



Universidad de Jaén

FACULTY OF SOCIAL AND LEGAL SCIENCES

Mathematics 2

2024-2025

Grado en Administración y dirección de empresas

Grado en Administración y Dirección de Empresas / Bachelor's Degree in Business

Administration and Management

Doble Grado en Administración y Dirección de Empresas y Finanzas y contabilidad

Grado en Finanzas y contabilidad

CAREA



Acceso Mayores 40

Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Movilidad (Coordinador)

P.O.D.

Solicitud bilingüismo

Syllabus 2024-25 - 11112023 - Mathematics 2 (Matemáticas II)

Caption

- Level 1: Tutorial support sessions, materials and exams in this language
- Level 2: Tutorial support sessions, materials, exams and seminars in this language
- Level 3: Tutorial support sessions, materials, exams, seminars and regular lectures in this language

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DEGREE: Grado en Administración y dirección de empresas (11112023)
FACULTY: FACULTY OF LAW AND SOCIAL SCIENCES
DEGREE: Doble Grado en Administración y dirección de empresas y Finanzas y contabil (11912009)
FACULTY: FACULTY OF LAW AND SOCIAL SCIENCES
DEGREE: Grado en Finanzas y contabilidad (11312021)
FACULTY: FACULTY OF LAW AND SOCIAL SCIENCES
DEGREE: Grado en Administración y dirección de empresas (11122023)
FACULTY: FACULTY OF LAW AND SOCIAL SCIENCES
ACADEMIC YEAR: 2024-25
COURSE: Mathematics 2

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Mathematics 2

CODE: 11112023 (*)

ACADEMIC YEAR: 2024-25

LANGUAGE: English

LEVEL: 3

ECTS CREDITS: 6.0

YEAR: 2

SEMESTER: PC

2. LECTURER BASIC INFORMATION

NAME: JÓDAR REYES, JOAQUÍN

DEPARTMENT: U124 - MATEMÁTICAS

FIELD OF STUDY: 595 - MATEMÁTICA APLICADA

OFFICE NO.: B3 - 037

E-MAIL: jjodar@ujaen.es

P: 953212934

WEBSITE: <http://www4.ujaen.es/~jjodar/>ORCID: <https://orcid.org/0000-0002-8421-019X>

LANGUAGE: -

LEVEL: 3

3. CONTENT DESCRIPTION

Differential and integral Calculus of several variables with applications to economics. Introduction to differential equations.

THEORETICAL CONTENTS

Unit 1. Limits and continuity of real-valued functions of several real variables. The space $\mathbb{R}^n$. Real-valued functions of several real variables. Limits of real-valued functions of several real variables. Continuity of real-valued functions of several real variables.

Unit 2. Differentiability of real-valued functions of several real variables. Partial derivatives. Directional derivatives. Differential of real-valued functions of several real variables. Homogeneous functions. Applications to economics.

Unit 3. Vector-valued functions of several real variables. Limits, continuity and differentiability of vector-valued functions. The Chain Rule. Applications to economics.

Unit 4. Optimization of real-valued functions of several real variables. Quadratic forms. Unconstrained optimization. Optimization with equality constraints. Applications to economics.

Unit 5. Integration of real-valued functions of several real variables. Double integral construction. Double integrals over rectangular domains. Double integrals over general bounded regions.

Unit 6. Introduction to differential equations. Basic concepts and notation. Integration methods for some types of first and second order ordinary differential equations. Applications to economics.

PRACTICAL CONTENTS

Written exercises and computer sessions related to the theoretical contents.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

Lectures (M1, M3, M4, M5), which will be developed face-to-face or via video conference: Theoretical contents and related practical examples will be developed in these sessions.

Seminars (M6, M7, M8, M10, M12, M13), which will be developed face-to-face or via video conference: 15 one-hour long sessions will be devoted for solving exercises, with special emphasis on applications to economics. Additionally, 15 one-hour long sessions, which will be also developed face-to-face or via video conference, will be devoted for solving exercises by using the software Mathematica.

Students with special educational needs should contact the Student Attention Service (Servicio de Atención y Ayudas al Estudiante) in order to receive the appropriate academic support

5. ASSESSMENT METHODOLOGY

1.- Detail:

* **S2. THEORETICAL CONCEPTS:** 5 points (50%): Written final exam about the theoretical concepts and related exercises. Learning results R1 and R4.

* **S3. EXERCISES:** 3 points (30%): Individual or group tests in which the students will do and explain similar exercises to those appearing in the lists of exercises of the subject. Learning results R1, R2 and R4.

* **S4. PRACTICES WITH MATHEMATICA:** 2 points (20%): Exam by using the software Mathematica. Practices with Mathematica guidelines may be used in the exam. Learning results R1, R3 and R4.

2.- Marks from S3 and S4 will be maintained during the current academic year (however, if a student attends a new Practices with Mathematica exam (S4) in a new official exam call during the current academic year, the old mark from S4 will be changed by the new Practices with Mathematica exam mark obtained).

3.- The final continuous grade will be the sum of the marks obtained from S2, S3, S4.

4.- Calculator is not allowed in tests and exams.

A final alternative grade given by the sum of the marks of the written theoretical-practical final exam (S2) and the Practices with Mathematica exam (S4), weighted 80% and 20%, respectively, will be considered for each student at each official exam call.

The final student grade will be the maximum of the final continuous student grade and the final alternative student one at each official exam call.

6. BOOKLIST ([Access the bibliography in the Library catalog](#))

MAIN BOOKLIST:

- Essential mathematics for economic analysis Knut Sydsaeter and Peter Hammond ; with Arne Strom. Edition: 4th ed. Author: Sydsæter, Knut.. Publisher: Pearson Education Limited ([Library](#))
- Further Mathematics for Economic Analysis Knut Sydsaeter...[et al.]. Edition: 2nd edition. Author: Sydsæter, Knut 1937- coaut.. Publisher: Pearson ([Library](#))
- introduction to mathematical analysis for economic theory and econometrics Dean Corbae, Maxwell B. Stinchcombe, Juraj Zeman. Edition: -. Author: Corbae, Dean. Publisher: Princeton University Press ([Library](#))
- Matemáticas aplicadas a la economía y a la empresa: 434 ejercicios resueltos y comentados . Edition: -. Author: Caballero Fernández, Rafael, coaut.. Publisher: Pirámide ([Library](#))
- Apuntes de la asignatura / Lecture notes. Edition: -. Author: Damas Serrano, Antonio; Jódar Reyes, Joaquín.
 - **Notes:** <https://platea.ujaen.es/>

ADDITIONAL BOOKLIST:

- Matemáticas para el análisis económico [Recurso electrónico] Knut Sydsaeter, Peter Hammond, Andrés Carvajal. Edition: 2ª ed. Author: Sydsæter, Knut.. Publisher: Pearson ([Library](#))

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

DETAILED INFORMATION

Quality Education: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

Timing and schedule:

The timing and the schedule will be the same in any scenario (whether the attendance is 100%, or if a blended system or an exclusively online teaching system is established); the only thing that will vary will be the teaching methodology. Thus, in the case of a blended or mixed scenario, the same number of sessions will be carried out as in the face-to-face mode (both for the theoretical classes, for the exercises and for the practical sessions with Mathematica).

Attendance:

The Teaching will be developed in the face-to-face mode for all students as long as the number of students and the capacity of the classroom allow it, following at all times the instructions of the University of Jaén. When this is not possible, a weekly rotation system will be established for face-to-face teaching. In general, an attendance will be attempted: 50% for the theory groups (2 subgroups) and 50% for the practice groups (2 subgroups). However, these percentages will be set by the Faculty before the start of classes. If the percentage estimates improved for any circumstance (reduction of the minimum distance between people, use of adjoining teaching spaces, ...) and allowed higher percentages of attendance, it would always be opted for these, and it would be taken the smallest number of subgroups possible, understanding as the most optimal case 100% attendance.

In any case, the students will have the basic material prepared by the teachers of the subject so that they can also carry out an asynchronous monitoring, both of the theory and of the exercises and practices with Mathematica.

Some tutoring sessions will be done face-to-face and others online (synchronous and asynchronous).

Assessment:

The blocks, percentages and assessment will be the same in any scenario, exclusively varying the assessment methodology, with tests that will be face-to-face or online. Whenever possible, efforts will be made to carry out tests and examinations face-to-face. If this is not possible, they will be carried out online according to the recommendations provided by the University of Jaén.

The mandatory instructions for taking online exams and tests, in the continuous assessment mode or official calls, will be published in advance in Docencia Virtual. These will consider the compatibility of carrying out all the tests online, with the use of webcam, recordings, etc. according to the guidelines given by the University of Jaén.

Each student must have the technical means necessary to carry out the online exams, such as a computer, a webcam, a microphone and the necessary software in each case. In this sense, according to instructions received from the General Secretariat of the University of Jaén, teachers must comply with the duty of information contained in article 13 of the General Regulation on Data Protection (Regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016) and report the recording of the exam via video conference, through the Google Meet platform, as an essential instrument to guarantee the transparency of the process.

When appropriate, the teaching staff reserves the right not to give consent for the capture, publication, retransmission or reproduction of their speech, image, voice and professorship explanations, in the exercise of their teaching functions at the University of Jaén.

In the case in which the tests or exams are carried out online, an online and oral assessment will be used for those students who have technical or other difficulties (properly justified) that occur during the assessment process, or when the teachers cannot verify the authorship of the tests carried out.

9. VIRTUAL TEACHING SCENARIO

Timing and schedule:

The timing and the schedule will be the same in any scenario (whether the attendance is 100%, or if a blended system or an exclusively online teaching system is established); the only thing that will vary will be the teaching methodology. Thus, in the case of a non-face-to-face scenario, the same number of sessions will be carried out as in the face-to-face or mixed modes (both for the theoretical classes, for the exercises and for the practical classes with Mathematica), only that all will be developed by video conference. In any case, the students will have the basic material prepared by the teachers of the subject so that they can also carry out asynchronous monitoring of the subject.

Attendance :

Teaching will be exclusively online.

All tutoring sessions will be conducted online (synchronous and asynchronous).

Assessment :

The blocks, percentages and assessment will be the same in any scenario, exclusively varying the assessment methodology, with tests that will be face-to-face or online. Whenever possible, efforts will be made to carry out tests and examinations face-to-face. If this is not possible, they will be carried out online according to the recommendations provided by the University of Jaén.

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In the case in which the tests or exams are carried out online, an online and oral assessment will be used for those students who have technical or other difficulties (properly justified) that occur during the assessment process, or when the teachers cannot verify the authorship of the tests carried out.

DATA PROTECTION CLAUSE (on line exams)

Institution in charge of data processing: Universidad de Jaén, Campus Las Lagunillas, s/n, 23071 Jaén

Data Protection Delegate: dpo@ujaen.es

Purpose: In accordance with the Universities Law and other national and regional regulations in force, carrying out exams and assessment tests corresponding to the courses students are registered in. In order to avoid frauds while sitting the exam, the exam will be answered using a videoconference system, being able the academic staff of the University of Jaén to compare and contrast the image of the person who is answering the exam with the student's photographic files. Likewise, in order to provide the exam with evidential content for revisions or claims, in accordance with current regulation frameworks, the exam will be recorded and stored.

Legitimacy: compliance with legal obligations (Universities Law) and other national and regional regulations currently in force.

Addressees: service providers who are the owners of the platforms where the exams are carried out and with whom the University of Jaén has signed the corresponding data access contracts.

Storage periods: those established in current in force regulations. In the specific case of exam videoconference recordings, not before the examination records and transcripts are closed or the exam can still be reviewed or challenged.

Rights: you can exercise your right of access, amendment, cancellation, opposition, suppression, limitation and portability by sending a letter to the postal or electronic address indicated above. In the event that you consider that your rights have been violated, you may submit a complaint to the Andalusian Council for Transparency and Data Protection www.ctpdandalucia.es

CLASS RECORDING CLAUSE PERSONAL DATA PROTECTION

Person in charge: Universidad de Jaén, Paraje Las Lagunillas, s/n; Tel.953 212121; www.ujaen.es

Data protection delegate (DPO): TELEFÓNICA, S.A.U. ; Email: dpo@ujaen.es

Procedure aim: To manage proper recordings of teaching sessions with the aim of facilitating learning process under a multimodal and/or online teaching

Period for record storage: Images will be kept during legal term according to regulations in force

Legitimacy: Data will be managed according to legal regulations (Organic Law 6/2001, December 21, on Universities) and given consent provided by selecting corresponding box in legal admission documents

Data recipients (transfers or assignments): Any person allowed to get access to every teaching modality

Rights: You may exercise your rights of access, rectification, cancellation, portability, limitation of processing, deletion or, where appropriate, opposition. To exercise these rights, you must submit a written request to the Information, Registration and Electronic Administration Service of the University of Jaen at the address above, or by e-mail to the address above. You must specify which of these rights you are requesting to be satisfied and, at the same time, you must attach a photocopy of your ID card or equivalent identification document. In case you act through a representative, legal or voluntary, you must also provide a document that proves this representation and identification. Likewise, if you consider that your right to personal data protection has been violated, you may file a complaint with the Andalusian Data Protection and Transparency Council www.ctpdandalucia.es

Campus Las Lagunillas s/n | 23071 - Jaén

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