepare the details regarding the cause of death after going through the case records in detail, and should present during the mortality meeting. The death records will be discussed in detail during this meeting.
- 8. Teaching Skills:** Post-graduate students must teach under graduate students (e.g. Medical, Nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc. Assessment is made using a checklist by medical faculty as well as by the students. Record of their participation is to be kept in Log Book. Training of postgraduate

students in Educational Science and Technology is recommended

9. Continuing Medical Education (CME) Programs:

Recommended that at least one national level CME program should be attended by each student during the course.

10. Conference: Attending conference is compulsory. Postgraduate student should attend at least one national conference during the course.

11).Research Activities: The Post-graduate students to be encourage to carry out research activities in the department.

The Candidate shall furnish proof of having undertaken the original research of high order. The research work shall be performed by the student during his / her study period under the supervision of the postgraduate teacher. This work shall be submitted to the university six months prior to the final examination.

OR

The candidate shall publish at least one research paper in a national indexed journal.

b) In addition, the candidate shall present at least one paper in the national or international conference.

- **Clinical And Practical Training:**

1. **schedule of posting**

- ♦ **Ward & ICCU's Duties : 12 months**

Duties should include diagnostic case workup and day to day management of common cases (angina, myocardial infarction, rheumatic heart disease, hypertension, congestive heart failure, congenital heart disease,). The resident should acquire the expertise / knowledge to diagnose and manage the cardiac emergencies (acute myocardial infarction and its complications, LVF, common arrhythmias, cardiogenic shock, pericardial tamponade etc).

- ♦ **Cardiac Emergency posting : 6 months**

The resident should learn prompt diagnosis and management of cardiac emergencies. He/she should fortify the skills of hemodynamic monitoring in emergency situations and should learn procedures like arterial line insertion, temporary venous pacing, central line insertion, pericardiocentesis, intra aortic balloon pump insertion, swan ganz catheter insertion etc.

- ♦ **Cath Lab posting : 8 months**

The resident should acquaint himself with the pre, peri and post procedural management of patients to be taken up for intervention in a cath lab. He/she should assist and perform procedures like coronary angiography, percutaneous coronary angioplasty, balloon valvuloplasty, cardiac catheterization of congenital heart disease patients, temporary pacemaker, permanent pacemaker, Electrophysiological diagnosis and management of arrhythmias, AICD, Bi-ventricular pacemaker, IABP insertion etc.

- ♦ **Non-invasive lab posting : 8 months**

The resident should learn the principles and fundamentals of echocardiography. He should be able to perform echo-cardiograms of adults, adolescents and infants under direct supervision. He should observe transesophageal echo's and should also master the skills of performing and interpreting stress tests and halter monitoring.

- ♦ **Cardiac surgery posting : 2 months**

The resident should learned pre operative preparation and management of post operative recovery patients. He/She should have seen CABG, valve replacement, congenital heart disease surgery and aortic surgery.

♦ Log Book:

The student will maintain log book of all the procedures done in non-invasive (diagnostic) lab and cath lab including emergency procedures, which will indicate the procedure assisted as 1st and 2nd assistant and procedures conducted by self for

following procedures: Pericardial Tap, Hemodynamic Monitoring, Echocardiography – transthoracic & Transesophageal, TMT, Holter Monitoring, Tilt Table Test, Coronary Angiography, PTCA, Balloon Valvuloplasty, Temporary Pacemaker, Permanent Pacemaker, AICD, Biventricular Pacemaker, IABP Insertion.

- **SCHEME OF EXAMINATION:**

End of term theory examination conducted at end of 1st, 2nd year and after 2 years 9 months

End of term practical/oral examinations after 2 years 9 months

Marks for **personal attributes** and **clinical work** should be given annually by all the consultants under whom the resident was posted during the year. Average of the three years should be put as the final marks out of 20.

Marks for **academic activity** should be given by the all consultants who have attended the session presented by the resident.

The Internal assessment should be presented to the Board of examiners for due consideration at the time of Final Examinations.

Summative Assessment

- ❖ Ratio of marks in theory and practical will be equal.
- ❖ The pass percentage will be 50%.
- ❖ Candidate will have to pass theory and practical examinations separately.

A. Theory examination

After completing of 3 years the theory examination shall consist of four question papers, each of three hours duration. Each paper shall carry maximum of 100 marks and that total maximum marks would be 400. The format for the theory paper shall be as follows:

Type of Questions	No. of Questions	marks for each question	Total Marks
Long Essay	10	10	100
Grand Total			100

Paper	Title	Marks
Paper - I	Basic sciences as related to Cardiology	100
Paper - II	Clinical/ Cardiology	100
Paper - III	Investigative Cardiology	100
Paper - IV	Recent advances in Cardiology	100
Total		400

B. CLINICAL EXAMINATIONS

Type of cases	No. of cases	Marks	Duration
Long cases	01	100	1hrs
Short cases	02	150(75X2)	30min.each
Practical & viva		150	

C. MAXIMUM MARKAS

Theory	Clinical Examination	Practical &viva	Grand total
400	250	150	800

D. PASSING CERITERION:

To pass the examination the candidate must secure 50% of the marks in each head of theory and practical's separately.

- **RECOMMENDED BOOKS (LATEST EDITIONS):**

S. No.	Title	Author	Publisher
01	Braunwald's Heart Disease	Douglas P.Zipes & Peter Libby	Elsevier
02	Hurst's The Heart	Valentine fuster, Robert A. Harzington, Jagar Narula, Zabin J. Eapea	McGraw-Hill Education
03	Grossman's Cardiac Catheterization, Angiography, and Intervention	Mauro Moscucci	Lippincott & wilkins
04	Stress testing: principles and practice	myrvin H. Ellestad.	Oxford university press
05	Drugs for the heart	Lionel H.Opie	Saunders
06	The cardiac catheterization handbook	Morton L. Kern	Elsevier
07	Moss and adam's Heart Disease in infants, children's and Adolescents	Hugh D.Allen	Lippincott Williams & wilkins
08	Pediatric Cardiology for practitioners 4 th edition	Myung k. park	Elsevier
09	Feienbaum's Echocardiography	William Armstrong, Thomas Ryan	Wolters kluwer
10	Valvular Heart Disease	Craig Asher Brian Griffin	Lippincott Williams & wilkins

- **REFERENCE JOURNALS:**

S. No.	Title	Publisher
1	New England Journal of Medicine	Massachusetts Medical Society (United States)
2	The Lancet	Elsevier
3	Journal of American College of Cardiology	Elsevier for the American College of Cardiology
4	Circulation	Lippincott Williams & wilkins
5	Heart	BMJ Group
6	Indian Heart Journal	Elsevier
7	Hypertension	Lippincott Williams & Wilkins
8	American Journal of Cardiology	Elsevier
9	Journal of Interventional Cardiology	Hindawi

