



Universidad de Jaén
School of Engineering of Linares

Mathematics 2

2024-2025

Grado en Ingeniería Química Industrial
Grado en Ingeniería Eléctrica
Grado en Ingeniería Mecánica
Doble Grado en Ingeniería Eléctrica e Ingeniería Mecánica



GRUPO



Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Syllabus 2024-25 - 14711010 - 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 Ingeniería eléctrica (14711010)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Grado en Ingeniería mecánica (14611010)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Grado en Ingeniería química industrial (14411008)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Doble grado en Ingeniería eléctrica e Ingeniería mecánica (14811010)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 ACADEMIC YEAR: 2024-25
 COURSE: Mathematics 2

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Mathematics 2
 CODE: 14711010 (*)
 LANGUAGE: English
 ECTS CREDITS: 6.0
 YEAR: 1
 SEMESTER: SC
 ACADEMIC YEAR: 2024-25
 LEVEL: 0

2. LECTURER BASIC INFORMATION

NAME: CASTILLO GONZÁLEZ, NURIA VICTORIA
 DEPARTMENT: U124 - MATEMÁTICAS
 FIELD OF STUDY: 595 - MATEMÁTICA APLICADA
 OFFICE NO.: -
 WEBSITE: -
 ORCID: -
 LANGUAGE: -
 E-MAIL: -
 P: -
 LEVEL: 1

3. CONTENT DESCRIPTION

THEORY

BLOCK I. ORDINARY DIFFERENTIAL EQUATIONS.

Topic 1. Introduction to differential equations.

Topic 2. First order differential equations.

Topic 3. Higher order linear differential equations with constant coefficients.

Topic 4. Introduction to the Laplace Transform.

Topic 5. Systems of linear differential equations with constant coefficients.

BLOCK II. NUMERICAL METHODS.

Topic 6. Introduction to Numerical Calculation. Resolution of nonlinear equations.

Topic 7. Approximation of functions.

Topic 8. Numerical integration.

Topic 9. Numerical resolution of initial value problems.

PRACTICES WITH COMPUTER.

The contents that appear in Block II of theory (Numerical Methods) are developed using the Mathematica program.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

In the expositive classes in a large group, the contents of Differential Equations will be taught. They will be carried out in the two hours of class assigned weekly in the schedule as theory. The CB1 and CBB1 competencies will be developed.

Small group classes will be used to teach Numerical Methods content. They will be carried out in the two hours assigned weekly in the computer rooms. In these classes the contents of Numerical Methods will be explained together with exercises using the Mathematica program. The CB1 and CBB1 competencies will be developed.

To the extent possible, at the end of the semester, one or two seminars taught in English will be held, preferably by Visiting Professors. These seminars will cover aspects of theory and emphasize practical applications currently used in industry and research, which may be of interest to students.

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

To pass the subject it is necessary to pass the differential equations block and the numerical methods block.

Detailed breakdown of the grades:

Second Aspect (from 0 to 7 points): Written exam on the theoretical and applied aspects of the subject (3 points for the Differential Equations block and 4 points for the Numerical Methods block). The contribution to the final grade of this part of the evaluation is subject to passing 40% of the grade of each block of the exam. Likewise, a continuous evaluation system may be proposed to obtain the 3 points corresponding to the Differential Equations block. The competencies CB1 and CBB1 will be evaluated as well as the results R02, R03, R06 and R08.

Third Aspect (from 0 to 2 points): Resolution of

exercises in the theory classroom proposed by the teacher throughout the term. A 20% of the final grade (2 points) will be obtained by means of the accomplishment of two or more tests on the contents of Differential Equations in class time. The competencies CB1 and CBB1 as well as the results R03, R04, R05, R06 and R07 will be evaluated.

Fourth Aspect (from 0 to 1 point): Computer classroom exam. A 10% of the total grade of the course (1 point) will be obtained by solving one or more exercises on the contents of Numerical Methods during practical class hours and using the Mathematica program. The competencies CB1 and CBB1 will be evaluated as well as the results R04, R06, R07 and R08.

The grades obtained by the students in the sections of work, activities and tests will be maintained in each of the official calls of the academic year.

Students are reminded of the obligation to identify themselves at any time during the tests by means of an ID card or equivalent document.

Students are reminded that, according to Article 18 of the Regulations of Academic Regime and Student Evaluation of the University of Jaen, "a call will be considered exhausted when the evaluation tests in which the student had participated together account for more than 30% of the final grade of the subject".

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

MAIN BOOKLIST:

- Multivariable calculus and differential geometry . Edition: -. Author: Walschap, Gerard, author.. Publisher: De Gruyter [\(Library\)](#)

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

Igualdad de género

DETAILED INFORMATION

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

Development of analytical and critical skills: Design projects that require the use of advanced mathematics to solve real problems. This helps students develop critical and analytical skills.

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

1) TEACHING METHODOLOGY AND TRAINING ACTIVITIES

FORMATION ACTIVITIES	FORMAT (PRESENTIAL/ ONLINE)	TEACHING METHODOLOGY DESCRIPTION
A1- Large group lectures	Rotating face-to-face 50%	Class in the schedule and classroom assigned to a part of the group and broadcast by videoconference to the rest, with periodic rotation of students, as determined by the Center. The contents of Differential Equations are taught. CB1 and CBB1 skills are developed.
A2- Small group classes	Rotating face-to-face 50%	Class in the schedule and classroom assigned to a part of the group and broadcast by videoconference to the rest, with periodic rotation of students, as determined by the Center. The contents of Numerical Methods are taught. The Mathematica program is used. CB1 and CBB1 skills are developed.

2) EVALUATION SYSTEM

- WHEN IT IS POSSIBLE TO TAKE THE FINAL EXAM IN PERSON:

ASPECT	CRITERIA	INSTRUMENT	WEIGHT
Theoretical concepts of matter	Mastery of the theoretical and practical concepts of the subject	Exam	80%
Carrying out work, cases or exercises.	Delivery of proposed problems. Development, documentation, originality, spelling and presentation will be valued.	Delivery of reports of exercises and/or works	10%
Computer practices.	Computer practices.	Realization of tests with the use of the computer on the contents taught of Numerical Calculation.	10%

- WHEN IT IS NOT POSSIBLE TO TAKE THE FINAL EXAM IN PERSON:

ASPECT	CRITERIA	INSTRUMENT	WEIGHT
Theoretical concepts of the matter.	Mastery of the theoretical and practical concepts of the subject.	Exam	60%
Carrying out work, cases or exercises.	Delivery of proposed problems. Development, documentation, originality, spelling and presentation will be valued.	Delivery and possible defense of relations of exercises and/or works.	20%
Computer practices.	Realization of computer practices.	Realization of tests with the use of the computer on the contents taught of Numerical Calculation. Written test.	20%

3) RESOURCES NEEDED

- Virtual platform
- Google Meet

9. VIRTUAL TEACHING SCENARIO

1) TEACHING METHODOLOGY AND TRAINING ACTIVITIES

FORMATION ACTIVITIES	FORMAT (PRESENIAL/ ONLINE)	TEACHING METHODOLOGY DESCRIPTION
A1- Large group lectures	Rotating face-to-face 50%	Class in the schedule and classroom assigned to a part of the group and broadcast by videoconference to the rest, with periodic rotation of students, as determined by the Center. The contents of Differential Equations are taught. CB1 and CBB1 skills are developed.
A2- Small group classes	.	Class in the schedule and classroom assigned to a part of the group and broadcast by videoconference to the rest, with periodic rotation of students, as determined by the Center.

	Rotating face-to-face 50	The contents of Numerical Methods are taught. The Mathematica program is used. CB1 and CBB1 skills are developed.
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2) EVALUATION SYSTEM

-WHEN IT IS POSSIBLE TO TAKE THE FINAL EXAM IN PERSON:

ASPECT	CRITERIA	INSTRUMENT	WEIGHT
Theoretical concepts of matter	Mastery of the theoretical and practical concepts of the subject	Exam	80%
Carrying out work, cases or exercises.	Delivery of proposed problems. Development, documentation, originality, spelling and presentation will be valued.	Delivery of reports of exercises and/or works	10%
Computer practices.	Computer practices.	Realization of tests with the use of the computer on the contents taught of Numerical Calculation.	10%

- WHEN IT IS NOT POSSIBLE TO TAKE THE FINAL EXAM IN PERSON:

ASPECT	CRITERIA	INSTRUMENT	WEIGHT
Theoretical concepts of matter	Mastery of the theoretical and practical concepts of the subject	Exam	60%
Carrying out work, cases or exercises.	Delivery of proposed problems. Development, documentation, originality, spelling and presentation will be valued.	Delivery of reports of exercises and/or works	20%
Computer practices.	Computer practices.	Realization of tests with the use of the computer on the contents taught of Numerical Calculation.	20%

3) RESOURCES NEEDED

- Virtual platform
- Google Meet

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