MEDICAL IMAGING TECHNIQUES (3-0-0)

Module I (15 Hours)

X-Ray Machines:

Basis of Diagnostic Radiology, Nature of X-rays, Properties of X-rays, Units of X-radiation, Production of X-rays : stationary anode tube & rotating anode tube.

X-Ray Machine: High Voltage Generation, High frequency Generator, High Tension Cable, Collimators & Grids, Exposure Time Systems, and Automatic Control.

Visualization of X-rays & Digital Radiography:

X-ray Films, X-ray Image Intensifier Television System, Dental X-ray machines, portable & mobile X-ray units, Digital Radiography, Flat Panel detector for Digital Radiography.

Module II (15 Hours)

Ultrasonic Imaging System: Physics of Ultrasonic waves, generation & detection of ultrasound, basic pulse-echo apparatus, brief description of different modes of scans like A-scan, M-mode, B-scan with its applications in medicine.

Computed Tomography Machine (CT):

Basic Principle of CT, System components: scanning system, Detector, Processing system, Viewing system, storing & documentation, Gantry geometry, Patient dose in CT Scan & Advantages of CT Scanning.

Module III (10 Hours)

MRI Machine & Gamma Camera:

Principles of NMR Imaging System, Basic NMR Components – Block Diagram Description, Advantages of NMR Imaging, The Gamma Camera – Block Diagram Description. Study of Working Principle of Emission CT, SPECT & PET scanners and Introduction to recent developments like Infrared Imaging, Ophthalmic Imaging, and Double headed CT & PET scanner.

Text Book:

Hand Book of Biomedical Instrumentation – 2nd Ed, R.S. Khandpur, Tata McGraw Hill- 2003.

Reference Books:

1) Introduction to Biomedical equipment technology, 4e. By JOSEPH.J.CAAR & JOHN.M.BROWN (Pearson education publication)

(2) Medical Instrumentation-application & design. 3e – By JOHN.G.WEBSTER John Wiley & sons publications

(3) Leslie. Cromwell – Biomedical instrumentation & measurements, 2e PHI

(4) Dr. M. Arumugam – Biomedical instrumentations, Anuradha Publishers