

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	School of Science		
<b>ACADEMIC UNIT</b>	Physics		
<b>LEVEL OF STUDIES</b>	Graduate		
<b>COURSE CODE</b>	M324	<b>SEMESTER</b>	2
<b>COURSE TITLE</b>	Physics Experiments in Education II		
<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>	
	3	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	General background		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>			

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>
<p><b>The course provides the students knowledge to plan and present an experiment on electromagnetism and physics of waves in the class. Specifically after the successful attendance of the course students should be in position:</b></p> <ul style="list-style-type: none"> <li>• <b>To plan an experiment of electromagnetism and wave physics with simple materials</b></li> <li>• <b>To select the proper instruments, to carry-out the experiment</b></li> <li>• <b>To analyze the experimental data, to calculate various quantities, to use tables and graphs</b></li> <li>• <b>To present the experiment and the results in the class</b></li> <li>• <b>To present the experimental data in a paper</b></li> </ul>

### 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...  
.....

Investigate, analysis and synthesis of an experiment and experimental results using the necessary technology  
Working independently  
Improvements of freedom, creative and inductive consideration.

### (3) SYLLABUS

Experiments concerning electromagnetism and physics of waves. Voltage, current, Resistance, Ohms law. Dependence of the Ohmic resistance from its geometric elements and the material. Synthesis of resistors, Kirchhoff's rules, potentiometer. Oscillator-measurements of DC and AC voltages, frequency, Lissajous. Study of electrical circuits RC, RL, RLC. Electrical oscillations. Experiment of Oersted, measure the magnetic field of the Earth, calculation of  $\mu_0$ . Study of the phenomena of reflection, refraction, measure of the refraction index of glass. Study of thin lenses, focus distance. Study of the phenomena of diffraction, Optical spectrometer, analysis of light.

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

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face to face														
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of the e-learning system, with uploaded notes, exercises for practice and communication with students.														
<b>TEACHING METHODS</b> <i>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</i>	<table border="1"><thead><tr><th><i>Activity</i></th><th><i>Semester workload</i></th></tr></thead><tbody><tr><td>Laboratory exercises</td><td>39</td></tr><tr><td>Preparation</td><td>26</td></tr><tr><td>Study of bibliography</td><td>25</td></tr><tr><td>Independent study</td><td>15</td></tr><tr><td>Essay writing</td><td>20</td></tr><tr><td>Course total</td><td><b>125</b></td></tr></tbody></table>	<i>Activity</i>	<i>Semester workload</i>	Laboratory exercises	39	Preparation	26	Study of bibliography	25	Independent study	15	Essay writing	20	Course total	<b>125</b>
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<b>STUDENT PERFORMANCE EVALUATION</b> <i>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.</i>	Oral examination, execution of experiment, presentation of the experimental results (50%) Final examination presentation of an experiment in the class.														

#### (5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Related academic journals:

- Εργαστηριακές ασκήσεις Ηλεκτρομαγνητισμού, Κ. Γ Ιωαννίδη, εκδ. Πανεπιστημιακό τυπογραφείο Πανεπιστημίου Ιωαννίνων.
- Εργαστηριακά πειράματα φυσικής 3 (ορατό φως-μικροκύματα-υπέρηχοι, Α. Α. Χριστοδουλίδη, Εκδ. Γ. Δούβαλης, Ε. Αποστόλου Ο.Ε. Ιωάννινα, 1998
- Σημειώσεις εργαστηρίου Κυμάνσεων και οπτικής, Σ. Κοέν, Α. Λύρας, Α. Οικιάδης, Π. Τσέκερης, Πανεπιστημιακό τυπογραφείο, Πανεπιστημίου Ιωαννίνων.