EES-709: BIOMEDICAL INSTRUMENTATION

Credit	L	T	P
4	**3**	**1**	**-**

UNIT-I
The cell, body fluids, body as a control system, biomedical signals and electrodes, biomedical amplifiers, general block diagram of biomedical instrumentation.

UNIT-II
Active versus passive sensors, Sensor error sources, sensor terminology, electrochemical sensors, electrodes for biophysical sensing, transducer and transduction principles, active and passive transducers, transducers for biomedical applications, transducer care.

UNIT-III
Heart is a potential source, ECG waveform, Frontal plane ECG measurements, Lead systems for ECG recording, determination of heart rate, electrocardiograph, ECG faults and troubleshooting, Introduction of EEG based instruments.

UNIT-IV
Stimulators; types of stimulators, electro-diagnostic/ therapeutic stimulator, peripheral nerve stimulator, AC and DC defibrillators, pacemakers, diathermy, respirators, blood pumps, Myoelectric control of paralyzed muscles.

UNIT-V
Electrical impedance plethysmography, Audiometry, X-rays and radiography, X-ray computed tomography, diagnostic ultrasound, electromagnetic flow meter, Magnetic resonance imaging, electrical impedance tomography.

ADDITIONAL TOPICS:

- NeuroSciences
- Recent Trends in Neurotechnology

TEXT/REFFERENCE BOOKS

1. Raja Rao, C; Guha, S.K. Principles of Medical Electronics and Biomedical Instrumentation. Universities Press (India) Limited 2013.
2. Barbara Christe. Introduction to Biomedical Instrumentation: The Technology of Patient Care. Cambridge University Press, 2012.
3. John G. Webster. Medical Instrumentation Application and Design. 4th Edition, John wiley & sons, 2009.
4. Joseph J. Carr and John M. Brown. Introduction of Biomedical Equipment Technology. 4th Edition, Pearson Education Asia, 2001.
5. John E, Susan B, Joseph B. Introduction to Biomedical Engineering. 2nd Edition, Academic Press, Indian Reprint 2009.