Course Type	Course Code	Name of Course	L	T	P	Credit
DE	ECD402	Biomedical Instrumentation	3	0	0	9

Course Objective

The objective of the course is to provide a view of the sensing mechanisms and principles of the instruments used for biomedical measurements

Learning Outcomes

Upon successful completion of this course, students will:

- Understand the principles of biomedical instrumentation
- Get acquainted with biomedical measurements
- Know about generation and measurements of biopotentials
- Acquire understanding of physiological pressure, volume, flow and sound
- Know the instruments used in medical imaging

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction to medical devices; medical measurement constraints; classification and regulation of biomedical instruments; Different types of transducers & their selection for biomedical applications	8	Acquire the background information of biomedical instrumentation and get the understanding of relevant transducers
2	The origin of biopotentials; biopotential electrodes; Biopotential amplifiers; Electrode arrays. Electrocardiogram, Common-mode suppression, Active shielding	8	To develop an understanding of the physiological origin of biopotentials, their measurement and amplification
3	Cardiovascular measurement: Measurement of Blood pressure, Blood flow, Electrocardiography, phonocardiography	8	Understand the measurement of cardiovascular dynamics
4	Respiratory System Measurement: Modeling respiratory system, Measurement of pressure, gas flow and volume	7	To learn about modeling and measurement of pressure, flow and volume related to respiratory system
5	Medical Imaging: Ultra sound imaging, Radiography, Tomography, Magnetic Resonance Imaging	7	Acquire an understanding of the concepts of medical imaging and applications
6	Electrical safety, Electrical hazards Distribution of electrical power, Safety in bioinstrumentation,	4	To know about electric safety in hospitals and minimization of hazards

Textbook:

1. John G. Webster, “Medical Instrumentation Application and Design”, John Wiley and sons, New York, 2004

Reference Books:

1. L. Cromwell, “Biomedical Instrumentation and Measurement”, PHI, 1990.
2. Joseph J. Carr, “Introduction to Biomedical Equipment Technology”, Pearson, 2002.
3. R. S. Khandpur, “Handbook of Biomedical Instrumentation”, McGraw Hill Education, 2014.