

# Medical Imaging - II

B.E. Sem. VII [BIOM]

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## EVALUATION SYSTEM

	Time	Marks
<b>Theory Exam</b>	3 Hrs.	100
<b>Practical &amp; Oral Exam</b>	–	–
<b>Oral Exam</b>	2 Hrs.	50
<b>Term Work</b>	–	25

## SYLLABUS

### 1. Computed Tomography

Principle of Computed tomography.

Scanner configurations/generations, CT system: Scanning unit (gantry), detectors, data acquisition system, spiral CT, scanner parameters, CT Number.

Reconstruction techniques, Radon Transform, Filtered Back projection, Fourier Reconstruction Technique, Iterative reconstruction Technique, Image quality and artifacts, Clinical applications of CT. Multi-detector computed tomography (MDCT), Flat panel detectors CT-Angiography

### 2. Magnetic Resonance Imaging

Physics of MRI, Relaxation Parameters and Spin Echoes, Magnetic Field Gradients, Slice selection and Frequency Encoding, Pulse sequences.

Hardware: Magnets, Gradient systems, RF coils.

Fourier Reconstruction techniques, Image contrast, Resolution and Factors affecting signal-to-noise.

Safety Considerations/Biological Effects of MRI.

### 3. Magnetic Resonance Spectroscopy (MRS)

Basic Principle of MRS and localization techniques, Chemical Shift Imaging, Single-voxel and Multivoxel MRS, Water Suppression techniques.

### 4. Basics of Electrical Impedance Tomography

### 5. Hybrid Imaging modalities and its clinical application

## Reference Books

1. Biomedical Technology and Devices Handbook (*James Moore, George Zouridakis*) CRC Press.
  2. Biomedical Engineering Handbook (*Bronzino*) CRC Press
  3. Physics of Diagnostic Imaging (*Dowsett*)
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