



Universidad de Jaén
School of Engineering of Linares

Mathematics 2

2024-2025

Grado en Ingeniería Civil

Grado en Ingeniería de Recursos Energético

Grado en Ingeniería de Tecnologías Mineras

Doble Grado en Ingeniería de tecnologías mineras e Ingeniería civil

Doble Grado en Ingeniería de Recursos Energéticos e Ingeniería Química Industrial



CREA



Guías docentes UJA
Horarios de tutorías
Llamamientos PAU

Syllabus 2024-25 - 14211009 - 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 de recursos energéticos (14211009)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
DEGREE:	Doble grado en Ingeniería de recursos energéticos e Ing. química industrial (15111010)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
DEGREE:	Grado en Ingeniería civil (14011009)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
DEGREE:	Grado en Ingeniería de minas (14111009)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
DEGREE:	Doble grado en Ingeniería de tecnologías mineras e Ingeniería civil (15011009)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
ACADEMIC YEAR:	2024-25
COURSE:	Mathematics 2

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Mathematics 2	ACADEMIC YEAR: 2024-25
CODE: 14211009 (*)	LEVEL: 1
LANGUAGE: English	SEMESTER: SC
ECTS CREDITS: 6.0	YEAR: 1

2. LECTURER BASIC INFORMATION

NAME: FLORENCIO DIAZ, RAFAEL	
DEPARTMENT: U124 - MATEMÁTICAS	
FIELD OF STUDY: 595 - MATEMÁTICA APLICADA	
OFFICE NO.: D - D-034	E-MAIL: rfdiaz@ujaen.es
WEBSITE: https://platea.ujaen.es	P: 953648603
ORCID: -	
LANGUAGE: -	LEVEL: 1

3. CONTENT DESCRIPTION

Development of the contents:

-Chapter 1: Functions of several variables.Examples and definitions.Graphs and level sets.Limits and continuity.Differentiation in several variables.Partial and directional derivatives.Differentiability.Gradient.Geometric interpretation and applications.Chain rule.Characterization of relative extremes.Lagrange multipliers method.Application of these mathematical tools with the help of Mathematica software.

-Chapter 2: Double integral. Definition of double integral. Calculation of double integrals over a rectangle. Calculation of double integrals over general regions. Variable change technique in double intergales. triple integral. Definition of triple integral. Calculation of triple integrals over a rectangle. Calculation of triple integrals over general regions. Change of variable technique in triple integrals. Application of these mathematical tools with the help of Mathematica software.

-Chapter 3: Differential geometry. Parameterized curves. Derivation and tangent and normal unit vector. Arc length. Vector fields. Application of these mathematical tools with the help of Mathematica software.

-Chapter 4: Differential equations. Definition and order of differential equation. Existence and uniqueness. Geometric analysis. Qualitative theory of autonomous differential equations. Techniques for solving first order differential equations. Techniques for solving second order linear differential equations. Introduction to equations in partial derivatives. Classification of differential equations in partial derivatives. Initial and

boundary conditions. Method of separation of variables. Application of these mathematical tools with the help of Mathematica software.

Chapter 5: Descriptive statistics. Statistical variables and types of variables. Tables and graphical representation of data. Precision and accuracy, significant figures. Central and dispersion values. Application of these mathematical tools with the help of Mathematica software.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

In the lectures in large group classes, theoretical aspects of the subject will be developed, practical examples and exercises will be solved.

In the practical group classes, exercises will be solved with the help of the computer.

As much as possible, at the end of the term, one or two seminars will be held in English, preferably by Visiting Professors. These seminars will cover aspects of the theory and will 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

The evaluation will consist of a final test or exam with a weight of 85% and a mark associated with a computer-based practical exam (15%).

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

MAIN BOOKLIST:

- Cálculo vectorial. Edition: 3ª ed.. Author: Marsden, Jerrold E.. Publisher: Addison-Wesley Iberoamericana ([Library](#))
- Introducción a las ecuaciones en derivadas parciales: texto para estudiantes de ciencias e ingeniería . Edition: -. Author: Stephenson, G.. Publisher: Reverté ([Library](#))
- Estadística para ingenieros . Edition: -. Author: Navidi, William. Publisher: McGraw-Hill ([Library](#))
- Ecuaciones diferenciales: Teoría, técnica y práctica . Edition: -. Author: Simmons, George Finlay.. Publisher: McGraw Hill ([Library](#))
- Multivariable calculus and differential geometry . Edition: -. Author: Walschap, Gerard, author.. Publisher: De Gruyter ([Library](#))

ADDITIONAL BOOKLIST:

- Cálculo infinitesimal de varias variables . Edition: 2a ed.. Author: Burgos, Juan de (Burgos Román). Publisher: McGraw-Hill Interamericana ([Library](#))
- Ecuaciones diferenciales con aplicaciones de modelado . Edition: 9ª ed.. Author: Zill, Dennis G. 1940-. Publisher: Cengage Learning ([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

In the case of not having the possibility of giving the regular courses face-to-face, the theory classes will be recorded and transmitted online.

In addition to that, exercises and activities will be proposed in order to allow the student to have some autonomy in the learning process. Different sorts of material will be uploaded to facilitate keeping up with the courses.

9. VIRTUAL TEACHING SCENARIO

In the case of having to do remote classes, this will be achieved by using Google's Meet tool.

Additionally, videos, exercises and other activities will be uploaded to make it easier for the students to follow the cours.

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