1. BASIC INFORMATION

Course	Mathematics for Economics I
Degree program	Economics
School	Economic, Business and Communication Sciences
Year	**First**
ECTS	6
Credit type	Basic
Language(s)	English
Delivery mode	**Campus-based**
Semester	First semester
Academic year	2025-2065
Coordinating professor	Marina Delgado

2. PRESENTATION

Mathematics is essential for economics students, providing the necessary foundations to understand economic concepts and solve problems. From a practical, case-based approach, students will develop skills in algebra, calculus, and geometry, enabling them to model and analyze economic scenarios rigorously.

3. COMPETENCIES AND LEARNING OUTCOMES

Knowledges:

- CON02. Identify the most relevant economic indicators using mathematical models.
    - Identify a mathematical problem based on the observation of economic reality.
    - Identify situations within a logical framework to propose appropriate calculation solutions for the economic world.

Skills:

HAB02. Solve problems and cases using data analysis techniques and tools, identifying patterns, trends, and predictions for economic decision-making.

- Develop analytical methods based on proposed theoretical frameworks in economics.
- Use basic quantitative methods tools by solving cases in a specific economic context.
- Graphically represent mathematical problems involving real functions of variables through posed problems.

Competencies:

COMP05. Analyse and evaluate macroeconomic information in new competitive environments for strategic business decision-making.

COMP08. Solve economic problems using calculus, graphical methods and mathematical analysis
COMP15. Identify and analyse the economic aspects of globalisation linked to: internationalisation of companies, foreign trade and global economy.

4. CONTENT

1. Linear and non-linear equations.
2. Matrices, determinants, range and calculus of the inverse.
3. Limits and continuity of functions of one and several variables. Homogeneous, composite and implicit functions.
4. Calculation of derivatives. Economic interpretation of the derivative of a linear, partial, scalar and vector function.
5. Jacobian and Hessian gradients.
6. Differentiability of functions and differentiation with derivability. Derivatives of composite and implicit function. Introduction to integral calculus and differential equations.

5. TEACHING-LEARNING METHODOLOGIES

The following teaching-learning methodologies will be applied:

- Lecture-based learning.
- Case method.
- Cooperative learning.
- Problem-based learning.
- Workshop-based learning.

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Assessment system	Weight
Masterclasses	8
Practical application seminars	22
Analysis of cases	20
Troubleshooting	16
Written reports	6
Self-employment	56
Debates and colloquiums	8
Tutoring	12
Face-to-face assessment tests	2

TOTAL	150

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
On-site evaluation tests	50 %
Cases / Problems by deliverables and tests	30 %
Group work	20 %

7.1. First exam period

To pass the course in the first exam period, you must obtain a final course grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of at 5.0 in the final exam for it to count towards the final grade along with all the grades corresponding to the other activities.

7.2. Second exam period

To pass the course in the second exam period, you must obtain a final grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of 5.0 in the final exam for it to count towards the final grade along with all the grades corresponding to the other activities.

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course, as well as the delivery dates:

Assessable activities	Deadline
Activity 1- 2	Week 1 to 5
Activity 2- 4	Week 6 to 10
Activity 3- 5	Week 11 to 18
Face-to-face evaluation tests	Week 16-18

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

The main reference work for this subject is:

- Sydsæter, K., & Hammond, P. J., & Strom, A., & Carvajal, A. (2021). *Essential mathematics for economic analysis*. Sixth Edition. Pearson Education.

The recommended Bibliography is:

- Anthony, M., & Biggs, N. (2024). *Mathematics for economics and finance: methods and modelling*. Cambridge University Press.
- Mavron, V. C., & Phillips, T. N. (2023). *Elements of mathematics for economics and finance*. Springer Nature.

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.
 From this unit we offer to our students:
1. Accompaniment and follow-up by means of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunities for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:
orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the "surveys" section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.