SARDAR RAJA COLLEGE OF ENGINEERING, ALANGULAM

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

MICRO LESSON PLAN

SUBJECT : MEDICAL ELECTRONICS

CODE : EC2021

CLASS : III Year / VI SEM

STAFF: Ms. F. ABISHA, Asst.Prof,

DEPT. OF ECE.

EC2021 MEDICAL ELECTRONICS L T P C

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UNIT I ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING 9

The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG,EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT II BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT 9

PH, PO2, PCO2, PHCO3, Electrophoresis, colorimeter, photometer, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood cell counters.

UNIT III ASSIST DEVICES AND BIO-TELEMETRY 9

Cardiac pacemakers, DC Defibrillator, Telemetry principles, frequency selection, Biotelemetry, radio-pill and tele-stimulation.

UNIT IV RADIOLOGICAL EQUIPMENTS 9

Ionosing radiation, Diagnostic x-ray equipments, use of Radio Isotope in diagnosis, Radiation Therapy.

UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION 9

Thermograph, endoscopy unit, Laser in medicine, Diathermy units, Electrical safety inmedical equipment.

TOTAL= 45 PERIODS

TEXTBOOKS

1. Leislie Cromwell, “Biomedical instrumentation and measurement”, Prentice Hall ofIndia, New Delhi, 2007.

REFERENCES

1. Khandpur, R.S., “Handbook of Biomedical Instrumentation”, TATA McGraw-Hill, NewDelhi, 2003.

2. Joseph J.Carr and John M.Brown, “Introduction to Biomedical equipment Technology”, John Wiley and Sons, New York, 2004.

SUBJECT DESCRIPTION AND OBJECTIVE

DESCRIPTION

Biomedical Engineering is the application of engineering principles and design concepts to medicine and biology. This field seeks to close the gap between engineering and medicine: It combines the design and problem solving skills of engineering with medical and biological sciences to advance healthcare treatment, including diagnosis, monitoring, treatment and therapy.

Biomedical engineering has only recently emerged as its own discipline, compared to many other engineering fields. Such an evolution is common as a new field transitions from being an interdisciplinary specialization among already-established fields, to being considered a field in itself.

Prominent biomedical engineering applications include the development of biocompatible prostheses, various diagnostic and therapeutic medical devices ranging from clinical equipment to micro-implants, common imaging equipment such as MRIs and EEGs, regenerative tissue growth, pharmaceutical drugs and therapeutic biologicals. Medical devices are regulated and classified as follows

1. Class I devices present minimal potential for harm to the user and are often simpler in design than Class II or Class III devices. Devices in this category include tongue depressors, bedpans, elastic bandages, examination gloves, and hand-held surgical instruments and other similar types of common equipment.
2. Class II devices are subject to special controls in addition to the general controls of Class I devices. Special controls may include special labeling requirements, mandatory performance standards, and postmarket surveillance. Devices in this class are typically non-invasive and include x-ray machines, PACS, powered wheelchairs, infusion pumps, and surgical drapes.
3. Class III devices generally require premarket approval (PMA) or premarket notification (510k), a scientific review to ensure the device's safety and effectiveness, in addition to the general controls of Class I. Examples include replacement heart valves, hip and knee joint implants, silicone gel-filled breast implants, implanted cerebellar stimulators, implantable pacemaker pulse generators and endosseous (intra-bone) implants

OBJECTIVE:

- To study the methods of recording various bio potentials
- To study how to measure biochemical and various physiological information
- To understand the working of units which will help to restore normal functioning
- To understand the use of radiation for diagnostic and therapy
- To understand the need and technique of electrical safety in Hospital

MICRO LESSON PLAN

HOURS	LECTURE TOPICS	READING
UNIT I - ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING		
1	The origin of Bio-potentials	T1
2	Bio potential electrodes	T1
3	Biological amplifiers	T1
4	ECG(AV Class)	T1
5	EEG	T1
6	EMG	T1
7	PCG	T1
8	EOG	T1
9	lead systems and recording methods, typical waveforms and signal characteristics	T1
UNIT II -BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT		
10	PH, PO2, PCO2	T1
11	PHCO3	T1
12	Electrophoresis	T1
13	Colorimeter, Photometer	T1
14	Auto analyzer	T1
15	Blood flow meter, cardiac output(AV Class)	T1
16	Respiratory measurement	T1
17	Blood pressure,temperature, pulse	T1
18	Blood cell counters.	T1
UNIT III ASSIST DEVICES AND BIO-TELEMETRY		
19	Cardiac pacemakers	T1 & R1
20		

HOURS	LECTURE TOPICS	READING
21	DC Defibrillator	T1
22		
23	Telemetry principles	T1
24	frequency selection	T1
25	Biotelemetry(AV Class)	T1 & R1
26	Radio-pill	T1
27	Tele-stimulation	T1
UNIT IV RADIOLOGICAL EQUIPMENTS		
28	Ionosing radiation	T1
29		
30		
31	Diagnostic x-ray equipments(AV Class)	T1
32		
33	Use of Radio Isotope in diagnosis	T1 & R2
34		
35,36	Radiation Therapy	T1
UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION		
37	Thermograph	T1 & R1
38		
39	Endoscopy unit	T1
40		
41	Laser in medicine	T1
42		
43	Diathermy units(AV Class)	T1
44		
45	Electrical safety in medical equipment	T1

T1.Leislie Cromwell,"Biomedical instrumentation and measurement",Prentice Hall of India, New Delhi, 2007.

R1.Khandpur,R.S.,"Handbook of Biomedical Instrumentation", TATA McGraw-Hill, NewDelhi, 2003.