EIC-312 Bio-Medical Instrumentation
L T P Cr Theory : 60 Marks
4 0 0 4 Class work : 40 Marks
Total : 100 Marks
Duration of Exam : 3 Hrs.

UNIT 1:INTRODUCTION

Origin of bio-electric signals, recording systems, source of low-level recording circuits, preamplifiers, main amplifier, driver stage, writing systems, types of recorder and transducers used

UNIT 2: BIO-MEDICAL RECORDERS AND DISPLAY SYSTEMS

ECG, EEG, EMG, Phono-cardiograph and electrodes used for ECG, EEG, EMG, Phono cardiograph, oscilloscopes used for bio-medical measurements, multi, channel display

UNIT 3: BLOOD GAS ANALYSERS

BP measurement, patient monitoring system .

UNIT 4: SPECIAL MACHINES

MRI and ultrasonic imaging systems, X-Ray machines, X-Ray computed tomography, basic NMR components, physics of ultrasonic rays, A-Scanner, B-Scanner, Echo-cardiography, display devices for ultrasonic imagery.

UNIT 5: CARDIAC PACEMAKERS AND DEFIBRILLATORS

External pacemaker, implantable pacemaker, programmable pacemaker, leads and electrodes used, DC defibrillators, electrodes used, implantable defibrillators

UNIT 6:BIO TELEMETRY

Introduction to bio telemetry, physiological parameters adaptable to bio telemetry, the components of bio telemetry system, implantable units, applications of telemetry in patient care

UNIT 7: LASER APPLICATIONS IN BIO-MEDICAL FIELDS

LASERS: Ruby Laser, Argon Laser, He-Ne Laser, CO_2 Laser, Nd-YAG Laser

TEXTBOOKS:

1.Introduction to Bio-Medical Instrumentation: R.S. Khandpur
2.Bio-Medical Instrumentation: Crambell

Lecture Plan

B.Tech Electronics and Instrumentation Engineering 6th Semester

Subject Name: Bio-Medical Instrumentation

Unit	Topic	Lecture	Reference
Introduction (1 hour)	Introduction of BMI, Role of instrumentation in medical field, Application of BMI	**Lecture 1**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
UNIT 1: INTRODUCTION (5 hours)	Origin of bio-electric signals, recording systems,	**Lecture 2**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	source of low-level recording circuits, preamplifiers, main amplifier, driver stage	**Lecture 3,4**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	writing systems, types of recorder and transducers	**Lecture 5,6**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
UNIT 2: BIO-MEDICAL RECORDERS AND DISPLAY SYSTEMS (9 hours)	ECG, electrodes used for ECG	**Lecture 7,8**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	EEG, electrodes used for EEG	**Lecture 9,10**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	EMG, electrodes used for EMG	**Lecture 11,12**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	Phono-cardiograph	**Lecture 13**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	oscilloscopes used for bio-medical measurements, multi, channel display	**Lecture 14,15**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
UNIT 3: BLOOD GAS ANALYSERS (4 hours)	BP measurement	**Lecture 16,17**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	patient monitoring system	**Lecture 18,19**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
UNIT 4: SPECIAL MACHINES (7 hours)	Basic NMR components, physics of ultrasonic rays, A-Scanner, B-Scanner	**Lecture 20**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	X-Ray machines	**Lecture 21**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	X-Ray computed tomography	**Lecture22**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	MRI and ultrasonic imaging systems	**Lecture23,24**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	Echo-cardiography, display devices for ultrasonic imagery.	**Lecture 25,26**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
UNIT 5: CARDIAC PACEMAKERS AND DEFIBRILLATORS (3 hours)	External pacemaker, implantable pacemaker, programmable pacemaker, leads and electrodes used	**Lecture 27,28**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	DC defibrillators, electrodes used, implantable defibrillators	**Lecture 29**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
UNIT 6: BIO TELEMETRY	Introduction to bio telemetry	**Lecture 30**	Bio-Medical Instrumentation: Crambell

(4 hours)	Physiological parameters adaptable to bio telemetry	**Lecture 31**	Bio-Medical Instrumentation: Crambell
	Components of bio telemetry system	**Lecture 32**	Bio-Medical Instrumentation: Crambell
	Implantable units, applications of telemetry in patient care	**Lecture 33**	Bio-Medical Instrumentation: Crambell
UNIT 7: LASER APPLICATIONS IN BIO-MEDICAL FIELDS LASERS (5 hours)	Ruby Laser	**Lecture 34**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	Argon Laser	**Lecture 35**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	He-Ne Laser	**Lecture 36**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	CO2 Laser	**Lecture 37**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	Nd-YAG Laser	**Lecture 38**	Introduction to Bio-Medical Instrumentation: R.S. Khandpur
	Revision, queries, quiz	**Lecture 39,40**	