Course Details

Course Department:	Department of Physics
Course Code:	PHY 216
Course Title:	Physics Laboratory III
Number of ECTS:	6
Level of Course:	1st Cycle (Bachelor's Degree)
Year of Study (if applicable):	2
Semester/Trimester when the Course Unit is Delivered:	Fall Semester
Name of Lecturer(s):	Theodossis Trypiniotis
Lectures/Week:	--
Laboratories/week:	1 (4 hours per lecture)
Tutorials/Week:	--
Course Purpose and Objectives:	The course aims in the understanding, performance and analysis of a series of experiments involving oscillations and wave physics and optics.
Learning Outcomes:	General: • To perform and analyse simple experiments of Wave Physics/Optics • To apply their theoretical background in Wave Physics/Optics to relevant experiments • To understand the operation principle and to be trained in the use of optical instruments and devices. Specifics: • To know and be able to measure the characteristics of mechanical (strings, sound) and electromagnetic standing waves • To demonstrate and analyse wave phenomena (resonance, absorption, reflection) in (ultra)sound waves • To use the thin lenses laws in order to setup simple optical instruments (projector, microscope, telescope) • To understand the optical effects of diffraction, refraction, reflection, interference and polarisation • To be able to apply the above into experimental setups of spectrometers (refraction, diffraction), interferometers (interference, reflection) and polarimetry (polarization) to measure characteristics of optical materials.
Prerequisites:	Not Applicable
Co-requisites:	Not Applicable
Course Content:	Introductory experiment: understanding the use of an oscilloscope for visualizing and analysis signals. 1. Wave oscillations in strings / Standing waves in springs

	2. Propagation and Doppler effect of ultrasound waves in air 3. Thin lenses laws-Geometrical Optics 4. Measurement of the speed of light 5. Fraunhofer diffraction 6. Prism and Diffraction spectrometers 7. Thin film interference 8. Michelson Interferometer 9. Polarization of light - Malus law 10. Polarization by reflection – Fresnel laws
Teaching Methodology:	1st Week Introduction to errors-data analysis-theory of the experiments to be performed 2nd-13st Week Within Lab Hours: • Review of the main errors detected in the lab reports of the previous lab • Students carry out the experiments in groups of 2-3 persons. Supervision and discussion with the instructor for the better understanding of the experimental procedure and the theory of the experiment • Supervision by the lab technician on the proper connection of the experimental apparatus. Tests, repairs and replacement of components where needed Out of Lab Hours: • Lab access and further practise in experiments after communication with the instructor • Discussion over the graded lab reports per lab group • Discussion over questions regarding the theory/experimental procedure
Bibliography:	Lab notes supplied by the instructor that contain: Theoretical introduction, experimental setup, experimental procedure and data analysis, questions relevant to the experiment. University physics with modern physics (volume A'): Mechanics, Waves Μηχανική, κύματα, H.D. Young and R.A. Freedman, Greek Edition, Εκδόσεις Παπαζήση. Fundamental University Physics, Volume II, Field and Waves. Alonso and E.J. Finn, (Greek translation). Optics E. Hecht, McGraw-Hill (Greek translation I.E. Σπυριδέλλης, ΕΣΠΙ, Athens).
Assessment:	1. Lab report grading:

	• Lab report submission by each student group one week after the completion of the experiment • Graded reports are returned to students one week after their submission to instructor • The grade average of the reports of all the lab exercises (one per lab group) contributes to the final grade of the course (total of 10-11 graded lab reports). 2. Final Exam: • Students carry out an experimental exercise that is relevant to the experiments performed during the semester. The exercise is randomly chosen from a pool of 11-12 labs • They submit a written report containing the experimental data, analysis and answers to questions relevant with the experiment.
Language of Instruction:	Greek
Delivery Mode:	Face-To-Face
Work Placement(s):	Not Applicable