

GUJARAT TECHNOLOGICAL UNIVERSITY

Electronics Engg. / Electronics & Communication Engg.

/Electronics & Telecommunication

B. E. SEMESTER: VII

Subject Name: **Biomedical Instrumentation (Department Elective - I)**

Subject Code: **171006**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	0	2	5	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Introduction to Biomedical Instrumentation: The age of Biomedical Engineering, Development of Biomedical Instrumentation, Biometrics, Introduction to the Man- instrument System, Components of the Man- Instrument System, Physiological Systems of the Body.	4
2.	Sources of Bioelectric Potentials: Action and Resting Potential, Propagation of Action Potential, The Bioelectric Potential.	4
3.	Basic Transducers principles: The Transducer and Transduction Principles, Active Transducer, Passive Transducers, Transducers for Biomedical Application.	3
4.	Electrodes: Electrode Theory, Biopotential Electrode, Biochemical Transducer.	4
5.	The Cardiovascular System: The Heart and Cardiovascular System, The Heart, Blood Pressure, Characteristic of Blood Flow, Heart Sounds.	5
6.	Cardiovascular Measurement: Electrocardiography, Blood Pressure, Blood Flow and Cardiac Output, Plethysmography, Heart Sounds, Echocardiography , Colour Doppler	5

	measurement	
7.	Bio Medical Equipment : ECG, EMG, EEG, Pace Maker, Defibrillator, Heart lung Machine, Dialysis, Diathermy Unit for surgery and therapy, LASER in Surgery, Equipment in Intensive Care Unit, Robotic Surgical Equipments, Invasive Medical Procedures	6
8.	Medical Imaging : Principle Of Radiation, Components Of X-Ray System, Principle Of CT Scan, USG, MRI, PET Scan.	4
9.	Biotelemetry: Introduction to Biotelemetry, Physiological parameters adaptable to Biotelemetry, The Components of a Biotelemetry System, Implantable Units, Application of Telemetry in Patient Care.	4
10.	Electrical Hazards & Patient safety in Bio-medical equipments: Significance of Electrical Danger, Physiological Effect of Electrical Current, Ground Shock, Hazards and Methods of Accident Prevention.	2
11.	Patient Monitoring system: Heart Rate Measurement, Pulse Rate Measurement, Respiration Rate Measurement, Blood Pressure Measurement, Microprocessor Applications in Patient Monitoring.	4

Reference Books:

1. Biomedical Instrumentation And Measurements- By Leslie Cromwell
2. Human Physiology: The Mechanism Of Function By Vander, Sherman
3. Medical Instrumentation By John. G. Webster –John Wiley
4. Introduction To Biomedical Equipment Technology- By Carr & Brown
5. Handbook Of Biomedical Instrumentation By R. S. Khandpur
6. Biomedical Instrumentation By Dr. M. Arumugam, Anuradha