ETE205 - Laboratory of Physics

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ETE205	**SEMESTER**	2
COURSE TITLE	Laboratory of Physics		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures and laboratory courses	4	6
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	GENERAL BACKGROUND
PREREQUISITE COURSES:	NO
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=2096

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Learning objectives of this laboratory course is that the student upon its completion has acquired:

- **Knowledge** about experimental measurements and analyzing experimental data performing simple experiments in mechanics and electromagnetism that are suitable for a Materials Engineer.
- **Abilities and Skills** to graphically represent the experimental data and to analyze them using statistical analysis, and the theory of least squares.
- **Ability** to determine the accuracy and reliability of a measurement as well as tackle various types of errors in experimental measurements.

Experiments: Simple pendulum, measuring the density of solids, Hooke's law, rotary pendulum, viscosity, electric current (Ohm's Law), capacitor charging-discharging, Oscilloscope, measurement of phase difference – Lissajous shapes

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Teamwork
- Production of new research ideas
- Criticism and self-criticism
- Production of free, creative and inductive thinking

(3) SYLLABUS

The course includes theoretical lessons and laboratory exercises and focuses on the following sections:

1. Introduction to experimental measurements, accuracy, reliability, experimental errors, graphs, least square theory.
2. Experiments in Mechanics: Simple pendulum, Measuring the density of solids, Hooke's law, rotary pendulum, viscosity
3. Experiments in electromagnetism: Electric current (Ohm's Law), capacitor charging-discharging, Oscilloscope, measurement of phase difference – Lissajous shapes.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of ICT in teaching lectures, use of the asynchronous learning system e-course

TEACHING METHODS

The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.
The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS

Activity	***Semester workload***
Laboratory practice	39
Lectures	13
Homework (Writing of reports)	30
Non-directed study and preparation for laboratory practice	30
Non-directed study and preparation for final examination	38

	Course total	150
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	LANGUAGE OF EVALUATION: Greek METHOD OF EVALUATION: (i) Analysis of experimental data and writing of reports as homework…… (ii) Optional midterm exam (iii) Written Final examination ….	

(5) ATTACHED BIBLIOGRAPHY

-Suggested bibliography:

- Εισαγωγή στην Ανάλυση Πειραματικών Μετρήσεων, Μ. Καμαράτος, Πανεπιστήμιο Ιωαννίνων, 2013 (in greek)
- Εισαγωγή στα Πειράματα Φυσικής (Μηχανικής – Θερμότητας), Χ. Παπαγεωργόπουλος, Πανεπιστήμιο Ιωαννίνων, 1998 (in greek)
- Data Reduction and Error Analysis for the Physical Sciences, P. R. Bevington – D. K. Robinson, McGraw-Hill, 1992.
- University Physics. Extended version with Modern Physics, H.D. Young 8th Edition, 1992
- Εργαστηριακές ασκήσεις ηλεκτρισμού μαγνητισμού, Κ. Ιωαννίδης, Πανεπιστήμιο Ιωαννίνων, 2012 (in greek)

- Related academic journals:

- As this course is general and introductory there are no relevant scientific journals