MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI
(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)
(Deemed to be University u/s 3 of UGC Act 1956)
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Curriculum for

Ph.D. Cardiac Care Technology

Academic Year 2025 - 26

Syllabus of Ph.D entrance Cardiac Care Technology

1. ECG (Electrocardiography)

- **ECG Machine and Calibration**:
  - Working principle of ECG machines.
  - Understanding paper speed, voltage calibration, and lead systems.
- **ECG Interpretation**:
  - Normal and abnormal rhythms (sinus rhythm, arrhythmias).
  - Identification of ischemia, infarction, and other pathologies (e.g., bundle branch blocks, ventricular arrhythmias).
  - Interpretation of stress ECG, Holter monitoring, and ambulatory ECG.
- **ECG in Special Conditions**:
  - ECG changes in electrolyte disturbances.
  - ECG in cardiac emergencies (e.g., myocardial infarction, acute arrhythmias).

2. Echocardiography

- **Basic Principles**:
  - Types of echocardiography (2D, 3D, Doppler, transesophageal).
  - Basic ultrasound physics and instrumentation.
- **Echocardiographic Modalities**:
  - M-mode, 2D, Doppler (Color Doppler, Pulsed-wave Doppler, Continuous-wave Doppler).
  - Transesophageal echocardiography (TEE).
  - 3D and 4D
- **Cardiac Function and Hemodynamics**:
  - Measurement of ejection fraction, stroke volume, cardiac output.
  - Assessing valvular disease (e.g., stenosis, regurgitation).
- **Common Cardiac Diseases**:
  - Echo findings in heart failure,
  - ischemic heart disease,
  - Congenital heart defects.
  - Use of echo in post-cardiac surgery and in critical care.

3. **Cardiac Invasive Procedures**

- **Cardiac Catheterization**:
  - Overview of coronary angiography (indications, technique, interpretation).
  - Types of catheters and access sites (radial, femoral).
  - Measurement of coronary artery pressures, coronary flow reserve.

- **Percutaneous Coronary Interventions (PCI)**:
    - Basics of PCI: balloon angioplasty, stent placement.
    - Techniques and devices used in PCI (e.g., drug-eluting stents, guidewires, balloons).
    - Complications and post-procedure care.

- **Principles of Radiation Safety**:

    - Understanding radiation protection during invasive procedures.

- **Cardiac Arrest**:

    - Management protocols (ACLS, BLS).
    - Role of defibrillation, pacing, and post-resuscitation care.

Director