

SYLLABUS

1. General

College	College of Applied Economic and Social Sciences		
Department	Regional and Economic Development		
Level of Studies	Undergraduate		
Couse Code	ΠΟΑ3528	Semester	5 ^ο
Course Title	Quantitative Methods in Economics		
Faculty Name	Marina Selini Katsaiti		
Office Hours	Monday Wednesday 12-1 pm and by appointment		
email	MsKatsaiti@aua.gr		
INDEPENDENT TEACHING ACTIVITIES where credit is awarded for discrete parts of the course e.g. lectures, laboratory exercises, etc. If credit is awarded for the whole course, indicate the weekly teaching hours and the total number of credits		WEEKLY CONTACT HOURS	ECTS
		5	5
COURSE TYPE Background, General Knowledge, Scientific Area, Skills Development	Major Course		
Prerequisites	-		
Language of instruction and examinations	Greek		
Course Offered to Erasmus Students	No		
Course Webpage	https://oeclasseaua.gr/eclasse/		

2. COURSE LEARNING OUTCOMES

Learning Outcomes	
<ul style="list-style-type: none"> The learning outcomes of the course describe the specific knowledge, skills and competences of an appropriate level that students will acquire after successful completion of the course. 	
At the end of this course students will be able to:	
1.	1.
2.	Use mathematical methods of dynamic optimization in economic problems.
3.	Know the mathematical techniques for solving optimal control problems.
4.	Model an optimal control problem and study it in detail.
5.	Know the mathematical terminology and mathematical tools that answer the needs of economics.
6.	Understand the important concepts of economic theory using mathematical methods.
7.	To use mathematical methods in economic modeling/standardization.
8.	Develop various strategies for solving economic problems.
General skills	
Taking into account the general competences that the graduate should have acquired (as listed in the Diploma Supplement and listed below), which one(s) does the course aim at?	
Search, analysis and synthesis of data and information, including the use of the necessary technologies	Project planning and management
Adaptation to new situations	Respect for diversity and multiculturalism
Decision-making	Respect for the natural environment
Autonomous work	Demonstrating social, professional and ethical responsibility and gender sensitivity
Group work	Exercise of criticism and self-criticism
Working in an international environment	Promotion of free, creative and deductive thinking
Working in an interdisciplinary environment	
Generating new research ideas	
<ul style="list-style-type: none"> Generating new research ideas Search, analysis and synthesis of data and information, using the necessary technologies Working in an interdisciplinary environment Using different ways of thinking (e.g. inductive, productive) 	

3. COURSE CONTENT

The course "Quantitative Methods in Economics" is a continuation of the course "Mathematics for Economists II". In particular:

Part 1

- 4. - Introductory Mathematical Concepts
- 5. - Introductory Introduction to Mathematics
- 6. - Mathematical Modelling
- 7. - Applications: demand, supply, cost, revenue
- 8. - More math about the straight line

Part 2

- 9. - Solving systems of linear equations
- 10. - Equilibrium and breakeven
- 11. - Consumer and producer surplus
- 12. - Other applications in economics
- 13. - Secondary, cubic and other polynomial functions
- 14. - Exponential functions

Part 3

- 15. - Numerical and geometric progressions and series
- 16. - Simple interest, compound interest and annual percentage rates
- 17. - Net present value

Part 4

- 18. - Slope of a curve and derivation
- 19. - Applications of derivation, limit functions, mean functions
- 20. - Arithmetic of functions of one variable

- 21. - Economic applications of maximum and minimum points
- 22. - Curvature and other applications
- 23. - Elasticity and derivation
- 24. - Partial derivation
- 25. - Applications of partial derivation
- 26. - Unconstrained optimization
- 27. - Arithmetic with constraints and Lagrange multipliers
- Part 5
- 28. - Integration as inverse of derivation
- 29. - The power rule in integration
- 30. - Integration of the natural exponential function
- 31. - The definite integral and the area under a curve
- 32. - Consumer and producer surplus
- 33. – Matrix Algebra

Preparing students for the exams

34. TEACHING AND LEARNING METHODS - ASSESSMENT

METHOD OF DELIVERY Face-to-face, Distance learning, etc.	Lectures and meetings with students	
USE OF TECHNOLOGY, INFORMATION AND COMMUNICATION <i>Use of ICT in teaching, laboratory training, communication with students</i>	<ul style="list-style-type: none"> - The use of excel and the processing of complex relationships and graphs (use of Mathematica/open source programs). - Use of PowerPoint for lectures and eClass. - Email contact with students for clarifications about the course either directly or via video conferencing (Zoom, Microsoft Teams, Skype). 	
ORGANISATION OF TEACHING <i>The way and methods of teaching are described in detail.</i> Lectures, Seminars, Laboratory Exercise, Field Exercise, Study & Analysis of Literature, Tutorials, Practical (Placement), Clinical Exercise, Artistic Workshop, Interactive teaching, Educational visits, Study visits, Project work, Writing of work / assignments, Artistic creation, etc. <i>The student's study hours for each learning activity as well as the hours of unguided study are indicated so that the total workload at semester level corresponds to the ECTS standards.</i>	Activity	Workload
	Lectures	65 hours
	Study of course material (material taught)	27 hours
	Exercises and practice of in economic applications	33 hours
	Course Total	125 hours
STUDENT ASSESSMENT <i>Description of the evaluation process</i> <i>Language of Assessment, Assessment Methods, Formative or Inferential, Multiple Choice Test, Short Answer Questions, Test Development Questions, Problem Solving, Written Work, Report, Oral Examination, Oral Examination, Public Presentation, Laboratory Work, Clinical</i>	<ul style="list-style-type: none"> - Final written examination without the use of books or notes (Problem Solving). - Optional written progress and quiz during the semester. - Students' attendance and active participation during lectures is taken positively in their evaluation. 	

<p><i>Examination of a Patient, Artistic Interpretation, Other</i></p> <p><i>Explicitly identified assessment criteria are stated and if and where they are accessible to students.</i></p>	<p>- The assessment criteria (and their rationale) are developed during the lectures, which is also the time (in the last lectures of the semester) when students are prepared for the exams.</p>
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35. BIBLIOGRAPHY

Main Textbooks (all in Greek):

- T. Bradley (2014), "Mathematics for Economics and Management", Kritiki Publications

Indicative bibliography for further reading:

- A. Chiang, K. Wainwright (2009), "Mathematical Methods for Economic Analysis", Critical Publications
- M. Hoy, J. Livernois, C. McKenna, T. Stengos, R. Rees, I. Kiritsis (Editors) (2013), 'Mathematics of Economics', Gutenberg Publications, Gutenberg Publications, K. Kriang (2013).
- M. Loukakis (2016), "Invitation to Mathematics of Economics and Management Sciences" (Volume B'), Sophia Publications
- A. Xepapadeas, I. Giannikos (2011), "Mathematical Methods in Economics", Gutenberg Publications
- During the lectures additional educational material from the Greek and foreign literature is used.