

Course Code	Course Name	Credits
26PH907	BIOMEDICAL INSTRUMENTATION	04

Course Objectives

- The objective of this course is to introduce student to basic biomedical engineering technology and introduce different biological signals, their acquisition, measurements and related constraints.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Successfully practice biomedical engineering to serve state and regional industries, hospitals, government agencies, or national and international industries.
- Work professionally in one or more of the following areas: biomedical electronics, medical instrumentation, medical imaging, biomedical signal processing, and biomaterials.

Unit 1 - Medical Instruments (12 Hrs.)

Electro - Cardiography (ECG) - Electromyography (EMG) - Electro - Encephelograph (EEG) - Phonocardiography.

Unit 2 – Pacemaker (12 Hrs.)

Introduction to Pacemakers - External and Internal pacemakers - Artificial heart valves - (Principle - block diagram and operation).

Unit 3 – Machine (12 Hrs.)

Anesthesia machine - Recording fetal heart movements and blood circulation using Doppler ultrasonic method - Laser based Doppler blood flow meter - Blood cell counter - B.P. measurement - Direct and indirect method - Haemocytometer - counting of RBCs and WBCs.

Unit 4 – Radiation Safety (12 Hrs.)

Radiation safety instrumentation - Effects of radiation exposure – Radiation monitoring instruments - Pocket dosimeter - pocket type radiation alarm.

Unit 5 – Area Monitoring Instruments (12 Hrs.)

Physiological effects due to current passage - micro shock and macro shock - Electrical Accidents in hospital - Micro shock hazards - macro shock hazards.

Reference Books:

- Bio-medical Instrumentation - Dr. M. Arumugam - Anuradha Agencies.
- Bio instrumentation - John G. Webster, editor - John Wiley & Sons, Inc
- Biological Instrumentation and methodology, P.K. Bajpai.

Websites and eLearning Sources:

- https://onlinecourses.nptel.ac.in/noc25_bt49/preview
- <https://youtu.be/IOvmhrmN3p0?si=aafJmUyG2i8JD5Vn>
- https://youtu.be/HsEtXMyZujw?si=I8xd-3fih0x_t3PS



COs and Bloom's Taxonomy Mapping – 26PH907

Course Outcomes	On successful completion of this course, students will be able to	BTL
CO1	Recall and explain biomedical signals and instruments	K1, K2
CO2	Apply instrumentation techniques in healthcare	K3
CO3	Analyze biomedical signal processing	K4
CO4	Evaluate performance of medical instruments	K5
CO5	Design biomedical instrumentation systems	K6

BTL (Bloom's Taxonomy Level) - K1 – Remembering, K2 – Understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6 - Create

Relationship Matrix – 26PH907

Course Outcomes	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)						Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	
CO1	3	2	1	1	1	2	3	2	1	2	1	1	1.67
CO2	3	3	2	1	1	2	2	2	2	2	1	1	1.92
CO3	3	3	3	2	2	2	2	3	3	2	2	1	2.33
CO4	2	2	2	2	2	2	2	2	2	3	2	2	2.17
CO5	2	2	3	3	2	2	2	2	3	3	2	2	2.33
Total													2.08

Mean Score: 3- High, 2- Medium/Moderate, 1-Low

