Course Title	**Physics for Biomedical Sciences**				
Course Code	MD110				
Course Type	Compulsory				
Level	1st Cycle (MD)				
Year / Semester	1st Year / 1st Semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	4 hrs / 14 weeks	Laboratories / week	0 / 14 weeks
Course Purpose and Objectives	This course is intended to introduce students to basic principles, concepts and applications of modern physics that are related and useful to biomedical sciences.				
Learning Outcomes	Upon successful completion of this course students should be able to: • Recall the basic concepts of waves and acoustics. • Explain the physical principles of ultrasound and the interaction of ultrasound with matter. • Describe the properties of geometrical optics, the function of magnifying lenses, the basic principle of simple optical microscope, as well as the function of the vision sensor. • Recall the origin of LASER radiation and its behavior when passing through matter. • Describe the physical principles of electromagnetic waves and electromagnetic radiation. • Describe the modern physics applications in life sciences and medicine in general.				
Prerequisites	None	Co-requisites	None		
Course Content	In that regard, students will familiarize themselves with: • Introduction and Fundamental Physics: Units of measurements, physical quantities, unit conversion, International System of Units, Scientific Notation, position, velocity, acceleration, force, Newton's law, work and energy, gravity, center of mass • Waves and Resonance: Resonance, wave concepts, traveling waves, waves at a boundary, standing waves and resonance. • Acoustics: Sound waves, intensity of the sound wave, producing sound, the human ear: physiology and function, the Doppler Effect in sound.				

	• Ultrasound: Generation and detection of ultrasound, ultrasound propagation mechanisms, ultrasound-tissue interactions, biomedical applications of ultrasounds, protection in diagnostic applications. • Electric Forces and Fields: Electric charge, Coulomb's Law, Conductors and Insulators, Electric Fields, Electric Potential Energy. Electric Current: Electric current and Resistance, Ohm's Law and electrical measurements. • Magnetic Fields: Magnetic Fields and forces, torque and force on a magnetic dipole. • Electromagnetic radiation: Electromagnetic waves, characteristics of electromagnetic radiation, propagation of electromagnetic radiation, electromagnetic spectrum, interactions of electromagnetic waves with biological tissue, risk limits. • Geometric Optics: optical properties of matter, light at an interface, optical fibers, application of optical fibers in medicine • Optical Lenses and Devices: optical lenses, the human eye, optical microscope. • LASER Radiation: laser radiation, types of laser devices, laser-tissue interactions, applications of laser in biology and medicine, laser safety. • Physics in Nuclear Medicine: radiopharmaceuticals, SPECT, PET. • Physics in Radiodiagnostics and Radiotherapy: tomography, medical imaging, teletherapy, brachytherapy,
Teaching Methodology	Face- to- face
Bibliography	Physics of the Life Sciences, by J. Newman University Physics, by H. Young & R. Freedman Fundamentals of Physics, by D. Halliday, R. Resnick, and J. Walker Schaum's Outline of College Physics, by F.J. Bueche, E. Hecht
Assessment	Examinations: 70% Assignment/Lab 20% Class Participation: 10%
Language	English