

## COURSE OUTLINE: MATHEMATICS I

### (1) GENERAL

<b>SCHOOL</b>	School of Economic Sciences		
<b>ACADEMIC UNIT</b>	Department of Accounting and Finance		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	AF102	<b>SEMESTER</b>	1 <sup>ST</sup>
<b>COURSE TITLE</b>	Mathematics I		
<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 and exercises		3	5
<b>TOTAL</b>		<b>3</b>	<b>5</b>
<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>	None		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes (upon request)		
<b>COURSE WEBSITE (URL)</b>			

### (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>• <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>Upon the successful completion of the course, the students will acquire knowledge and skills that will allow them to:</p> <ul style="list-style-type: none"> <li>• Understand the basic concepts of maths</li> <li>• Calculate limits and examine the continuity of functions</li> <li>• Understand the rules of differentiation of different types of functions</li> <li>• Familiarize with and use the basic theorems of Differential Calculus (Bolzano theorem, mean value theorem, Rolle theorem, De L' Hospital rules etc.)</li> <li>• Analyze the monotonicity of a function and calculate the local extrema</li> <li>• Examine functions with respect to curvature and find the asymptotes</li> <li>• Familiarize with the basic knowledge of integral calculus and integration rules</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> <p><i>Search for, analysis and synthesis of data and information, Project planning and management</i></p>

<i>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>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> .....
<ul style="list-style-type: none"> <li>• Investment evaluation</li> <li>• Search for, analysis and synthesis of data and information with the use of the necessary technology</li> <li>• Decision-making</li> </ul>	

**(3) SYLLABUS**

The course focuses on fundamental issues regarding differential and integral calculus of functions of a variable as well as the basic principles of linear algebra. It aims to educate students around the basic mathematical concepts and methodologies in order to be able to solve problems and exercises in specific areas of mathematics. Furthermore, it aims to provide students with the necessary mathematical knowledge needed in order to be able to understand the syllabus of other courses (economic theory, linear programming, production economics, agricultural economics, etc.) in the following semesters of their undergraduate studies and pursue postgraduate studies having conquered the basic knowledge.

Syllabus:

- Introductory concepts of functions, real functions and their characteristics, types of functions, graphs of functions
- Limits of a function, one-sided limits
- Continuity of functions, types of discontinuity
- Derivatives of functions and their applications
- Monotonicity and local extrema
- Curvature, turning points, asymptotic functions
- Integrals

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

<p><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face and distance learning	
<p><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	Use of the electronic platform e-class	
<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>	<b>Activity</b>	<b>Semester workload</b>
	lectures	15
	27	30
	exercises	45
	27	60
	written assignment	
	42	
	Independent study	
54		
Course total	<b>150</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>In order to provide students with options according to their preferences and personal time management, their performance evaluation takes place in three ways:</p> <ol style="list-style-type: none"> <li>I. <b>Reports (60%) and written assignment (40%).</b> Student participation in the reports is optional. Students are examined in every single unit of the course. Written assignment is also optional, but it requires intensive commitment to the course subject. Instructions on how to carry out the assignment as well as information about the submission deadline are announced on e-class.</li> <li>II. <b>Written assignment (40%) and final written exams (60%).</b> Written assignment is optional, but it requires intensive commitment to the course subject.</li> <li>III. <b>Final written exams (100%)</b> for students who neither opt for reports nor carry out a written assignment.</li> </ol> <p><b>Language of examination: Greek</b></p>	

(5) SUGGESTED BIBLIOGRAPHY

1. Κοντέος, Γ. & Σαριαννίδης, Ν. (2012), "Μαθηματικά", Κοζάνη, ISBN 978-960-93-3978-0.
2. Δημητρακούδης, Δ., Θεοδώρου, Ι., Κικίλιας, Π., Κουρής, Ν., Παλαμούρδας, Δ. (2002) «Διαφορικός - Ολοκληρωτικός Λογισμός», Εκδόσεις ΔΗΡΟΣ, Αθήνα.
3. Chiang A. (1997). Μαθηματικές Μέθοδοι Οικονομικής Ανάλυσης. Κριτική, Αθήνα. [ISBN:960-218-141-9]
4. Τσουλφίδης Λ. (1999). Μαθηματικά οικονομικής ανάλυσης: μέθοδοι και υποδείγματα. Gutenberg, Αθήνα. [ISBN: 978-960-01-0723-8]
5. K. Sydsæter, P. Hammond (2008) Essential mathematics for economic analysis. Pearson Education. [ISBN-10: 0273713248]
6. T. Bradley, P. Patton (2002) Essential mathematics for economics and business. J. Wiley [ISBN-10: 0470018569 ]