

4197 - MEDICAL INSTRUMENTS - IV									
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)				
Lectures	Practical	Credits			Theory		Practical Ex.		Total
3	3	6	25	25	3 Hrs	100	50 Oral	200	
Pre-requisite		Source	Semester	Theory	Test	Total	TW	PR	Gr Total
Nil		MEX		75	25	100	50	50	200

Rationale: This course deals with more specialised equipment, such as imaging devices, x-rays, ultrasound, etc. These equipment may be found in more specialised hospitals.

COURSE CONTENTS		Hrs	Mks
1. INFORMATION CONTENT OF AN IMAGE		3	8
Modulation transfer function, Noise equivalent bandwidth. Image quality with respect to SNR and image resolution.			
2. MEDICAL IMAGING EQUIPMENT		9	16
X-rays: X-ray tube, nature of X-rays, X-ray absorption, Tissue contrast. X-ray equipment block diagram. Fluoroscopy System. CT scanners. MRI scanners. Ultrasonic imaging systems. Medical Thermography.			
3. THERAPEUTIC AND PROSTHETIC DEVICES		12	24
Hemodialysis. Lithotripsy. Infant incubators. Drug Delivery Systems. Therapeutic Applications of LASER. Bladder stimulators. Cochlear prosthesis.			
4. SURGICAL INSTRUMENTS		4	8
Electrosurgical unit. Active electrodes. Return Electrode. Safety aspects. Surgical diathermy analysers.			
5. AUDIOMETERS		4	8
Basic audiometer. Pure tone audiometer. Speech audiometer. Evoked response audiometry system.			
6. COMPUTER APPLICATIONS IN THE MEDICAL FIELD		10	24
Computer aided ECG analysis. Computerised catheterisation laboratory. Computerised patient monitoring system. Telemedicine.			
7. PATIENT SAFETY		6	12
Electric shock hazards. Leakage currents. Testing instruments for checking safety parameters of biomedical equipments.			
Total		48	100

PRACTICAL:

1. Study of surgical diathermy machine.
2. Study of the X-ray machine.
3. Study of the image intensifier.
4. Study of the sonography machine.
5. Study of an audiometer.
6. Study of LASER based surgical equipment.

FIELD VISITS:

1. Visit to a CT / MRI scanning center.
2. Visit to a Hemodialysis center.
3. Visit to a Lithotripsy center.

MINI PROJECT:

The student is expected to design a database for medical use using software tools of his choice. The students will then make a presentation of their project to the faculty.

RECOMMENDED BOOKS:

1. Handbook of Biomedical Instrumentation by R.S. Khandpur.
2. Medicine and Clinical Engineering by Bertil Jacobson, J.G. Webster.
3. Medical Instruments Technical Manuals from various manufacturers.
4. Principles of Biomedical Instrumentation and Measurement by R. Aston.

