7th Semester	RBM7D004	Medical Imaging Techniques	L-T-P 3-0-0	3 Credits

Module-I: **(10 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: **(10 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, Bscan with its applications in medicine.

Module-III: **(10 hours)**

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-IV:

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.

Books:

[1] Hand Book of Biomedical Instrumentation – 2nd Ed, R.S. Khandpur, Tata McGraw Hill-2003.
[2] Introduction to Biomedical equipment technology, 4e. By JOSEPH.J.CAAR&JOHN.M.BROWN (Pearson education publication)
[3] Medical Instrumentation-application & design. 3e – By JOHN.G.WEBSTER, John Wiley & sons publications
[4] Leslie. Cromwell – Biomedical instrumentation & measurements, 2e PHI
[5] Dr. M. Arumugam – Biomedical instrumentations, Anuradha Publishers