

**COURSE DATA****Data Subject**

Code	36109
Name	Mathematics I
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. Period
1316 - Degree in Economics	Faculty of Economics	1 First term

Subject-matter

Degree	Subject-matter	Character
1316 - Degree in Economics	7 - Mathematics	Basic Training

Coordination

Name	Department
CASASUS ESTELLES, TRINIDAD	257 - Business Mathematics

SUMMARY

Mathematics I is a 6 credits basic training course in the first year, first semester of Economics degree.

This course examines the basic mathematical tools for description, analysis and quantitative understanding of the economic environment and decision-making in the firm, providing to the student the concepts, techniques and basic mathematical tools to successfully face up the degree.

These contents include a review of matrix algebra, the study of functions of one and several variables: trend, continuity and marginal analysis, and introductions to integral calculus and differential equations.

PREVIOUS KNOWLEDGE



Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Prior knowledge corresponding to first and second high school in the field of humanities and social sciences are assumed.

OUTCOMES

1316 - Degree in Economics

- Be able to collect and analyse information.
- Have decision-making skills and be able to apply knowledge to practice.
- Be able to work in a team (including interdisciplinary teams).
- Be able to learn autonomously.
- Be able to use ICTs.
- Apply the principles of economic analysis (rational decision) to the diagnosis and resolution of problems.
- Understand and apply the scientific method, which involves formulating hypotheses, deducing verifiable results and contrasting them with empirical and experimental evidence.
- Know and understand the basic quantitative tools for economic analysis, diagnosis and prospection, such as mathematics, statistics and econometrics.

LEARNING OUTCOMES

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To pass the course the student must demonstrate the acquisition of the following skills:

- Management of basic quantitative tools and their application to economic environment.
- Search, selection and evaluation of appropriate information for analysis.
- Ability to select a theoretical framework for the development of analysis.
- Increased ability to use the logical thinking to address real situations of the economic world.



DESCRIPTION OF CONTENTS

1. Basics of Algebra

Linear and non-linear equations systems. Matrices, determinants, range and inverse matrix.

2. Limits and continuity of functions

Topology concepts in \mathbb{R}^n . Functions of one and several variables: homogenous function, composite function and implicit function. Graphs of functions. Level curves. Concepts of limit and continuity.

3. Derivability of functions

Definition and economic interpretation of the derivative of a real function. Calculation of derivatives. Definition and economic interpretation of partial derivatives of scalar and vectorial functions. Higher order derivatives of functions of one or several variables. Gradient, Jacobian and Hessian.

4. Differentiability of functions

Differentiability of functions. Relationship among the concepts of continuity, derivability and differentiability. Directions of increasing of a function. Derivative of the composite function. Derivative of the implicit function.

5. Introduction to integral calculus and differential equations

Basic techniques of integration. Riemann integral: integrability conditions and Barrow's rule. Improper integrals. Introduction to differential equations.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Classroom practices	30,00	100
Study and independent work	40,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	5,00	0
Preparation of practical classes and problem	25,00	0
TOTAL	150,00	

TEACHING METHODOLOGY

The teaching methodology to carry out the objectives is based on theory and practice in which the teacher will encourage the use of mathematical and symbolic language and rigorous and systematic reasoning, and promote self-study both individually and as a team.

In the lectures the professor highlights the main aspects of each topic, solve examples and guide the study of the student through the materials available in the "aula virtual" and basic bibliography. The explanations will be combined with the involvement of the students through the discussion of exercises and brief questions raised by the teacher. After the class, the materials needed for the next class will be indicated, so that the student can prepare the next session. It is intended that the student develops his/her ability to self-study (with the pre-class work) and his/her ability to argue rigorously using mathematical and symbolic language.

Additionally to these classes, practical classes are carried out to analyze business problems with exercises and activities to show how to define, solve and expose systematically complex problems.

The Professor solves problems and proposes others for subsequent classes so that each class the student will be able to raise the proposed problems and clearly defend a method of resolution. The planning of practical activities (number, characteristics and location in the course schedule) will be presented in the first class of each group and course, and published in the "Aula Virtual" (<http://aulavirtual.uv.es>).

The previous theoretical and practical study may result in deliveries of problems or test which are subject to evaluation by the teacher during the semester.

EVALUATION



The evaluation of the course consists on the following parts:

1. Written exam in the day officially announced. In this exam, the student will be evaluated on the specific competences over the course content and application (maximum mark 7 points).
2. Continuous evaluation of the student which will assess the achievement of general competences and the degree of participation of the student in the process of teaching and learning by doing exercises (maximum mark 3 points). These activities can be retaken.

To pass the course the written exam must be overcome. The final mark is the sum of the written exam mark plus the continuous evaluation mark. In case of not passing the written exam, the final mark will be a maximum of 4.5. Logically, to pass the course the student must obtain a final mark greater than or equal to 5 points

REFERENCES

Basic

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Additional

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