COURSE OUTLINE

(1) GENERAL

SCHOOL	NATURAL SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHYSICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**112**	**SEMESTER**	**6,8**
COURSE TITLE	MATHEMATICS FOR PHYSICISTS		

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**
	4	4
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*	Special 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=359

(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*

After the successful completion of the course, the student will be able to:

1. Develop techniques for the solution of mathematical problems that predominantly arise in physics.
2. Judge correctly and decide between the mathematical accuracy and the physical perspective.
3. Solve specific physical problems that will be employed in Classical and Quantum Physics at an advanced level.
4. Develop general techniques for mathematical solutions.

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
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and

Working independently	*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…*
	…….

Production of free, creative and inductive thinking. Working independently. Production of new research ideas.

(3) SYLLABUS

Finite linear vector spaces. Infinite linear vector spaces. Curved coordinate systems. Integral transformations. Conformal transformations. Distributions theory. Differential equations and classical functions. The Sturm-Liouville problem. Solution of differential equations through the Green method. Integral equations.

(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 the course web page on http://ecourse.uoi.gr to post notes, exercise sheets and to communicate with the students
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***
Lectures	39
Problem Solving	13
Study of Bibliography	25
Independent Study	20
Exams	3
Course total	***100***

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.*	Submission of homeworks every week for assessment. Presentations by the students on weekly basis. End-of-semester written exams (3 hours) on problem solving.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1) D. Logan, Εφαρμοσμένα Μαθηματικά, ΙΤΕ, Πανεπ. Εκδοσεις Κρήτης, 2010
2) Ι. Βέργαδος, Μαθηματικές Μέθοδοι Φυσικής, Τόμος Ι, ΙΤΕ, Πανεπ. Εκδοσεις Κρήτης, 2011

- Related bibliography:

3) F. W. Byron, Jr. and R. W. Fuller, Mathematics of Classical and Quantum Physics, Dover, 1969
4) Matthews & R. L. Walker, Mathematical Methods of Physics, Benjamin.
5) P. Dennery and A. Krzywicki, Mathematics for Physicists, Dover, 1995
6) G. B. Arfken & H. J. Weber, Mathematical Methods for Physicists, 6th edition, Elsevier Inc.