COURSE OUTLINE

(1) GENERAL

SCHOOL	OF SCIENCES		
ACADEMIC UNIT	PHYSICS DEPARTMENT		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**21**	**SEMESTER**	**2**
COURSE TITLE	ELECTRICITY AND MAGNETISM		

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**
	5	7
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	OF GENERAL BACKGROUND
PREREQUISITE COURSES:	-
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=1219 http://ecourse.uoi.gr/enrol/index.php?id=443 http://ecourse.uoi.gr/enrol/index.php?id=462 http://ecourse.uoi.gr/enrol/index.php?id=323

(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*

In this course, the student acquires the necessary knowledge for the understanding the phenomena of Electricity and Magnetism. With the completion of the course the student is able to:

- Use the principle of superposition and law of Gauss to calculate the electrical forces and the intensity of the electric field in various electricity problems
- To calculate the electric potential of charge distributions and through this to specify the intensity of the electric field
- To understand the basics of electrical circuits, capacitors and resistors and analyze circuits using Kirchhoff ‘s rules
- To calculate the magnetic forces that act on moving charges and the magnetic fields due to currents (Hall effect, Biot-Savart and Ampere laws)

- To understand the concepts of induction and self-induction, to solve problems using Faraday's and Lenz's laws and analyze and solve RL circuits
- To deal with electromagnetic oscillations, AC currents and oscillation circuits and analyze and solve RCL circuits
- To comprehend the Maxwell's equations and their use with concordance with the above

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

Search for, analysis and synthesis of data and information, with the use of the necessary technology. Adapting to new situations and decision-making. Autonomous work and criticism. Promotion of free, creative and inductive thinking

(3) SYLLABUS

The electric field. The electrical charge. Coulomb's law. Intensity of electric field. Electrical field lines, electric flux and Gauss's law. Potential of the electric field. Calculation of the electric field intensity from the potential. Capacitors and dielectrics. Electric current and resistance. Kirchhoff's rules for solving DC circuits. Magnetic field. Hall effect. Laws of Biot-Savart, Ampere and Faraday. Inductance and self-inductance. Magnetic properties of matter. Alternative currents, RL, CL and RCL circuits. Maxwell equations and electromagnetic waves

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face teaching
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	The Communication with students and the availability of the necessary material (notes, exercises, bibliography, etc.) is performed via the asynchronous learning system (ecourse)
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*	
STUDENT PERFORMANCE	

Activity	***Semester workload***
Lectures (Theory)	52
Tutorial Placements	13
Study of Bibliography	72
Self-Study	35
Written Exams	3
Course total	***175***

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.*	Written exams at the end of the course focusing on the understanding of the theory and ability to solve problems

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

- D. Halliday, R. Resnick, R. Walker, Fundamentals of Physics, Extended Version, Translation of 8th Edition, Vol.2, ISBN: 978-960-01-1594-9, Gutenberg Publications, 2013, Athens (Greek Edition)
- H.D. Young and R.A. Freedman, University Physics with Modern Physics, Translation of 11th Edition. Vol.2, (Electromagnetism-Optics) 2nd Greek Edition, ISBN 978-960-02-2473-3, Papazisis Publications, 2010, Athens
- R.A. Serway, J.W.Jewett, Physics for Scientists and Engineers, With Modern Physics, Translation of 8th American Edition, ISBN 978-960-461-509-4, Klidarithmos Publications, 2013, Athens (Greek Edition)