

**KRISHNA INSTITUTE OF MEDICAL SCIENCES
“DEEMED TO BE UNIVERSITY”, KARAD.**

Diploma in Cath Lab Technician

(Program Code- 1804) (Course Code- 1804-11)

DIPLOMA COURSE IN CARDIAC TECHNOLOGY

SYLLABUS

**BASIC ANATOMY & PHYSIOLOGY
THEORY**

- **Duration of the Course:** One Year

- **Eligibility** :- 12th std(Science)

- **Fee:**

- **Selection Method:** Entrance Examination conducted by the University.

- **Faculty:** 1. Dr.AbhijeetShelke
MD(MED)DNB(Cardiology)EP.
Interventional Cardiologist &Electrophysiologist.
2. DR.VIJAYSINH PATIL
MD (MED) DNB Cardiology
FESC, FICI,Interventional Cardiologist
3. Dr.RameshKawde
MBBS, PGDCC
Junior Cardiologist.

- **Infrastructure:**
 - Latest GE Innova IGS 520 Cath LAB.
 - All cardiac, Nuro&peripheral applications.
 - EP Machine
 - FFR.

- **Contributing Department:** Department of Cardiology
- **Medium of Instruction:** English.
- **Attendance:** 90% attendance is mandatory to become eligible for the examination and will be certified by the course director.

SYLLABUS

- **I ST SEMISTER (6 MONTH)**

A. Introduction to Anatomy:

1. Cardiovascular system: pulmonary & systemic. Heart , arteries, veins.
2. Respiratory system: Nose, trachea, lungs, gaseous exchange in lungs. Detailed respiration process.

B. PHYSIOLOGY

1. Overview of the cardiovascular system
2. Cardiac cycle
3. Cardiac excitation and
4. Assessment of cardiac output
5. Hemodynamics
6. Solute transport between blood and tissues
7. Vascular smooth muscle

8. Control of blood vessels
9. Specialization in individual
10. Cardiovascular receptors, reflexes and central control
11. Coordinated cardiovascular responses

12. Cardiovascular responses in pathological situations
13. Respiratory physiology
14. Hematology and coagulation physiology blood

C. PHARMACOLOGY RELATED TO CARDIAC TECHNOLOGY

1. Anti-anginal agents
2. Anti-failure agents
3. Anti-hypertensive drugs
4. Anti-arrhythmic agents
5. Antithrombotic agents
6. Lipid lowering and anti-atherosclerotic drugs:
7. Miscellaneous drugs

D. PATHOLOGY, MICROBIOLOGY, CLINICAL FEATURES AND TREATMENT OF DISEASES PERTINENT TO CARDIAC TECHNOLOGY

1. Valvular heart disease

Etiology

Acquired valvular heart disease

Rheumatic fever and rheumatic heart disease

Aortic stenosis

Aortic regurgitation

Mitral valve disease

Mitral stenosis

Mitral regurgitation

Mitral valve disease

Tricuspid valve disease Infective

endocarditis Valvuloplasty and

valve Surgery

2. **Coronary artery**

disease Pathophysiology and
clinical recognition Angina
Pectoris

Symptomatic and asymptomatic myocardial ischemia Types
and locations of myocardial infarction Thrombolytic therapy

Medical treatment Percutaneous
interventions Surgical treatment

Cardiac rehabilitation

3. **Systemic hypertension**

Essential and secondary hypertension

4. **Heart failure**

Surgical and medical treatment

5. **Myocardial diseases** Dilated
cardiomyopathy Hypertrophic
cardiomyopathy Restrictive
cardiomyopathy Myocarditis

6. **pericardial Diseases** Pericardial

Effusion Constrictive pericarditis
Cardiac tamponade

E. **ENGLISH**

Communication:-

Role of communication Defining
Communication Classification of
communication Purpose of communication
Major difficulties in communication
Barriers to communication
Characteristics of successful communication – The seven Cs
Communication at the work place
Human needs and communication “Mind mapping”
Information communication

F. Cardiac catheterization laboratory basics

Type of catheters

Catheter cleaning and packing

Techniques of sterilization-advantages and disadvantages of each Setting up the cardiac catheterization laboratory for a diagnostic study Table movement

Image intensifier movement

Image play back

Intra cardiac pressures

Pressure recording systems

Fluid filled catheters versus catheter tipped manometers

Artifacts, damping, ventricularization

Pressure gradient recording – pullback, peak – to peak

Cardiac output determination Thermo
dilution method

Oxygen dilution method Principles of
oximetry

Shunt detection and calculations. Coronary angiography

Coronary angiographic catheters

Use of the manifold

Angiographic views in coronary angiography

Laboratory preparation for coronary angiography

Left Ventriculography – catheters, views, use of the injector

Right heart catheterization and angiography

II SEMISTER

- **6-12 MONTHS**

A. PATHOLOGY, MICROBIOLOGY, CLINICAL FEATURES AND TREATMENT OF DISEASES PERTINENT TO CARDIAC TECHNOLOGY

1. Electrical disturbances of the heart
2. Pulmonary hypertension
3. Peripheral Vascular Disease
4. Congenital heart disease
5. Cyanotic congenital heart disease

B. BASIC ELECTROCARDIOGRAPHY (ECG)

Fundamental principles of electrocardiography Cardiac electrical field generation during activation

Cardiac wave fronts

Cardiac electrical field generation during ventricular recovery

Electrocardiographic lead systems

Standard limb leads

Precordial leads and the Wilson central terminal

Augmented limb leads

The hexaxial reference frame and electrical axis
Recording adult and pediatric ECGs
The normal electrocardiogram
Atrial activation The normal P wave
Atrial repolarization
Atrioventricular node conduction and the PR segment Ventricular
activation and the QRS complex Ventricular recovery and ST-T wave
U wave
Normal variants
Rate and rhythm

C. TREADMILL EXERCISE STRESS TESTING AND 24 HOUR AMBULATORY ECG (HOLTER) RECORDING

Exercise physiology Exercise protocols
Lead systems
Patient preparation
ST segment displacement – types and measurement
Non-electrocardiographic observations
Exercise test indications, contra-indications and precautions
Cardiac arrhythmias and conduction disturbances during stress testing
Emergencies in the stress testing laboratory
Principles of Holter Recording Connections of the Holter recorder Holter Analysis
Guidelines for ambulatory electrocardiography

D. ECHOCARDIOGRAPHY

M-mode and 2D transthoracic echocardiography

Views used in transthoracic echocardiography

Doppler echocardiography: pulsed, continuous wave and colour

Measurement of cardiac dimensions

Evaluation of systolic and diastolic left ventricular function

Regional wall motion abnormalities

Stroke volume and cardiac output assessment

Transvalvular gradients

Orifice area

Continuity equation

Echocardiography in Valvular heart disease:

Mitral stenosis Mitral regurgitation Mitral valve prolapse Aortic stenosis

Aortic regurgitation Infective endocarditis Prosthetic valve assessment

Echocardiography in Cardiomyopathies: Dilated

Hypertrophic

Restrictive

Constrictive pericarditis

Pericardial effusion and cardiac tamponade Echocardiographic detection of congenital heart disease: Atrial septal defect

Ventricular septal defect Patent ductus arteriosus Pulmonary stenosis Tetralogy of Fallot Coarctation of aorta

Left atrial thrombus Left atrial myxoma Transoesophageal echocardiography

Text book recommended: Echocardiography –
Feigenbaum

E.CARDIAC CATHETERIZATION LABORATORY ADVANCED

- **Aortic angiography** – aortic root, arch, abdominal aorta

Peripheral angiography and carbondioxide angiography

Catheterization and angiography in children with congenital heart disease.

- **Contrast agents**

Ionic and non-ionic

Types of non-ionic agents

Contrast nephropathy

Measures to reduce incidence of contrast neophropathy

- **Coronary angioplasty (PTCA)**

Equipment and hardware used in

PTCA: Guiding catheters,

Guidewires Balloons Stents

Setting up the laboratory for a PTCA case

Management of complications: Slow flow/no flow

Acute stent thrombosis

Dissection

Perforation

- **Pediatric Interventions**

Aortic and pulmonary valvuloplasty Coarctation angioplasty and stenting Device closure of PDA,ASD,VSD
Technique and decices used

Sizing of devices

Coil.closure of PDAs

- **Balloon Mitral valvuloplasty(BMV)**

Techniques and hardware used in BMV Setting up the laboratory for a BMV case Technique and equipment used for transseptal puncture Recording of transmitral pressure gradients Management of cardiac tamponade

- **Peripheral intercentions**

Equipment and techniques used

Endovascular exclusion of aneurysms

Self-expanding stents, covered stents and cutting ballons

- **Intra-aortic balloon pump (IABP)**

Theory of intra-aortic balloon counterpulsation

Indications for IABP use

Setting up the IABP system

- **Thromboembolic disease**

Indications and use of venacaval filters

Techniques of thrombolysis – drug and catheters used Thrombus aspirations systems – coronary, peripheral Thrombus aspirations systems – coronary, peripheral

- **Cardiac pacing**

Temporary pacing – indications, technique

Permanent pacing

Indications

Types of pacemakers and leads

Setting up the laboratory for permanent pacing

Pacemaker parameter checking

Follow-up of pacemaker patients

- **Cardiac electrophysiology**

Catheters used in electrophysiology studies

Connection of catheters during an EP study

Equipment used in arrhythmia induction and mapping

Radiofrequency ablation

Image archival systems and compact disc (CD) writing

Text book recommended:

Cardiac Catheterization – Grossman