

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	School of Science		
<b>ACADEMIC UNIT</b>	Physics		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	<b>10EKO02</b>	<b>SEMESTER</b>	<b>6</b>
<b>COURSE TITLE</b>	<b>ELECTROMAGNETISM II</b>		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>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</i>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
Lectures (theory and exercises)		5	7
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Special Background		
<b>PREREQUISITE COURSES:</b>	No		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes, in the English language for Erasmus students		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uoa.gr/courses/PHYS127/">https://eclass.uoa.gr/courses/PHYS127/</a>		

## (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

Upon successful attendance and completion of the course, the student is able –in combination with the knowledge acquired by the Physics III and Electromagnetism I courses –to understand using numerous examples and applications, the principles of the fundamental electromagnetic interaction.

The course aims to:

Provide the student with the necessary mathematical skills in order to solve complex problems of electrodynamics resulting from the time dependent sources (moving charges and currents).

Usage of the above techniques to understand related dynamic phenomena of the production and propagation of electromagnetic waves.

### 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

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Others...

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The course aims at the following general competences:

Search for, analysis and synthesis of data and description of phenomena using the fundamental equations of electrodynamics (Maxwell equations)

Working independently

Production of free, creative and inductive thinking

Analytical and synthetic thinking

Critical thinking

Time management

Creativity

Self control skills

Meeting Deadlines and Keeping Schedules

Problem solving

### (3) SYLLABUS

- Applications of Maxwell's equations, electromagnetic potentials and Coulomb and Lorenz gauges.
- Maxwell's stress tensor, energy-momentum conservation.
- Electromagnetic waves in dielectrics and conductors, dispersion.
- Waveguides, resonant cavities and transmission lines.
- Electromagnetic radiation, electric and magnetic dipole radiation (Lienard-Wiechert potentials, fields from moving charges).
- Radiation reaction.

#### (4) TEACHING and LEARNING METHODS - EVALUATION


<p><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face	
<p><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Yes</p> <p>Electronic communication with the students using ICT (Information and Communications Technology), eclass platform</p>	
<p><b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i> <i>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.</i></p> <p><i>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</i></p>	<p><b>Activity</b></p>	<p><b>Semester workload</b></p>
	Lectures	52
	Exercises	13
	Individual Study/ Study and Analysis of bibliography / Preparation	80
	Writing reports/ essays	27
	Exams	3
	<b>Course Total</b>	<b>175</b>
<p><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Final written exams in Greek</p> <p>Homeworks with problems to solve</p>	

## (5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography (given through the EYDOXUS platform):

- Introduction to Electrodynamics, D. Griffiths, translated in Greek (2004) Ίδρυμα Τεχνολογίας και Έρευνας-Πανεπιστημιακές εκδόσεις Κρήτη (Κωδ. Ευδ. 22691598)

*Other*

- Classical Electrodynamics, J. D. Jackson (John Wiley & Sons inc.)
- Electromagnetism, G. L. Pollack, & D. R. Stump (Addison-Wesley)
-  Modern Electrodynamics, A. Zandwill (Cambridge University Press)