Program : **Diploma in Biomedical Engineering**	
Course Code : **3241**	Course Title: **Basic Medical Sciences**
Semester : **3**	Credits: **3**
Course Category: **Engineering Science**	
Periods per week: **3 (L:2, T:1, P:0)**	Periods per semester: **45**

Course Objectives:

- To lay foundation about the basic medical terms used in biomedical engineering and basic anatomy and physiology of the human body.
- To provide the knowledge of anatomy and physiology for devising technology for human rehabilitation.

Course Prerequisites: Nil

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Summarize bio-potential generation and transmission in human body.	12	Understanding
CO2	Describe the anatomy and physiology of the cardiovascular and respiratory systems.	11	Understanding
CO3	Illustrate the Nervous System and Urinary System	11	Understanding
CO4	Explain the anatomy of the eye and ear and functioning of all special sense organs	9	Understanding
	Series Test	2	

CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2						
CO2	2						
CO3	2						
CO4	2						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Summarize bio-potential generation and transmission in human body.**		
M1.01	Define various medical terminologies	2	Remembering
M1.02	Describe the anatomy and physiology of cell and tissues	3	Understanding
M1.03	Illustrate the concept of bioelectric potentials and demonstrate using Nernst Equation.	3	Understanding
M1.04	Extend the concept of bio potential transmission in nerves and its measurement.	3	Understanding
Contents: **Cell, Tissues and Bio potential** Definition of anatomy, physiology, biochemistry, biophysics. Basic anatomical positions and planes - supine, prone, sagittal, coronal and transverse. Cells: structure of human cell, Elementary tissues of the body - types and their functions(listing) - Epithelial, connective, muscle, nerve cells Introduction to bio potential, Origin of bioelectric potential, Resting membrane potential, Action potential, Transmission of impulse through nerve fibers, Recording of membrane potential - microelectrode, monophasic, biphasic.			
CO2	**Describe the anatomy and physiology of the cardiovascular and respiratory systems.**		
M2.01	Explain the cardiovascular system and the circulation of blood in human body	2	Understanding
M2.02	Summarize the anatomy and physiology of human heart	2	Understanding
M2.03	Illustrate the electrical activity of the heart and cardiac cycle	3	Understanding

M2.04	Describe the anatomy and physiology of the respiratory system & physics involved in mechanism of respiration	2	Understanding
M2.05	Explain the mechanism of ventilation, lung volumes and lung capacities	2	Understanding
	Series Test – I	1	

Contents:

Cardiovascular and Respiratory Systems

The cardiovascular system - systemic and pulmonary circulation, The structure of heart - chambers and valves - major blood vessels, The functioning of heart - electrical and mechanical events - cardiac cycle - blood pressure - cardiac output, ECG

Respiratory System: Anatomy of the respiratory system, Mechanism of ventilation, Process of gas exchange, Definition of lung volumes and capacities.

CO3	**Illustrate the Nervous System and Urinary System**		
M3.01	Explain the general organization of the nervous system and anatomy of brain	4	Understanding
M3.02	Summarize the physiology of each part of the brain	2	Understanding
M3.03	Summarize the anatomy and physiology of the urinary system	2	Understanding
M3.04	Illustrate the structure of kidneys, nephron and explain the process of urine formation	3	Understanding

Contents:

Nervous system and Urinary Systems

General organization of the nervous system, Central nervous system - anatomy and functioning of the human brain - cerebrum - cerebellum - brainstem - pons - hypothalamus(temperature regulation) - medulla, Spinal cord

Urinary System: anatomy of urinary system - overview of anatomy of the kidney, Structure and function of the nephron, physiology of urine formation

CO4	**Explain the anatomy of the eye and ear and functioning of all special sense organs**		
M4.01	Describe the structure of the eye and the visual Process.	3	Understanding
M4.02	Illustrate the structure of ear, process of hearing and equilibrium	3	Understanding
M4.03	Summarize the functioning of sense of smell, taste and touch.	3	Understanding
	Series Test – II	1	

Contents:

Special Sense Organs

Eye: anatomy of eye - different parts - function of each part, process of vision

Ear: anatomy of ear - different parts - function of each part, process of hearing, role of ear in equilibrium of body.

Nose & Tongue: Process of sensing of smell and taste - structure of olfactory receptors and taste buds.

Skin: Sensory receptors in human skin - Cutaneous receptors – mechanoreceptors - nociceptors and thermoreceptors

Text / Reference:

T/R	Book Title/Author
T1	Anatomy and Physiology for Nurses/ Evelyn C Pearce
T2	Introduction to Biomedical Instrumentation/ Leslie Cromwell
R2	A textbook of Medical Physiology / Artur C Guyton & Hall
R3	Handbook of Biomedical Instrumentation / R S Khandpur
R4	Applied Physiology / Samson Wright & Cyril A Keele

Online resources:

Sl.No	Website Link
1	www.wikipedia.com
2	www.khanacademy.org
3	https://freevideolectures.com/subject/anatomy-physiology/
4	https://www.shomusbiology.com/human-physiology.html
5	http://oli.stanford.edu/anatomy-and-physiology/