COURSE DATA

Data Subject	
Code	35882
Name	Mathematics
Cycle	Grade
ECTS Credits	6.0
Academic year	2024 - 2025

Study (s)

Degree	Center	Acad. year	Period
1314 - Degree in International Business	Faculty of Economics	1	First term

Subject-matter

Degree	Subject-matter	Character
1314 - Degree in International Business	6 - Mathematics	Basic Training

Coordination

Name	Department
JUAN MARTINEZ, MARIA DEL CARMEN	257 - Business Mathematics

SUMMARY

Mathematics is a one semester foundation course in basic mathematics for business placed in the first term (September-January) of the first year of the Degree in International Business.

This course is concerned with the essential mathematics for the quantitative description, analysis and comprehension of economic environment and for making business decisions. Moreover, it provides the basic concepts, techniques and mathematical tools for dealing with the other courses of this Degree.

Contents include matrix algebra, functions of one and several variables: tendency, continuity and differentiability, and an introduction to mathematical programming and integral calculus.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

The only prerequisite is standard elementary calculus, linear algebra and differentiation of functions of one variable.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1314 - Degree in International Business

- Develop the capacity to evaluate and critically analyse international economic phenomena and agents.
- Be able to work in multidisciplinary and intercultural teams.
- Know how to use the statistical methods and software to manage the company's operations.
- Use the economic and financial information of the company to make decisions.
- Develop the capacity to prepare and defend reports that contribute to the decision-making of public and private agents.
- Utilizar rigurosamente el lenguaje matemático y el razonamiento lógico-deductivo en la formulación de los fenómenos económico-empresariales.
- Aprender a razonar de una forma rigurosa y sistemática, adoptando una actitud emprendedora para la solución de nuevos problemas complejos.
- Resolver problemas mediante la aplicación de las matemáticas, utilizando un lenguaje simbólico.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

To pass the course, the student must show his knowledge of the elementary mathematical concepts, techniques and tools required to deal with the rest of the Degree. Among others: matrix algebra; how to solve systems of equations; continuity, derivability and differentiability of functions of one or several variables; calculus and economic interpretation of partial derivatives of functions of several variables; and calculus of Riemman’s and improper integrals.

DESCRIPTION OF CONTENTS

1. Basics of algebra

Systems of linear and nonlinear equations. Matrices, determinants and inverse matrices.

2. Limits and continuity of functions

Introduction to the topology of Rn. Functions of one and more variables: homogeneous, composite and implicit functions. Graphs of functions: level curves. Concepts of limit and continuity.

3. Derivability of functions

Definition and economic interpretation of the derivative of functions of one variable. Rules for differentation. Definition and economic interpretation of the partial derivatives of real and vector valued functions of several variables. Higher-order derivatives of real- and vector-valued functions of several variables. Differential vector and matrix and hessian matrix.

4. Differentiability of functions

Differentiability of functions. Relation between continuity, derivability and differentiability. Directions of maximum growth of a function.

5. Introduction to mathematical programming

Formulation of a problem of mathematical programming. Type of problems. Modelling.

6. Introduction to integral calculus

Techniques of integration. Riemann integral. Existence of the definite integral and Barrow's rule. Improper integrals.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Classroom practices	30,00	100
Study and independent work	40,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	3,00	0
Preparation of practical classes and problem	25,00	0
Resolution of case studies	7,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

The learning methodology consists of **lectures** and **practice sessions**, where the teacher encourages students in the use of mathematical and symbolic language and logic and systematic thinking and he/she promote the individual and team private study learning.

In the **lectures** the lecturer explains the major topics, illustrate and clarifies definitions and theorems using completely worked out examples, and assists students in their self-study learning and use of the bibliography. The lecturer's explanations will be combined with the students' participation in class through small questions and exercises designed for the discussion of frequent doubts. At the end of the class, the lecturer will give guidelines and homework to prepare next class at home. The aim is that the student develops his/her capacity for self-study and self-learning and for expressing formally using mathematical and symbolic language.

In the **practice sessions** the lecturer shows the main economic and business applications of the topics developed in the lectures and encourages students in the definition, solution and formal discussion of complex problems. The lecturer will solve worked out problems and he/she will propose the preparation of new ones for the next classes. Thus, each student will be able to formulate problems and propose and justify his/her method of resolution.

The study and/or posterior development of lectures and practice sessions will generate **written assignments** and **class and homework tasks** which will be taken into consideration in the continuous assessment of student.

EVALUATION

The evaluation of the course is based on a system consisting of the following parts:

1. **Written exam** in the day officially announced. In this exam, the estudent will be evaluated on the specific competencies over the course content and application (maximum mark 7 points).

2. **Continuous evaluation** of the student which will assess the achievement of general competencies 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 plus the continuous evaluation mark. Logically, to pass the course you must obtain a final mark greater than or equal to five (5).

REFERENCES

Basic

- Calvo, C. e Ivorra, C. (2012). Las Matemáticas en la Economía a través de ejemplos en contextos económicos. Ed. Tirant lo Blanch. Valencia.
- Haeussler, E. F. y Paul, R. S. (2002). Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences. 10th Edition. Prentice Hall.
- Ivorra, C. (2007). Matemáticas Económico-Empresariales. Laboratori de Materials, 2. PUV.
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- Sydsaeter, K. y Hammond, P. J. (2006). Essential Mathematics for Economic Analysis. 2nd Edition. Prentice Hall

Additional

- Sydsaeter, K. y Hammond, P. J. (2006). Essential Mathematics for Economic Analysis. 2nd Edition. Prentice Hall
- Alegre, P. et al. (1991). Ejercicios Resueltos de Matemáticas Empresariales. Ed. AC. Vol. 1 y 2
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- Casasús, T. et al. (1991). Matemáticas Empresariales. Ed. La Nau Libres.
- Muñoz, F.; Guerra, C. et al. (1988). Manual de Álgebra Lineal. Ed. Ariel.