**Lecture Schedule**

**Department of Electronics and communication engineering**

# Branch & Section : III B.Tech - II Sem & ECE-I&II Regulation : R13

**Subject : Biomedical Engineering Academic Year : 2017 -2018**

**Name of the Faculty : G.Tirupati**

Course Objectives:

* To define and classify the different physiological systems and biopotentials.
* Explain the underlying principles and characters of electrodes and transducers and its use in medicine.
* Understand the development of cardiovascular, respiratory devices and its importance in health care.
* Distinguish operation and working of various therapeutic equipment.
* List and classify various accidental currents and prevention measures.

Course outcomes:

* Able to understand different physiological systems and its potentials.
* Develop the transducers and electrodes for signal acquisition.
* Analyze various therapeutic devices and appraise the use of biotelemetry
* Assess the various leakage currents and plan for prevention.
* Elaborate the usage of cardiovascular systems and respiratory systems.

|  |  |  |  |
| --- | --- | --- | --- |
| UUnit | Name of the Topic | Classes Required | Total classes Required |
| I | Motivation to Biomedical Instrumentation& | 1 | 13 |
| Age of Biomedical Engineering & Development of Biomedical Instrumentation | 1 |
| Biometrics | 1 |
| Components of the Man-Instrument System | 1 |
| Physiological System of the Body | 1 |
| Problems Encountered in Measuring a Living System | 2 |
| Sources of Bioelectric Potentials | 2 |
| Resting and Action Potentials | 1 |
| Propagation of Action Potential | 1 |
| Bioelectric Potentials-ECG, EEG , EMG,EP | 2 |
| II | Introduction to electrodes and transducers | 1 | 9 |
| Principles of electrode theory | 1 |
| Biopotential electrodes | 1 |
| Types of biopotential electrodes | 1 |
| Principles of biotransducers and category | 1 |
| Active and passive transducers | 1 |
| Different transducers in biomedical applications | 1 |
| Pulse sensor and respiration sensor | 1 |
| Transducers with digital output | 1 |
| IIII | Heart and Cardiovascular System, | 1 | 10 |
| Conduction system of Heart | 1 |
| Electro Cardiograph(ECG) | 1 |
| Blood Pressure Measurement | 1 |
| Measurement of Blood Flow and Cardiac Output | 1 |
| Measurement of Heart Sound | 1 |
| Plethysmography. | 1 |
| Physiology of The Respiratory System | 1 |
| Instrumentation for respiration | 1 |
| Respiratory Therapy Equipment | 1 |
| IIV | Elements of Intensive-Care Monitoring, | 1 | 14 |
| Patient Monitoring Displays & Diagnosis | 1 |
| Calibration and Repair ability of Patient  Monitoring Equipment | 1 |
| Other Instrumentation for  Monitoring Patients | 1 |
| Organization of the Hospital for Patient-Care  Monitoring | 1 |
| Pacemakers and its applications | 1 |
| Defibrillators and its applications | 1 |
| Radio Frequency Applications of  Therapeutic use. | 1 |
| Audiometers and Hearing Aids. | 1 |
| Myoelectric Arm, Laparoscope | 1 |
| Anatomy of Vision, & ophthalmology instruments | 1 |
| Clinical Laboratory Instruments | 1 |
| Biomaterials |  |
| Stimulators. | 1 |
| FV  V | Introduction to Imaging and telemetry | 1 | 11 |
| Principles of Ultrasonic Measurement, | 1 |
| Ultrasonic Imaging | 1 |
| Ultrasonic applications | 1 |
| X-Ray | 1 |
| Radio-Isotope Instrumentations | 1 |
| CAT Scan | 1 |
| Emission Computerized Tomography | 1 |
| MRI | 1 |
| Components of Biotelemetry System, Physiological Parameters Adaptable to  Biotelemetry | 1 |
| Implantable Units, Telemetry for ECG Measurements during Exercise, Telemetry for  Emergency Patient Monitoring. | 1 |
| vVI | Biopotential Amplifiers | 1 | 6 |
| Monitors, Recorders | 1 |
| Physiological Effects and Electrical Current | 1 |
| Shock Hazards from Electrical Equipment | 1 |
| Methods of Accident Prevention | 1 |
| Isolated Power Distribution | 1 |
|  | **Total=63** |

**Text Books:**

1. “Bio-Medical Instrumentation”, Cromewell, Wiebell, Pfeiffer

2. “Bio-Medical Electronics and Instrumentation”, Onkar N. Pandey,Rakesh Kumar, Katson Books.

**References:**

1. “Introduction to Bio-Medical Equipment Technology”, 4th Edition,

Joseph J. Carr, John M. Brown, Pearson Publications.

2. Bio-Medical Instrumentation by Dr.M.Aurmhugum.

3. “Hand Book of Bio-Medical Instrumentation”, Khandapur.McGrawHill

# 4. Medical Instrumentation Application and Design” 4th edition by [John G. Webste](https://www.amazon.in/s/ref=dp_byline_sr_book_1?ie=UTF8&field-author=John+G.+Webster&search-alias=stripbooks)r.