1. BASIC INFORMATION

Course	Mathematics
Degree program	Global Bachelor Degree in International Business
School	Social Sciences and Communication
Year	First course
ECTS	6
Credit type	Basic
Language(s)	English
Delivery mode	On-Campus
Semester	First semester
Academic year	2025-2026
Coordinating professor	Rafael Escalera Rivas
Professor	Rafael Escalera Rivas

2. PRESENTATION

Mathematics is a first-semester freshman course that covers a variety of fundamental topics, including what is commonly known as Calculus of one and several variables, Linear Algebra, and Linear Programming. Its primary objectives are to help students to develop a good understanding of fundamental mathematical concepts, and to improve their problem-solving skills. The course will provide them with many useful mathematical tools required in economic analysis and widely used in subsequent subjects of their degree program.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CB1/BS1: Students must demonstrate a deep knowledge and understanding of a field of study that is based on secondary education and that, whilst supported by advanced textbooks, involves acquaintance with the vanguard of their area of study.
- CB2/BS2: Students must apply their knowledge to their work and vocation in a professional way and must demonstrate their skills in sustaining arguments and solving problems within their field of study.
- CB3/BS3: Students must be able to gather data, usually within their field of study, interpret it and make judgments and considerations on relevant social, scientific or ethical issues.
- CB4/BS4: Students must be able to convey information, together with ideas, problems and solutions to a specialized or non-specialized audience.
- CB5/BS5: Students must have developed the necessary learning skills so as to undertake subsequent studies with autonomy.

Cross-curricular competencies:

- CT1/CS1. Self-learning skills: The ability to choose the most effective strategies for controlling our own learning environment and acting autonomously throughout the learning process.
- CT4/CS4. Analysis and synthesis skills: Being able to break down complex situations into their constituent parts, and also to assess other alternatives and approaches in order to find the best solutions. Synthesis seeks to reduce complexity in order to facilitate understanding and/or problem solving.
- CT5/CS5. Capacity to apply knowledge: Being able to use knowledge acquired in academic contexts in situations that resemble as closely as possible the reality of the chosen future profession.
- CT8/CS8. Information management: The ability to find, select, analyze and integrate information from different sources.
- CT13/CS13. Problem solving: The ability to resolve a confusing issue or a complicated situation that stands in the way of achieving a goal and where there is no predefined solution.
- CT17/CS17. Teamwork: The ability to actively participate and cooperate with other people, areas and/or organizations to achieve common goals.

Specific competencies:

- CE8/SS8: Capacity to use the management tools available in the area of administration and finance, in the context of international business.
- CE10/SS10: Ability to use the tools available in the area of production management including planning, sales forecasting, inventory management and quality control of the production process.
- CE20/SS20: Ability to use the mathematical tools and basic methods of calculation, algebra and programming necessary to solve economic problems.

Learning outcomes:

Upon successful completion of the course, the student will be able to:

- LO1: Understand basic terms and concepts related to linear algebra, differential calculus and financial mathematics.
- LO2: Analyze and work out problems related to linear algebra, differential calculus and financial mathematics, which demonstrate an understanding of the theoretical concepts.

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CB1, CB2, CB4, CB5, CT1, CT4, CT5, CT17, CE8, CE10.	**LO1**: Understand basic terms and concepts related to linear algebra, differential calculus and financial mathematics.
CB1,CB2, CB3, CB4, CB5, CT1, CT4, CT5, CT17, CE8, CE10, CE20.	**LO2**: Analyze and work out problems related to linear algebra, differential calculus and financial mathematics, which demonstrate an understanding of the theoretical concepts

4. CONTENT

- Linear Algebra: Systems of equations and matrix analysis
- Analysis of functions
- Differential and integral calculus
- The fundamentals of financial calculus
- Mathematical programming: Constrained optimization problems

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Master Class
- Case Studies
- Cooperative learning
- Problem Based Learning (PBL)

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:

Learning activity	Number of hours
Master Classes	40 h
Problem solving sessions	35 h
Case study analysis	15 h
Group and collaborative activities and projects	20 h
Formative assessment	10 h
Tutoring	10 h
Autonomous Work	20 h
TOTAL	**150h**

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
Case analysis and problem solving	30%
Written reports	20%
Comprehensive knowledge exams	50%

You'll find a description on Virtual Campus of each assessment activity that has to be completed, as well as delivery deadline and assessment procedure for each one.

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 4 in both partial exams (Calculus and Algebra) and an average greater or equal than 5 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 at 5 in the final exam for it to count towards the final grade along with all the grades corresponding to the other activities. At least 2 points must be earned in the calculus part and 2 in algebra part.

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:

Assessable activities	Deadline
Activity 1	Week 1-7
Activity 2	Week 8-13
Activity 3	Week 14-17
Exams	Week 16

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:

- DAVID, C.L. *Linear Algebra and its Applications.* Addison Wesley, 2006.
- LARSON R., HOSTETLER R. P., EDWARDS B.H. *Calculus of a single variable*. Brooks Cole, 2009.

The recommended Bibliography is:

- BALBÁS, A., et al. *Análisis matemático para la economía (Tomos I y II):* Editorial AC, 1988.
- BALBÁS, A., et. al. *Programación matemática.* Editorial AC, 1990.
- BORBOLLA, R: *Optimización, cuestiones, ejercicios y aplicaciones a la economía*. Prentice Hall, 2000.
- SYDSAETER,K, HAMMOND, P. *Essential Mathematics for Economic Analysis,* 4th Edition. 2012.

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.

12. USE OF IA REGULATION

The student must be the author of his/her work/activities.

The use of Artificial Intelligence tools (AI) must be authorized by the teacher in each assignment/activity, indicating in what way it uses are permitted. The teacher will inform in advance in which situations AI tools may be used to improve spelling, grammar and editing in general. The student is responsible for clarifying the information given by the tool and duly declaring the use of any AI tool, according to the guidelines given by the teacher. The final decision on the authorship of the work and the appropriateness of the reported use of an AI tool rests with the lecturer and those responsible for the degree.