

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

Code	36759
Name	Mathematics
Cycle	Grade
ECTS Credits	6.0
Academic year	2021 - 2022

Study (s)

Degree	Center	Acad. year	Period
1933 - D.D. in Law-Economics 2022	Doubles Studies Faculty of Law - Faculty of Economics	1	First term

Subject-matter

Degree	Subject-matter	Character
1933 - D.D. in Law-Economics 2022	1 - Asignaturas de primer curso	Obligatory

Coordination

Name	Department
MENEU GAYA, ROBERT	257 - Business Mathematics

SUMMARY

Mathematics is a semester-long basic training subject that is taught in the first year, first semester of the double Degree in Law and Economics and consists of a total of 6 credits.

This subject studies the basic mathematical tools for the description, analysis and understanding in quantitative terms of the economic environment, techniques and basic mathematical instruments to successfully tackle the double degree.

These contents include the review of matrix calculus, the study of functions of one and several variables: continuity and marginal analysis, and the approach and resolution of optimization problems with restrictions.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

Previous knowledge corresponding to first and second year of high school in the branch of humanities and social sciences is assumed.

OUTCOMES

LEARNING OUTCOMES

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

- Search, selection and evaluation of adequate information for analysis.
- Increased ability to use logical / strategic reasoning to deal with real situations in the economic world.
- Use of basic quantitative tools and their application to the economic environment.
- Ability to select a theoretical frame of reference for the development of the analysis.
- Be able to apply different analysis methods and techniques using computer programs.

DESCRIPTION OF CONTENTS

1. Basic notions of algebra

Systems of linear and nonlinear equations. Matrix, determinants, range and calculation of the inverse.

2. Limits and continuity of functions

Notions of topology in \mathbb{R}^n . Functions of one and several variables: homogeneous, compound 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. Derivative calculation. Definition and economic interpretation of partial derivatives of scalar and vector functions. Successive derivatives of functions of one or more variables. Gradients, Jacobian and Hessian.

**4. Differentiability of functions**

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

5. Optimization

Basic concepts. Unconstrained optimization with one or more decision variables. Optimization with equality constraints: Lagrange multipliers method. Optimization with inequality constraints: Kuhn and Tucker conditions. Modeling of nonlinear, linear and integer linear problems.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theoretical and practical classes	60,00	100
Study and independent work	60,00	0
Preparation of evaluation activities	15,00	0
Resolution of case studies	10,00	0
Resolution of online questionnaires	5,00	0
TOTAL	150,00	

TEACHING METHODOLOGY

The didactic methodology to carry out the objectives is supported by theoretical and practical classes in which the teacher will promote the use of mathematical and symbolic language and rigorous and systematic reasoning, and will favor the autonomous work of the student both individually and as a team.

In the theoretical classes, the teacher will highlight the main aspects of each topic, make standard examples and guide the study of the students through the materials available in the virtual classroom and the basic bibliography. The explanations will be combined with the participation of the students through the discussion of proposed exercises and / or brief questions posed by the teacher for the class discussion of the most frequent doubts. At the end of the class, the necessary materials for the next class will be indicated, so that the student can prepare the session.

It is intended that the student develop her capacity for autonomous work (with the work prior to class) and her ability to argue rigorously using mathematical and symbolic language. Together with these classes, practical classes will be developed in which the theoretical knowledge studied will be applied in the analysis of business problems and the ability of the student to define, solve and expose complex problems in a systemic way. The teacher will previously solve some standard problems and propose the realization of others for subsequent classes, so that in each class the student must be able to pose the proposed problems and clearly defend a resolution method.



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 will be published in the Virtual Classroom (<http://aulavirtual.uv.es>) or in the faculty website.

The study prior and / or after the development of the theoretical and practical content may lead to "deliveries" or "tests" that will be subject to continuous evaluation by the teacher during the semester.

EVALUATION

The evaluation of the subject is based on a system that consists of the following parts:

- Written exam on the day the subject exam is officially convened, in which the specific competencies of the subject will be evaluated regarding content and its application (maximum mark 7 points).
- Continuous evaluation of the student in which the achievement of the general competences of the degree and the participation and involvement of the student in the teaching-learning process will be evaluated (maximum mark 3 points). Continuous assessment activities are recoverable.

To pass the course, the written exam must be passed. The final grade will be obtained from the sum of the written exam grade plus the continuous assessment grade. In case of not passing the written exam, the final mark will be a maximum of 4.5. Logically, to pass the subject, a final grade greater than or equal to five (5) must be obtained.

REFERENCES

Basic

- Chiang, A.C. y Wainwright, K. (2006): Métodos fundamentales de Economía matemática. McGraw Hill. 4ª Edición. S 330.4 CHI
- Barbolla, R., Cerdá, E. y Sanz, P. (2011): Optimización. Programación Matemática y aplicaciones a la Economía. Ed. Garceta. S i519.87 BAR
- Calvo C. e Ivorra C. (2012) Matemáticas en la Economía a través de ejemplos en contextos económicos. Biblioteca virtual Tirant (accesible a través de trobes.uv.es)

Additional

- Sydsaeter K. y Hammond P. J. (2002) Matemáticas Esenciales para el Análisis Económico. Ed. Pearson. S 51 SYD
- Canos, M. J., Ivorra C., Liern V. (2002) Matemáticas para la Economía y la Empresa. Ed Tirant lo Blanch. Valencia. S 51 CAN



- Ivorra C. (2007) Matemáticas Económico-Empresariales. Laboratori de Materials, 2. PUV. Disponible en línea a través de trobes.uv.es

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

In the event that attendance is suspended during classes (totally or partially) and / or in the subject exams, the following will be attended.

1. Contents

The contents collected in the teaching guide are maintained.

2. Volume of work and temporary planning of teaching

The volume of work collected in the teaching guide is maintained.

3. Teaching methodology

In non-face-to-face classes, methods such as videoconferences, videos, activities in the virtual classroom, work with material provided by the teacher or any other method that the teacher considers to be adapted to the subject and the existing possibilities will be used. The tutorials will be carried out by videoconference, email, virtual classroom or any other method that the teacher considers appropriate.

4. Evaluation

Both parts of the evaluation system are maintained. If the written exam of the first call is face-to-face, the system included in the teaching guide will be maintained. If the written exam of the first call is not face-to-face, the weight assigned to each part will change (the written exam will go from a maximum mark of 7 points to a maximum mark of 2.5 points and the continuous assessment will go from a maximum mark of 3 points to a maximum mark of 7.5 points) and the continuous evaluation will not be recoverable. Furthermore, if the teacher calls an oral exam, it will be held as close as possible, depending on availability, to the date of the official call. If the written exam of the second call is face-to-face, the system included in the teaching guide will be maintained. If the written exam of the second call is not face-to-face, the weight assigned to each part will change (the written exam will go from a maximum mark of 7 points to a maximum mark of 2.5 points and the continuous assessment will go from a maximum mark of 3 points to a maximum mark of 7.5 points) and the continuous evaluation will be recoverable. Furthermore, if the teacher calls an oral exam, it will be held as close as possible, depending on availability, to the date of the official call.

5. Bibliography

The references collected in the teaching guide are maintained. In addition, each teacher will be in charge of providing students with the material that he considers appropriate to follow the subject.