COURSE DATA

Data Subject

Code	35816
Name	Mathematics I
Cycle	Grade
ECTS Credits	6.0
Academic year	2024 - 2025

Study (s)

Degree	Center	Acad. year	Period
1313 - Degree in Business Management and Administration	Faculty of Economics	1	First term
1330 - Degree in Business Management and Administration (Ontinyent)	Faculty of Economics	1	First term
1921 - Double Degree Program BMA and Law	Faculty of Law	1	First term
1926 - Double Degree Program Tourism and BMA	Faculty of Economics	1	First term

Subject-matter

Degree	Subject-matter	Character
1313 - Degree in Business Management and Administration	15 - Mathematics	Basic Training
1330 - Degree in Business Management and Administration (Ontinyent)	15 - Mathematics	Basic Training
1921 - Double Degree Program BMA and Law	1 - Year 1 compulsory subjects	Basic Training
1926 - Double Degree Program Tourism and BMA	1 - Asignaturas de formación básica de primer curso	Basic Training

Coordination

Name	Department
DOMINGO JUAN, MARIA CARMEN	257 - Business Mathematics
LINO SORLI, MARIA DEL PILAR	257 - Business Mathematics
SAEZ MORENO, JUAN ANTONIO	257 - Business Mathematics

SUMMARY

Mathematics I is a one-semester foundation course in basic mathematics for business placed in the first term of the first year of the Degree in Business Management and Administration and has 6 credits.

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: limits, continuity and marginal analysis, and an introduction 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 year in high school in the field of humanities and social sciences are assumed.

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

1313 - Degree in Business Management and Administration

- Demonstrate capacity for analysis and synthesis.
- Have organisation and planning skills.
- Demonstrate oral and written communication skills in the native language.
- Be able to use English in a professional environment.
- Be able to analyse and search for information from different sources.
- Be able to solve problems.
- Be able to negotiate and reconcile interests effectively.
- Be able to transmit and communicate complex ideas and approaches to both specialised and lay audiences.
- Be able to work in a team.

- Have critical and self-critical capacity.
- Manage time effectively.
- Be able to learn autonomously.
- Be able to adapt to new situations.
- Show creativity.
- Show leadership and skills for mobilising the capacities of others.
- Have initiative and entrepreneurial spirit.
- Show motivation for quality.
- Be able to understand and use the different quantitative and qualitative methods to reason analytically, evaluate results and predict economic and financial parameters.
- Be able to apply analytical and mathematical methods for the analysis of economic and business problems.
- Be able to define, solve and present complex problems systemically.
- Be able to express oneself in formal, graphic and symbolic languages.
- Be able to plan, organise, control and evaluate the implementation of business strategies.

1330 - Degree in Business Management and Administration (Ontinyent)

- Demonstrate capacity for analysis and synthesis.
- Have organisation and planning skills.
- Demonstrate oral and written communication skills in the native language.
- Be able to use English in a professional environment.
- Be able to analyse and search for information from different sources.
- Be able to solve problems.
- Be able to negotiate and reconcile interests effectively.
- Be able to transmit and communicate complex ideas and approaches to both specialised and lay audiences.
- Be able to work in a team.
- Have critical and self-critical capacity.
- Manage time effectively.
- Be able to learn autonomously.
- Be able to adapt to new situations.
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- Be able to plan, organise, control and evaluate the implementation of business strategies.

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

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

- To search, select and evaluate the appropriate information to be analysed.
- To use logical/strategic reasoning to address real situations in the economic world.
- The ability to recognise an economic problem from observation of reality.
- The ability to select a theoretical framework of reference for the development of the analysis.
- The management of basic quantitative tools and their application to the economic environment.

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 R^n. Functions of one and several variables: homogeneous 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 didactic methodology to achieve the objectives is based on **lectures and practical sessions** in which the teacher will encourage students in the use of mathematical and symbolic language and rigorous and systematic reasoning, and he/she will promote autonomous work both individually and as part of a team.

In the **lectures**, the lecturer will highlight the main aspects of each topic, give model examples and guide the students' study through the materials available in the virtual classroom and the basic 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 **practical sessions,** the lecturer will show the main economic and business applications of the topics developed in the lectures and he/she will encourage 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 justify his/her method of resolution.

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

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 skills over the course content and application (maximum mark 7 points).

2. **Continuous evaluation** of the student which will assess the achievement of general skills of the degree and the 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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- Calvo, C. e Ivorra, C. (2012). Las Matemáticas en la Economía a través de ejemplos en contextos económicos. Ed. Tirant lo Blanch. Valencia. (disponible en línea)
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- Haeussler, E. F. and Paul, R. S. (2018). Introductory mathematical analysis for Business, Economics and the Life and Social Sciences. Pearson Education. 14th edition.
- Ivorra, C. (2007). Matemáticas Económico-Empresariales. Laboratori de Materials, 2. PUV.
- Ivorra, C. y Juan, C. (2007). Matemáticas Empresariales. Laboratori de Materials, 7. PUV.

Additional

- Alegre, P. et al. (1991). Ejercicios Resueltos de Matemáticas Empresariales. Ed. AC. Vol. 1 y 2.

- Alegre, P. et al. (1995). Matemáticas Empresariales. Colección Plan Nuevo. Ed. AC.
- Bradley, G. L. y Smith, K. J. (1998). Cálculo en una variable. Volumen I. Ed. Prentice Hall.
- Casasús, T. et al. (1991). Matemáticas Empresariales. Ed. La Nau Llibres.
- Haeussler, E. F. y Paul, R. S. (2003). Matemáticas para administración y economía. Pearson Education. 10ª edición.
- Muñoz, F. et al. (1988). Manual de Álgebra Lineal. Ed. Ariel.
- Palencia, F. J. y García, M. C. (2022). Cálculo para economistas. Ejercicios resueltos. UNED Mac Graw Hill.
- Sydsaeter, K. y Hammond, P. J. (2002). Matemáticas Esenciales para el Análisis Económico. Ed. Prentice Hall.