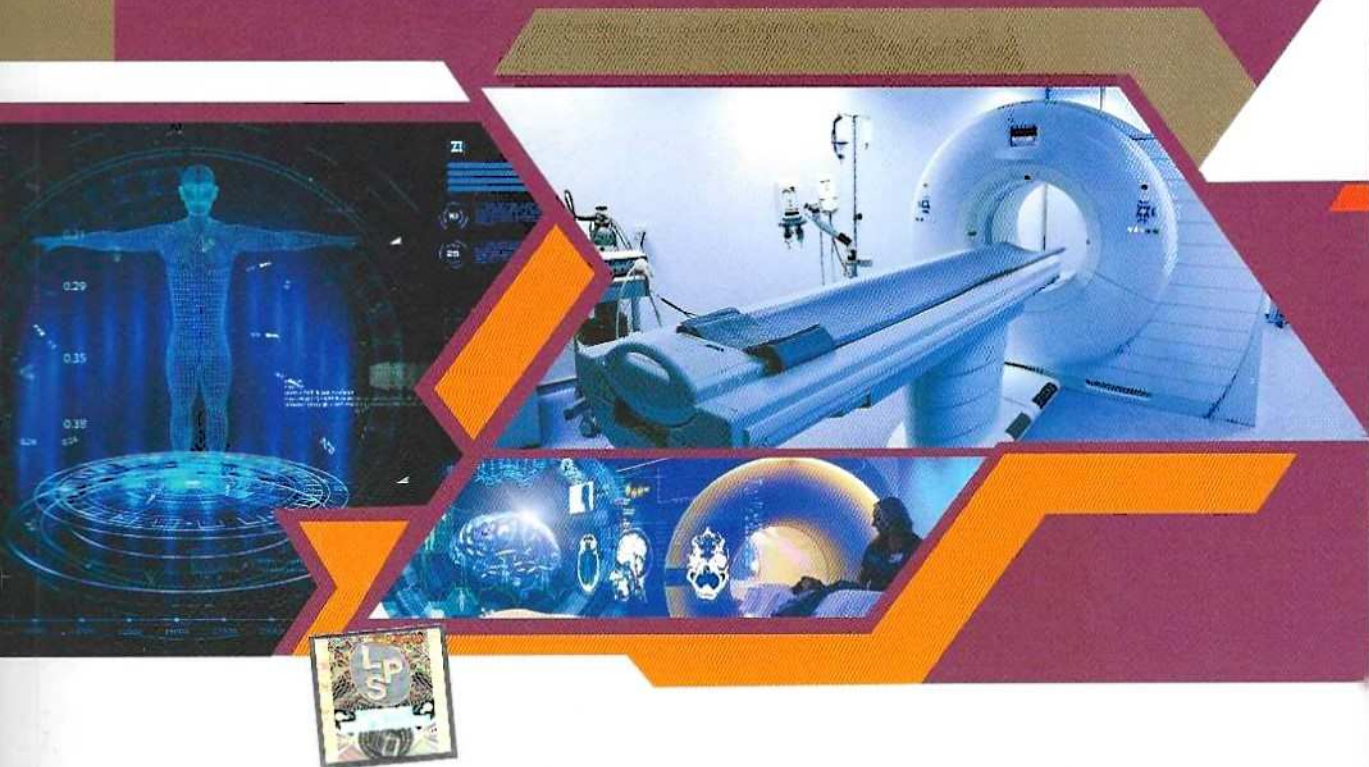


MEDICAL IMAGING SYSTEMS

(CBM 355 Professional Elective)

For B.E. V / VI Semester ECE, EIE, ICE,
ETE, Biomedical and MEE Branches

As per the Latest Syllabus of Anna University, Chennai
(REGULATIONS - 2021)



SUCHITRA PUBLICATIONS
(A GROUP OF LAKSHMI PUBLICATIONS)

K. PADMAPRIYA

SYLLABUS

ANNA UNIVERSITY, CHENNAI

For B.E., ECE, EIE, ICE, ETE, BME and MEE Branches

MEDICAL IMAGING SYSTEMS

- UNIT I X RAYS 9**
Nature of X-rays- X-Ray absorption - Tissue contrast. X-Ray Equipment (Block Diagram) - X-Ray Tube, the collimator, Bucky Grid, power supply, Digital Radiography - discrete digital detectors, storage phosphor and film scanning, X-ray Image Intensifier tubes - Fluoroscopy - Digital Fluoroscopy. Angiography, cine Angiography. Digital subtraction Angiography. Mammography.
- UNIT II COMPUTED TOMOGRAPHY 9**
Principles of tomography, CT Generations, X-Ray sources- collimation- X- Ray detectors - Viewing systems - spiral CT scanning - Ultra fast CT scanners. Image reconstruction techniques - back projection and iterative method.
- UNIT III MAGNETIC RESONANCE IMAGING 9**
Fundamentals of magnetic resonance - properties of electromagnetic waves : speed, amplitude, phase, orientation and waves in matter - Interaction of Nuclei with static magnetic field and Radio frequency wave - rotation and precession - Induction of magnetic resonance signals - bulk magnetization - Relaxation processes T1 and T2. Block Diagram approach of MRI system - system magnet (Permanent, Electromagnet and Superconductors), generations of gradient magnetic fields, Radio Frequency coils (sending and receiving), shim coils, Electronic components, fMRI.
- UNIT IV NUCLEAR IMAGING 9**
Radioisotopes - alpha, beta, and gamma radiations. Radio Pharmaceuticals. Radiation detectors - gas filled, ionization chambers, proportional counter, GM counter and scintillation Detectors, Gamma camera - Principle of operation, collimator, photomultiplier tube, X-Y positioning circuit, pulse height analyzer. Principles of SPECT and PET.
- UNIT V RADIATION THERAPY AND RADIATION SAFETY 9**
Radiation therapy - linear accelerator, Telegamma Machine. SRS - SRT - Recent Techniques in radiation therapy - 3D CRT - IMRT - IGRT and Cyber knife - radiation measuring instruments Dosimeter, film badges, Thermo Luminescent dosimeters - electronic dosimeter - Radiation protection in medicine - radiation protection principles.

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