

Course Plan of (Medical Physics)

I. Course Description:

This course introduces students to the fundamental concepts of physics as applied to medical technology and healthcare. It covers topics such as radiation therapy, diagnostic imaging, nuclear medicine, and radiation safety. Students will explore how physical principles are utilized in the development and operation of medical equipment, with a focus on improving patient care and health outcomes.

I. Course Content:

A – Theoretical Aspect:

Learning Outcomes	Contact hours	No. of Weeks	Sub Topics List	Units/Topics List	Order
a1,b1	2	2	• Concepts of unit and measurements. • Fundamental and derived units. • Units of length, weight, mass, time. • Matter: properties of solids, liquids and gases • Measurement of length, area, volume, mass and density	Introduction	1
a1,b1			▪ Definition, physical effects, related laws ▪ Specific gravity ▪ Centre of gravity and principles of gravity. ▪ Effect of gravitational forces on human body. ▪ Properties of fluids ○ Fluid flow ○ Blood flow. -Continuity equation. -Poseuille's Law. -Stoke's Law.	Gravity	2

			- Viscosity - Volume and flow measurement - Gas flow measurement - Liquid flow measurement - Gas lows - Measurement of blood pressure		
a1,b1	2	1	- Their unit of measurements. - Type and transformation of energy, forces of the body, static forces. Principles of machines, friction and body mechanics. - Simple machine-lever and body mechanic, pulley and traction, incline plane, screw.	Force, Work, Energy	3
a1,b1			- Nature, measurement, transfers of heat. - Effects of heat on matter. - Relative humidity, specific heat. - Temperature scales. - Regulations of body temperature. - Use of heat for sterilization.	Heat	4
a1,b1	1	1	Midterm exam		5
a1,b1	2	1	- Laws of reflection. - Focusing elements of the eye, defective vision and its correction, use of lenses. - Relationship between energy, frequency and wave length of light. - Biological effects of light. - Use of light in therapy.	Light	6
			Atmospheric pressure, hydrostatic pressure, osmotic	Pressure	7

a1,b1	4	2	pressure, Measurement of pressures in the body. - Arterial and venous blood pressures, ocular pressure, intracranial pressure, application of these. - Density, fluid pressure, principles of Archimedes, floating bodies, hydrometers, surface tension, capillary viscosity, diffusion and osmosis.		
			- Frequency, velocity and intensity. - Nature of transmission of sound, music and noise. - Vocalisation and hearing. - Use of ultrasound. - Noise pollution and its prevention. - Hearing aids, stethoscope, tuning fork	Sound	8
			- Nature of Electricity. Voltage, Current, Resistance and their Units - Flow of electricity in Solids, Electrolytes, Gases and Vacuum - ECG, EEG, EMG, ECT - Pace maker and defibrillation - Magnetism and electricity - M.R.I. Scanning, CAT SCAN	Electricity and Electromagnetism	9
	2	1	- Atomic Energy - Structure of Atom - Isotopes and Isobars - Radioactivity - Use of radioactive isotopes.	Radiation	10

a1,b1			▪ Radiation protection units and limits. Instruments used for detection of ionising radiation X-ray ▪ Radioactive forms of elements used in medicine, X-ray and radiotherapy unit and radium ward		
a1,b1			▪ Principles of Electronics ▪ Common electronic equipment used in patient care	Electronics	11
a1,b1	1	1	Final exam		12
	16	9	Number of Weeks /and Units Per Semester		