

DEPARTMENT OF ELECTRONICS
MSc Electronics

ELE 510 - MEDICAL ELECTRONICS
(Open Elective)

Unit – I

10 hours

Introduction: History of Medical Devices, the Role of Biomedical Engineering Technologists in Health Care Characteristics of Human Anatomy and Physiology That Relate to Medical Devices

Diagnostic Devices: Physiological Monitoring Systems Overview Integration and Connectivity, Central Stations, Telemetry.

Diagnostic Device for Heart: Electrocardiogram (ECG) Monitors and Machines, Electrocardiograph – ECG Electrodes, Amplifiers Interference, Filters, Lead Arrangements, Patient Isolation, Digital Systems, Waveform Analysis and Measurements, Stress Testing, Ambulatory ECG Recorders/Analysis Systems.

Unit –II

10 hours

Diagnostic Device for Circulatory System and Blood: Introduction, Hypertension, Hypotension, Blood Pressure Measurement, Pulse Oximeters, Transcutaneous CO₂ Analyzers,

Blood Chemistry Analyzers, Glucometers. Doppler Blood Flow Detectors

Diagnostic Device for Respiratory System: Pulmonary Function Analyzers, Respiration Monitors, Capnography Monitors, Oxygen Analyzers, Bronchoscopy Systems.

Diagnostic Device for Nervous System: Clinical significance of EEG, Multi-channel EEG recording system, Epilepsy, Evoked Potential recording system, MEG (Magneto Encephalon Graph). EEG Bio Feedback Instrumentation

Diagnostic Device for Digestive System: Endoscopes, Types of Endoscopes, Rigid Endoscopes, Flexible Endoscopes, Other System Components, Video Recorder/Storage, Video Monitor

Unit- III

10 hours

Diagnostic Imaging system: X-Rays, Computed (Axial) Tomography Scanners, Magnetic Resonance Imaging Scanners, Positron Emission Tomography, Diagnostic Ultrasound

Treatment Devices: Heart, Circulatory System and Blood, Respiratory System, Nervous System, Renal System, Sensory Organs, Reproduction, Skin, Bone, Muscle, and Miscellaneous

Text Book:

1. “Introduction to Biomedical Engineering Technology” Laurence Street, CRC Press Taylor & Francis Group
2. , “Medical Devices and Systems” ,Joseph D. Bronzino, CRC Press Taylor & Francis Group, Third Edition.
3. “Biomedical Instrumentation and Measurements” Leslie Cromwell, Fred J. Weibell, PHI, 15th Edition.

Reference Book:

1. “Medical Instrumentation Application and Design, third edition”, John G. Webster, Wiley India Edition, 2007.
2. “Introduction to Biomedical equipment technology”, Joseph J. Carr and John M. Brown, PHI, 2003.

