IV B.Tech – I Semester

(20EC7322) Bio-Medical Electronics
(Program Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

Pre- Requisites: Electronic Measurements & Instrumentation

Course Objectives:

- To understand the basic sources of bioelectric potentials and electrodes
- To know about cardiovascular system
- To understand the Patient Care & Monitory and Therapeutic and prosthetic Devices
- To identify about bio telemetry, Automation testing
- To analyze instrumentation for the X Rays, Modern Imaging Systems

UNIT–I: Sources of Bioelectric potentials and Electrodes

Man Instrument System, Resting and Action Potentials, Propagation of Action Potentials, The Bioelectric Potentials. Electrodes: Electrode theory, Potential Electrodes, Biochemical Transducers, introduction to bio-medical signals.

UNIT–II: The Cardiovascular System

The Heart and Cardiovascular System, The Heart, Blood Pressure, Characteristics of Blood Flow, Heart Sounds, Cardio Vascular Measurements, Electrocardiography, Measurement of Blood Pressure, Measurement of Heart Sounds, Event detection, PQRS & T-Waves in ECG, the first & second Heart beats, ECG rhythm analysis, analysis of exercise ECG.

UNIT–III: Patient Care & Monitory and Therapeutic and prosthetic Devices

The elements of Intensive Care Monitory, Diagnosis, Calibration and reparability of Patient Monitoring equipment, other instrumentation for monitoring patients, pace makers, defibrillators, Respiratory Therapy Equipment ,Audiometers and Hearing Aids, MyoelectricArm,Laparoscope,OphthalmologyInstruments,AnatomyofVision,ElectrophysiologicalTests,Ophthalmoscope,TonometerforEyePressureMeasurement,Diathermy,ClinicalLaboratoryInstruments

UNIT–IV: Bio telemetry and Instrumentation for the clinical laboratory

Introduction to bio telemetry, the components of bio telemetry system, implantable units, applications of telemetry in patient care-The blood tests on blood cells, chemical test, automation of chemical tests.

UNIT–V: Medical Imaging Systems and electrical safety of Medical equipment

Instruments for X-rays, Modern Imaging Systems: Tomography, Magnetic resonance Imaging System, Ultrasonic Imaging System, Medical Thermography. Physiological effects of electrical current, shock Hazards from electrical equipment, Methods of accident prevention.

Course Outcomes:

After successful completion of the course, the students can be able to

S. No	Course Outcome	BTL
1	Understand the basic sources of bioelectric potentials and electrodes	L2
2	Will be knowing about cardiovascular system	L2
3	Knowing the elements of Intensive Care Monitory, Diagnosis, Calibration and repairability of Patient Monitoring equipment	L2
4	Understand the concepts of bio telemetry, automation testing	L2
5	Analyze the instrumentation for the medical use of Modern Imaging Systems	L2

Correlation of COs with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	-	-	-	-	-	-	-	-	-	2	-
CO2	2	2	1	-	-	-	-	-	-	-	-	-	2	-
CO3	1	2	1	-	-	-	-	-	-	-	-	-	2	-
CO4	1	2	2	-	-	-	-	-	-	-	-	-	3	-
CO5	1	3	-	-	-	-	-	-	-	-	-	-	3	-

Text Books:

1. Biomedical Instrumentation and Measurements – C. Cromwell, F.J. Weibell, E.A.Pfeiffer – Pearson education.
2. Bio-Medical Electronics and Instrumentation-Onkar N. Pandey, Rakesh Kumar, KatsonBooks
3. Biomedical signal analysis – Rangaraj, M. Rangayya – Wiley Inter science – John willey & Sons Inc.

Reference Books:

1. Hand Book of Bio-Medical Instrumentation – R.S. Khandpur, (TMH)
2. Introduction to Bio-Medical Engineering – Domach, (Pearson)
3. Introduction to Bio-Medical Equipment Technology – Cart, (Pearson)