

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	School of Applied Economics and Social Sciences		
<b>DEPARTMENT</b>	Department of Regional and Economic Development		
<b>LEVEL OF COURSE</b>	Undergraduate		
<b>COURSE CODE</b>	ΠΟΑ1108	<b>SEMESTER</b>	2ο
<b>COURSE TITLE</b>	Mathematics for Economists II		
<b>INSTRUCTOR</b>	Spyridon Tsangaris		
<b>Office Hours</b>			
<b>email</b>	tsangarisp@aua.gr		
<b>INDEPENDENT TEACHING ACTIVITIES</b> 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		<b>WEEKLY TEACHING HOURS</b>	<b>ECTS CREDITS</b>
		5	5
<b>COURSE TYPE</b> <i>general background, special background, specialized general knowledge, skills development</i>	Specialized General knowledge		
<b>PREREQUISITE:</b>	-		
<b>TEACHING AND ASSESSMENT LANGUAGE:</b>	Greek		
<b>THE COURSE IS OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBPAGE (URL)</b>	<a href="https://oeclass.aua.gr/eclass/courses/4952/">https://oeclass.aua.gr/eclass/courses/4952/</a>		

## 2. LEARNING OUTCOMES

### Learning outcomes

The course learning outcomes, specific knowledge, skills, and competencies 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

### 1) Knowledge

- Attain a thorough understanding of sequences and series.
- Develop a solid understanding of linear algebra.
- Develop a solid understanding of mathematical optimization, including the concepts of objective functions, decision variables, and constraints.

### 2) Skills

- Apply linear algebra techniques to economic problems, such as analyzing input-output models, and solving systems of linear equations.
- Perform basic operations on matrices, such as addition, subtraction, scalar multiplication, matrix multiplication, and its properties.
- Apply optimization techniques to real-world problems in economics and management.
- Students will be skilled in quantitative reasoning and critical thinking, allowing them to evaluate economic arguments.
- Analytical and critical thinking skills in formulating and solving optimization problems.

### 3) Capabilities

- Solve economic problems, which may involve optimizing an objective function subject to linear constraints.
- Solve linear programming problems.
- Apply linear algebra techniques to perform empirical estimation using econometric models.

### General Competences

Taking into consideration the general competencies that the degree holder must acquire (as these appear in the Diploma Supplement and appear below), 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

Teamwork

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...

- Decision-making
- Searching for, analyzing, and synthesizing data and information, with the use of necessary technology.
- Decision making
- Promotion of free, creative, and inductive thinking

### 3. CONTENT OUTLINE

<p><u>Part 1</u></p> <ul style="list-style-type: none"> <li>Sequences</li> <li>Series</li> <li>Convergence criteria, Power Series</li> <li>Taylor series</li> <li>Economic applications (Present value of cash flows)</li> </ul> <p><u>Part 2</u></p> <ul style="list-style-type: none"> <li>Introduction to linear algebra</li> <li>Matrices and Matrix Operations</li> <li>Determinants</li> <li>Matrix inversion</li> <li>Systems of Linear Equations</li> <li>Eigenvalues and Eigenvectors</li> <li>Economic applications (Input-Output analysis)</li> </ul> <p><u>Part 3</u></p> <ul style="list-style-type: none"> <li>Constrained optimization: Lagrange multipliers</li> <li>Envelope theorem</li> <li>Karush–Kuhn–Tucker conditions</li> <li>Linear programming</li> <li>Economic applications (Consumer Behavior)</li> </ul>
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### 4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD <i>Face-to-face, Distance learning, etc.</i>	Face-to-face lectures	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, and communication with students</i>	<ul style="list-style-type: none"> <li>Using Excel, Mathematica, and open-source programs to plot functions.</li> <li>Support Learning through the e-class platform.</li> <li>Communicating with students using Zoom, Microsoft Teams, and Skype.</li> </ul>	
TEACHING ORGANIZATION <i>The manners 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>	Δραστηριότητα	Φόρτος Εργασίας Εξαμήνου
	Lectures	65
	Theory study	27
	Exercises	33
	Total number of hours	125

STUDENT PERFORMANCE EVALUATION	
<p><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 the 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>	<ul style="list-style-type: none"> <li>• Final written exam</li> <li>• Optional midterm exam</li> <li>• Attendance and Class Participation</li> </ul>

## 5. READING LIST

<ul style="list-style-type: none"> <li>• Chiang, C. A., &amp; Wainwright, K. (2009). Μαθηματικές Μέθοδοι Οικονομικής Ανάλυσης. Εκδόσεις Κριτική.</li> <li>• Chiang, C. A., &amp; Wainwright, K. (2004). <i>Fundamental Methods of Mathematical Economics</i>. McGraw Hill.</li> <li>• Ξεπαπαδέας, Α., &amp; Γιαννίκος, Ι. (2011). Μαθηματικές Μέθοδοι στα Οικονομικά. Εκδόσεις Gutenberg.</li> <li>• Κατερίνης, Π., &amp; Φλυτζάνης, Η. (2020). Ανώτερα Μαθηματικά. Εκδόσεις Μπένου.</li> <li>• Λουκάκης, Μ. (2016). Πρόσκληση στα Μαθηματικά Οικονομικών και Διοικητικών Επιστημών, (τόμος Β'). Εκδόσεις Σοφία.</li> </ul>
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