

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF SCIENCES		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF MATHEMATICS		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	MAE743	<b>SEMESTER</b>	7th Semester
<b>COURSE TITLE</b>	Introduction to Mathematical Physics		
<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	6	
<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>	Specialized general		
<b>PREREQUISITE COURSES:</b>	Classical Mechanics		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	GREEK		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	YES		
<b>COURSE WEBSITE (URL)</b>	<a href="http://users.uoi.gr/mxenos">http://users.uoi.gr/mxenos</a> <a href="http://www.math.upatras.gr/~maik/MF.html">http://www.math.upatras.gr/~maik/MF.html</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b>  <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>• Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</li> <li>• Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</li> <li>• Guidelines for writing Learning Outcomes</li> </ul>		
<p>The objectives of the course are:</p> <ul style="list-style-type: none"> <li>• Development of the theoretical background in matters relating to mathematical physics.</li> <li>• Ability of the student to apply the basic concepts of mathematical physics.</li> <li>• Upon completion of this course the student will be able to solve with analytical and approximate mathematical methods simple problems of mathematical physics and deepen further understanding of such methods.</li> </ul>		
<p><b>General Competences</b>  <i>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?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="vertical-align: top;"> <i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>  <i>Adapting to new situations</i>  <i>Decision-making</i>  <i>Working independently</i>  <i>Team work</i>  <i>Working in an international environment</i>  <i>Working in an interdisciplinary environment</i>  <i>Production of new research ideas</i> </td> <td style="vertical-align: top;"> <i>Project planning and management</i>  <i>Respect for difference and multiculturalism</i>  <i>Respect for the natural environment</i>  <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>  <i>Criticism and self-criticism</i>  <i>Production of free, creative and inductive thinking</i>            .....  <i>Others...</i>            .....         </td> </tr> </table>	<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> ..... <i>Others...</i> .....
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The course aims to enable the undergraduate students to develop basic knowledge of Mathematical Physics and in general of Applied Mathematics. The student will be able to cope with problems of Applied Mathematics giving the opportunity to work in an international multidisciplinary environment.

### (3) SYLLABUS

Short introduction of linear vector spaces, Vector spaces of infinite dimensions, The Sturm-Liouville problem, Orthogonal polynomials and special functions, Multi-dimensional problems, Operator Theory, Applications in modern Physics.

### (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>		
<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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	39 hrs
	Study of theory	78 hrs
	Home exercises	33 hrs
	Total	150 hrs
<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>	Written examination at the end of the semester (obligatory), Homework and / or midterm exam (optional).	

### (5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:  
- Related academic journals:

- Mathematical methods for physics, Volume 1, J.D. Vergados, 1st Edition. 2009 (in Greek).
- Applied mathematics, D.J. Logan, 1st Edition, 2010 (in Greek).