

19BMB203	MEDICAL INSTRUMENTATION	L	T	P	J	C	
		3	0	2	0	4	
UNIT I	FUNDAMENTALS OF MEDICAL INSTRUMENTATION						9+6
Sources of Biomedical signals, Basic medical instrumentation system, Performance requirements of medical instrumentation systems, General constraints in design of medical instrumentation systems, Regulation of medical devices. Experiment: Data acquisition of physiological signals							
UNIT II	CARDIAC EQUIPMENT						9+6
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. Experiment: Measurement of Blood Pressure and Blood Flow							
UNIT III	NEUROLOGICAL EQUIPMENT						9+6
Clinical significance of EEG, Multi channel EEG recording system, Epilepsy, Evoked Potential–Visual, Auditory and Somatosensory, MEG (Magneto Encephalo Graph). EEG Bio Feedback Instrumentation. Study of EEG stimulator Experiment: Study of EEG stimulator							
UNIT IV	SKELETAL MUSCULAR EQUIPMENT						9+6
Generation of EMG, recording and analysis of EMG waveforms, fatigue characteristics, Muscle stimulators, nerve stimulators, Nerve conduction velocity measurement, EMG Bio Feedback Instrumentation. Experiment: Study of EMG stimulator							
UNIT V	PATIENT SAFETY						9+6
Physiological effects of electricity – important susceptibility parameters – Macro shock – Micro shock hazards – Patient’s electrical environment – Isolated Power system – Conductive surfaces – Electrical safety codes and standards – Basic Approaches to Protection against shock, Protection equipment design, Electrical safety analyzer – Testing the Electric system Experiment: Study of Electrical safety measurements							

L: 45 T: 0 P: 30 J: 0 TOTAL: 75 PERIODS

TEXT BOOKS

1. Khandpur R.S, —Handbook of Biomedical Instrumentation , 3rd edition, Tata McGraw-Hill, New Delhi, 2014.
2. John G. Webster, —Medical Instrumentation Application and Design , 4th edition, Wiley India Pvt Ltd, New Delhi, 2015.
3. Joseph J. Carrand John M. Brown, “Introduction to Biomedical Equipment Technology”, Pearson education, 2012.

REFERENCES

1. Myer Kutz, “Standard Handbook of Biomedical Engineering & Design”, Mc Graw Hill, 2003
2. L.A Geddasa and L.E. Baker, “Principles of Applied Biomedical Instrumentation”, John Wiley and Sons, Third Edition, Reprint 2008.
3. Leslie Cromwell, “Biomedical Instrumentation and Measurement”, Pearson Education, New Delhi, 2007
4. Antony Y.K. Chan, “Biomedical Device Technology, Principles and design”, Charles Thomas Publisher Ltd, Illinois, USA, 2008.

COURSE OUTCOMES

At the end of the course students should be able to

- CO1:** Understand the basic concepts of Medical Instrumentation
- CO2:** Explain the working and recording setup of all basic cardiac equipment.
- CO3:** Understand the working and recording setup of basic neurological equipment.
- CO4:** Discuss the recording of EMG and the therapeutic equipment for muscle and nerves.
- CO5:** Analyze the importance of patient safety against electrical hazard

CO/PO Mapping

Course code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2														
CO3														
CO4														
CO5														

Staff In Charge

Academic Coordinator

HoD/BME

