

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	School of Business		
<b>ACADEMIC UNIT</b>	Department of Tourism Economics and Management		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	<b>TO3017</b>	<b>SEMESTER</b>	<b>Winter</b>
<b>COURSE TITLE</b>	<b>MATHEMATICS</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		3	5
Laboratory Exercises		1	
<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>	NO		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	GREEK		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	NO		
<b>COURSE WEBSITE (URL)</b>	<a href="http://eclass.chios.aegean.gr/courses/DBA101/">http://eclass.chios.aegean.gr/courses/DBA101/</a>		

### (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>This is an introductory course to calculus. Calculus is a foundation course as it plays an important role in the understanding of science, economics, and other disciplines. This introductory course covers the basic concepts of limits, continuity, differentiation, integration and algebra. The aim of the course is to help students understand and apply mathematical concepts in real world problems.</p> <p>After completing this course, students should demonstrate competency in the following skills:</p> <ul style="list-style-type: none"> <li>• apply arithmetic and algebraic reasoning to solve problems</li> <li>• use limit definition and differentiation rules</li> <li>• be able to explain the concept of continuous functions</li> <li>• compute derivatives of polynomial and transcendental functions</li> <li>• apply differentiation to solve max or min problems</li> <li>• understand the concept of definite and indefinite integral</li> </ul>
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- compute definite and indefinite integrals
- interpret mathematical models and draw inference from them
- understand matrices and determinants
- understand basic economic functions
- comprehend the concept of rate of change and how to use it to solve real world problems
- Compute instantaneous rate of change

All above are aligned to Level 6 of European Qualification Framework

### 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?*

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

- ✓ Production of free, creative and inductive thinking
- ✓ Working independently
- ✓ Team work
- ✓ Decision-making
- ✓ Search for, analysis and synthesis of data and information, with the use of the necessary technology
- ✓ Working in an international environment
- ✓ Working in an interdisciplinary environment

All above are aligned to Level 6 of European Qualification Framework

### (3) SYLLABUS

- Real numbers
- Functions
  - Real functions
  - Composition of functions
  - Inverse Functions
  - Economic Functions (Supply & Demand Function, Consumption Function)
- Limits and continuity
  - Limits
  - Continuous Functions
  - Basic Theorems of Continuity
- Derivatives
  - Introduction to derivatives
  - Rules of differentiation
  - First and Second Derivative
  - Fundamentals Theorems of Calculus (Rolle's Theorem, The Mean's Value Theorem, Theorem of De L' Hospital)

- Graphing functions with calculus
- Applications of Derivatives to Economic Functions (Cost Functions, Income Functions)
- Integration
  - The definite and the indefinite integral
  - Techniques of Integration
  - Applications of integration in Economics
- Algebra
  - Definition of matrices and determinants
  - Multiplication of Matrices
  - Determinants
- Multivariable functions
  - Function of Several Variables
  - Partial Derivatives
  - The rule chain
  - Maximum and minimum points
  - Applications of multivariable functions at economics

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

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face to face lectures	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	<ul style="list-style-type: none"> <li>• Use of ICT in teaching (PPT presentations)</li> <li>• Communication with students via e-mail and e-class platform</li> <li>• Uploading course material on e-class system.</li> </ul>	
<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>  <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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	39
	Laboratory Exercises	13
	Practice Exercises	15
	Independent study	58
	<b>Course total</b>	<b>125</b>
<b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i>  <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>  <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	<ul style="list-style-type: none"> <li>• Evaluation of students takes place via written exams. Two options of evaluation are used: <ul style="list-style-type: none"> <li>○ 1<sup>st</sup> method: final exam paper</li> <li>○ 2<sup>nd</sup> method: two interim-exam papers; one at the end of 6<sup>th</sup> week of the semester and the other one at the end of the semester</li> </ul> </li> <li>• In special cases, for students with disabilities, evaluation takes place via oral exams</li> <li>• Language of evaluation: Greek</li> <li>• Multiple choice questions and questions of problem solving are used for evaluating learning outcomes</li> </ul>	

#### (5) ATTACHED BIBLIOGRAPHY

<p>- <i>Bibliography:</i></p> <ol style="list-style-type: none"> <li>1. Mavri, M., (2013). "Maths for economics and Business", Propobos Publications (in greek)</li> <li>2. Thomas, Finney, Weir, Giodano , (2012). "Calculus" University Editions of Crete</li> <li>3. Renshaw, G., (2009). "Maths for economics", 3rd Edition Oxford University Press</li> <li>4. Dowling, E., (1993). "Mathematical Methods for Business and Economics". McGraw-Hill Companies, Inc.</li> <li>5. Spivak, M. (2005). "Calculus", University Editions of Crete</li> <li>6. Marsden, J.E., Tromba, A.J., (2005). "Calculus", University Editions of Crete.</li> <li>7. Strang, G. (2002). "Algebra", University Editions of Crete.</li> <li>8. Fragkou, D.V., (2005). «Exercises for Single Variable Function», 3<sup>rd</sup> Edition, Ziti Publications, (in greek).</li> </ol>
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9. Athanasiadis, G.A., Fragkou, D.V., (2002). «Caluclus Exercises», Ziti Publications (in greek).