

5th Semester	REI5D002	Biomedical Instrumentation	L-T-P 3-0-0	3 CREDITS
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Biomedical Instrumentation

Module-I: (13 Hours)

Introduction to Bioengineering, Biochemical Engineering, Biomedical Engineering, Sources of Biomedical Signals, Basic medical Instrumentation systems and their need, use of microprocessors in medical instruments, PC based medical Instruments, general constraints in design of medical Instrumentation system & Regulation of Medical devices.

Bioelectrical Signals & Electrodes: Origin of Bioelectric Signals, Electrocardiogram, Electroencephalogram, Electromyogram, Electrode-Tissue Interface, Polarization, Skin Contact Impedance, Motion Artifacts.

Module-II: (10 Hours)

Electrodes for ECG: Limb Electrode, Floating Electrodes, Pre-gelled disposable Electrodes, Electrodes for EEG, Electrodes for EMG.

Physiological Transducers: Introduction to Transducers, Classification of Transducers, Performance characteristics of Transducers, Displacement, Position and flow and pressure Transducers.

Strain gauge pressure transducers, Thermocouples, Electrical Resistance Thermometer, The mister, Photovoltaic transducers, Photo emissive Cells & Biosensors (Biochemical sensors).

Module-III: (10 Hours)

Recording Systems: Basic Recording systems, General considerations for Signal conditioners, Preamplifiers, Differential Amplifier, Isolation Amplifier, Electrostatic and Electromagnetic Coupling to AC Signals, Proper Grounding (Common Impedance Coupling)

Books:

- [1] Hand Book of Biomedical Instrumentation by R.S.Khandpur,-2nd Edition, Tata McGrawHill, 2003.
- [2] Introduction to Biomedical Engineering by Michael M.Domach,Pearson Education Inc,-2004.
- [3] Biomedical Instrumentation and Measurements- by Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, 2ndEdition, PHI learning Pvt. Ltd
- [4] Introduction to Biomedical equipment technology,4e.ByJOSEPH.J.CAAR &JOHN M.BROWN (Pearson education publication).
- [5] Medical Instrumentation-application & design. 3e – By JOHN.G.WEBSTER John Wiley & Sons publications.