INTRODUCTION TO BIOMEDICAL IMAGING TECHNIQUES

SYLLABUS

DEPARTMENT: DEPARTMENT OF PHYSICS

NAME OF COURSE: INTRODUCTION TO BIOMEDICAL IMAGING TECHNIQUES

COURSE CODE: CPCC22

TOTAL HOURS: 40

UNIT-I PROJECTION X-RAY IMAGING (5 HOURS)

Radiation, Electrons and ionization, Equipment, examples and adverse effects, Clinical applications of X-ray imaging, Mammography, Abdominal X-ray scans, Detecting and diagnosing bone fractures.

UNIT-II COMPUTED TOMOGRAPHY (CT) IMAGING (5 HOURS)

Terminology and Equipments, Sinograms, Image building exercise, Image reconstruction, Artifacts, Pros & Cons, Clinical applications of CT, Cerebral scans, Pulmonary disease, Abdominal imaging.

UNIT-III ULTRA SOUND IMAGING (5 HOURS)

System architecture, Components and terminology, Refraction and Sound speed, Image formation and typical uses, Artifacts, Advanced methods, Safety and Bioeffects in Ultrasonic imaging. Clinical applications of Ultra sound, Obstetrics and Gynecology, Cardiac disease etc.

UNIT-IV MAGNETIC RESONANCE IMAGING (10 HOURS)

System overview, Magnet properties and precession, Coils, flipping protons, larmor frequency, Farady induction, Obtaining contrast, Examples, Artifacts, Pros & Cons. Clinical applications of MRI, Brain, Musculoskeletal system, Cardiac system.

UNIT-V OTHER IMAGING TECHNIQUES (5 HOURS)

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Nuclear medicin functional imaging techniques positron emission tomography (PET) and Single-photon emission computed tomography (SPECT) and endoscopy. Various clinical applications.

Course also includes 10 hrs of medical imaging lab visit to familiarize with various imaging techniques.