**MRI Principle and Physics BVORAD-402**

**UNIT-1**

Basic Principles of MRI,Atomic Structure, Motion in the atom,MR Active Nuclei,Alignment,Precession,Larmor Equation, Resonance and Result of Resonance,MRsignal,Free Induction Decay Signal (FID), Relaxation, T 1 Recovery and T 2 Decay, Pulse Timing Parameters,Instrumentation and Equipment of MRI Introduction,Magnetism,PermanentMagnets,Electromagnets,SuperconductingElectromagnets ,FringeFields,ShimCoils,GradientCoils,Radio Frequency (RF Patient Transportation System, MR Computer Systems and the User Interface, MRI safety and Site Planning

**UNIT-2**

Government Guidelines

Safety Terminology

Hardware and Magnetic Field Considerations

Radio Frequency Fields

Gradient Magnetic Fields

The Main Magnetic Field

Projectiles

Siting Considerations

MRI Facility Zones

Safety Education

**UNIT 3**

Protection of General Public from the Fringe Field

Implants and Prostheses

Pacemakers

Patient Conditions

Safety Policy

Image weighting and Contrast in MRI

Introduction

Image Contrast

Contrast Mechanisms

Relaxation in Different Tissues

T1 Contrast & T2 Contrast

Proton Density Contrast Weighting

**UNIT 4**

Introduction to Pulse Sequences

The spin echo pulse sequence

Timing parameters in spin echo

The gradient echo pulse sequence

Gradients

The advantages of gradient echo pulse sequences

The disadvantages of gradient echo pulse

Timing parameters in gradient echo

Weighting and contrast in gradient echo