Course Details

Course Department:	Department of Physics
Course Code:	PHY 362
Course Title:	Principles and Practice of Physics
Number of ECTS:	7
Level of Course:	1st Cycle (Bachelor's Degree)
Year of Study (if applicable):	4
Semester/Trimester when the Course Unit is Delivered:	Spring Semester
Name of Lecturer(s):	G. Archontis, G. Itskos, F. Ptochos, S. Skourtis, N.Toumbas and T. Trypiniotis
Lectures/Week:	2 (2 hours per lecture)
Laboratories/week:	--
Tutorials/Week:	--
Course Purpose and Objectives:	This course aims to review and deepen the understanding of Physics Principles taught in General Physics classes and laboratories. In a traditional course, students evaluate their understanding of a Physics Principle by their ability to solve related problems. To combat this narrow perspective, the course re-enforces understanding of Physics Principles. The students test their understanding by their ability to explain Physics Principles in a thorough and clear manner, using a combination of theoretical methods, simple experiments and activities and modern technologies (applets, simulations, videos).
Learning Outcomes:	The students should be able to: • Demonstrate a thorough understanding of theoretical principles taught at General Physics courses and experimental techniques taught in General Physics laboratory courses (Mechanics, Electromagnetism, Waves, Optics, Thermodynamics). • Chose appropriate experiments and experimental demonstrations, to demonstrate physics principles. • Design activities that use simple materials and tools to demonstrate various physics principles. • Communicate physics principles in a clear, thorough and effective manner. • Incorporate modern technologies (videos, simulations, applets, information from the internet) into presentations, discussions and explanations of physics principles • Prepare well-structured presentations for the effective communication of a specific Physics topic.
Prerequisites:	Not Applicable
Co-requisites:	Not Applicable
Course Content:	Selected Topics from: Mechanics and Thermodynamics: Kinematics, Newton’s Laws and 2 Momentum

	Conservation, Energy forms and Energy Conservation, Rigid Body Motion and Angular Momentum conservation, Gravity, Oscillations, Reference Frames and Elements of Relativity, Elements of Thermodynamics. Electromagnetism: Electric Fields, Electric Potential, Circuits, Magnetic Fields, Induction, alternating currents, Maxwell's Equations, Electromagnetic waves. Waves and Optics: Classification and characteristics of waves, the wave equation, wave interference and diffraction, nature and propagation of sound, sound sources, nature and propagation of light, geometric optics and optical instruments, interference and diffraction.
Teaching Methodology:	The course uses one 2-hour discussion and one 2-hour hands-on activity session / week. The students are instructed to review a selected Physics Principle before the sessions. During the discussion session, the students discuss with the instructors basic Physics Principles. The discussion aims to uncover and clarify student misconceptions. The students and instructors discuss methods and strategies to explain and communicate these principles. In the activity session the students explain a set of physics principles or a specific topic in a presentation or with an activity based on simple materials and tools. The students also draw connections between physics principles and relevant experiments/experimental observations. The lectures utilize Powerpoint presentations, PHET simulations, applets and short videos of relevant animations/simulations or experiments. The students undertake projects, in which they use theoretical principles, modern technologies and /or suitable activities to explain Physics Principles at the level of tertiary or secondary education or for the general public.
Bibliography:	1. D. Halliday, R. Resnick and J. Walker. Fundamentals of Physics (Greek translation). 2. H. Young and R. Freedman. University Physics (Greek translation). 3. E. Mazur. Principles and Practice of Physics. 4. R. Chabay and B. Sherwood. Matter and Interactions. 5. L. Epstein. Thinking Physics (in Greek). 6. A. Arons. Teaching Introductory Physics.
Assessment:	• Home assigments throughout the year (40%), • Two projects at the end of the two semesters (2x30%)
Language of Instruction:	Greek Some learning material will be given in English.
Delivery Mode:	Face-To-Face
Work Placement(s):	Not Applicable