

16BM306 DIAGNOSTIC AND THERAPEUTIC EQUIPMENTS-I

Hours Per Week :

L	T	P	C
3	1	-	4

Total Hours :

L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
45	15	-	20	46	6	12	3	5



Course Description and Objectives:

This course introduces the human-instrument systems and problems encountered in attempting to obtain measurements from a living body. It also includes all diagnostic and therapeutic related equipment. The objective of the course is to make the students understand the medical devices applied in measurement of parameters related to cardiology, neurology and the methods of continuous monitoring and transmitting them.

Course Outcomes:

The student will be able to:

- use different medical devices applied in measurement of parameters related to cardiology, neurology etc.
- explain about cardiac assist devices, its continuous monitoring and transmission.
- measure signals generated by muscles.
- analyze, troubleshoot, repair, and calibrate diagnostic and therapeutic equipment.

SKILLS:

- ✓ *Differentiate various instruments in hospitals.*
- ✓ *Determine diagnostic techniques used in health care.*
- ✓ *Know the principles in transmission of biosignals in telemetry.*
- ✓ *Know the procedures for safely carrying out therapeutic process.*

ACTIVITIES:

- *Analyse principles behind holter monitoring, defibrillators and other monitoring systems.*
- *Develop new therapeutic equipment in hospital management.*
- *Understand sources of leakage current and method of monitoring it.*
- *Analyse the criticality of an instrument and trouble shoot it economically.*

UNIT- 1**L-9, T-3**

CARDIAC EQUIPMENT: Electrocardiograph, Normal and Abnormal Waves, Heart rate monitor, Holter Monitor, Phonocardiography, Plethysmography; Cardiac Pacemaker- Internal and External Pacemaker– Batteries, AC and DC Defibrillator- Internal and External.

UNIT - 2**L-9, T-3**

NEUROLOGICAL EQUIPMENT: Clinical significance of EEG, Multi-channel EEG recording system, Epilepsy, Evoked Potential–Visual, Auditory and Somatosensory, MEG (Magneto Encephalo Graph). EEG Bio Feedback Instrumentation.

UNIT - 3**L-9, T-3**

SKELETAL MUSCULAR EQUIPMENT: Generation of EMG, Recording and analysis of EMG waveforms, Fatigue characteristics, Muscle stimulators, Nerve stimulators, Nerve conduction velocity measurement, EMG Bio Feedback Instrumentation.

UNIT - 4**L-9, T-3**

PATIENT MONITORING AND BIOTELEMETRY: Patient monitoring systems, ICU/CCU Equipments, Infusion pumps, Bed side monitors, Central consoling controls; Radio Telemetry (single, multi), Portable and Landline Telemetry unit, Applications in ECG and EEG Transmission.

UNIT - 5**L-9, T-3**

EXTRA CORPOREAL DEVICES AND SPECIAL DIAGNOSTIC TECHNIQUE: Need for heart lung machine, Functioning of bubble, Disc type and membrane type oxygenators, Finger pump, Roller pump, electronic monitoring of functional parameter; Hemo Dialyser unit, Lithotripsy, Principles of Cryogenic technique and application, Endoscopy, Laproscopy; Thermography – Recording and clinical application, Ophthalmic instruments.

TEXT BOOK:

1. Khandpur R.S, “Handbook of Biomedical Instrumentation”, Tata McGraw Hill, 3rd edition, New Delhi, 2003.

REFERENCE BOOKS:

1. Myer Kutz, “Standard Handbook of Biomedical Engineering and Design”, Mc Graw Hill, 2003.
2. L.A Geddes and L.E.Baker, “Principles of Applied Biomedical Instrumentation”, 3rd edition, 2008
3. Leslie Cromwell, “Biomedical Instrumentation and Measurement”, 1st edition, Pearson Education, New Delhi, 2007.
4. Antony Y.K.Chan, “Biomedical Device Technology, Principles and design”, Charles Thomas Publisher Ltd, Illinois, USA, 2008.
5. John G.Webster, “Medical Instrumentation Application and Design”, 3rd edition, John Wiley and Sons, New York, 2006.