

Course Title	Physics for Biomedical Sciences				
Course Code	BMS125				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	1 st Year / 2 nd Semester				
Teacher's Name	TBA				
ECTS	5	Lectures / week	2 Hours	Laboratories / week	None
Course Purpose and Objectives	The main objective of this course is to introduce students to basic principles, concepts and applications of modern physics that are related and useful to biomedical sciences.				
Learning Outcomes	<p>Upon completion of this course students will be able to:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 				

	<ul style="list-style-type: none"> • 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 										
Teaching Methodology	Face- to- face										
Bibliography	<ul style="list-style-type: none"> • 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	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">Mid – Term Examination</td> <td style="width: 30%; text-align: center;">30%</td> </tr> <tr> <td>Final Examination</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>Assignments</td> <td style="text-align: center;">20%</td> </tr> <tr> <td>Class Participation</td> <td style="text-align: center;">10%</td> </tr> <tr> <td></td> <td style="text-align: center;">100%</td> </tr> </table>	Mid – Term Examination	30%	Final Examination	40%	Assignments	20%	Class Participation	10%		100%
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Language	English										