Course Details

Course Department:	Department of Physics
Course Code:	PHY 322
Course Title:	Advanced Physics Laboratory II
Number of ECTS:	6
Level of Course:	1st Cycle (Bachelor's Degree)
Year of Study (if applicable):	4
Semester/Trimester when the Course Unit is Delivered:	Fall Semester
Name of Lecturer(s):	Panos Razis
Lectures/Week:	--
Laboratories/week:	1 (5 hours per lecture)
Tutorials/Week:	--
Course Purpose and Objectives:	The practice of graduate students in a modern laboratory environment is a necessary component and essential asset of a degree in physics, regardless of the direction and professional orientation that will follow later. In particular, modern labor market needs require students to gain experience in new technologies in computing and electronic systems, detector devices, Lasers, microelectronics circuits, etc. The subject matter of the course includes a series of fundamental experiments of Atomic and Nuclear Physics with a focus on the autonomy of each experiment. Also, particular attention is paid to the use of computers for both the acquisition and analysis of experimental data.
Learning Outcomes:	Students acquire systematic experience and friction with regard to: Using electronic devices (oscilloscopes, multimeters, teslameters, high voltage power supplies, pre-amplifiers, main amplifiers, ADCs, multichannel analyzers), nuclear radiation detectors, Maestro software for data acquisition and calibration of energy spectra, Origin software for the fitting of theoretical functions to the experimental data, and the graphic presentation of the results.
Prerequisites:	Not Applicable
Co-requisites:	Not Applicable
Course Content:	Introduction: • Gauss and Poisson Distributions • Least Squares Method • Interaction of Charged Particles with Matter • Basic Nuclear Electronics Experiments:

	• Measurement of the Specific Charge of the Electron • Observation of the Zeemann Effect • Observation of the Electron Spin Resonance • The Compton Effect • X-Ray Fluorescence and Moseley´s Law • Rutherford Scattering • Spectroscopy of α Particles • Spectroscopy of β Particles • Spectroscopy of γ Rays • The Geiger-Müller Counter
Teaching Methodology:	Introduction and examination of the students in the theoretical part of each experiment prior to its performance. Carrying out the experiment under the supervision of the teacher and the technical staff. Delivery before leaving the laboratory of all the measurements they took.
Bibliography:	1. H. Tsertos, "Experimental Physics II", comprehensive students' manuscript, University of Cyprus, Nicosia 2016 (Main text, in Greek). 2. G. F. Knoll, "Radiation Detection and Measurement" John Wiley & Sons, Inc., New York. 3. P. R. Bevington, "Data Reduction and Error Analysis for Physical Science" McGraw-Hill Book Company, New York. 4. W. R. Leo, "Techniques for Nuclear and Particle Physics Experiments" 5. Springer-Verlag, Berlin , Heidelberg. 6. N. Tsoulfanidis, "Measurement and Detection of Radiation" McGraw-Hill, New York. 7. A. Melissinos, "Experiments in Modern Physics", Academic Press. 8. K. S. Krane, "Introductory Nuclear Physics" John Wiley & Sons, New York.
Assessment:	30% Written Reports of each experiment, 20% Oral Exam/Presentation of an experiment, 50 % Final Exam
Language of Instruction:	Greek
Delivery Mode:	Face-To-Face
Work Placement(s):	Not Applicable