



Universidad de Jaén
School of Engineering of Linares

Mathematical fundamentals 1

2024-2025

Grado en Ingeniería Telemática

Grado en Ingeniería de Tecnologías de Telecomunicación

Doble Grado Ingeniería de Tecnologías de la Telecomunicación e Ingeniería Telemática



GRATIS



Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Syllabus 2024-25 - 14311004 - Mathematical Fundamentals 1 (Fundamentos matemáticos I)

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

Back

Full version (Spanish)

English

DEGREE: Grado en Ingeniería de telecomunicación (14311004)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Doble Grado Ing. de tecnologías de la telecomunicación e Ing. telemática (15211004)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Grado en Ingeniería telemática (14511004)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 ACADEMIC YEAR: 2024-25
 COURSE: Mathematical Fundamentals 1

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Mathematical Fundamentals 1
 CODE: 14311004 (*)
 LANGUAGE: English
 ECTS CREDITS: 6.0
 YEAR: 1
 ACADEMIC YEAR: 2024-25
 LEVEL: 1
 SEMESTER: PC

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

3. CONTENT DESCRIPTION

1. Real and complex numbers.
2. Real functions of one and several variables.
Limits and continuity in real functions of one and several variables.
3. Differentiability in one and several variables.

Derivability. Fundamental theorem of calculus. Differentiability in one and several variables. Optimization in one and several variables. Curves and surfaces in space.

4. Integration in one and several variables.

Double and triple integral.

5. Numerical and functional sequences and series.

Sequences of real numbers. Limits of numerical sequences. Series of real numbers. criteria of convergence of series of positive terms. Sequences and series of functions. Punctual and uniform convergence.

Classes in practice groups:

0. Introduction to Basic concepts of programming with Mathematica.
1. Real and complex Practices with Mathematica.
- 2 Real functions in one and several variables. Numerical interpolation. Practices with Mathematica.
3. Differentiability in one and several Study of extremes. Taylor polynomial. Adjustment for minimums squares. Numerical differentiability. Practices with Mathematica.
4. Integration in one and several variables. Numerical integration. Practices with Mathematica.
5. Numerical and functional sequences. Practices with Mathematica.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

With this methodology, the CGB1 competence will be developed and it will contribute to achieve the learning results. 1,2,11,12,13,14.

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

With this system, the CGB1 competence reached by the student will be evaluated. The positive evaluation will mean that the student has sufficiently achieved the learning outcomes 1,2,11,12,13,14.

During the course, both the theoretical concepts of the subject and the completion of work and practices with a computer will be evaluated. The procedure and dates for the evaluation of these aspects will be detailed more precisely at the beginning of the course. In any case, the virtual platform will appear, at least one week in advance, the dates or the limit of the dates in which said knowledge will be assessed.

The qualifications obtained by the students in the continuous evaluation process in the sections of Submission of work and exam with computer (or in writing) will be maintained in each of the official calls of the academic year.

In accordance with article 18 of the Regulations for the Academic Regime and Student Evaluation of the University of Jaén, an ordinary call will be considered exhausted when the evaluation tests in which the student has participated together account for more than 30% of the the final grade of the subject.

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

MAIN BOOKLIST:

- Advanced calculus of several variables . Edition: -. Author: Kumar, Devendra, author.. Publisher: Alpha Science International Ltd. ([Library](#))
- introduction to mathematical analysis . Edition: -. Author: Shirali, Satish, author.. Publisher: Alpha Science International ([Library](#))

ADDITIONAL BOOKLIST:

- Numerical methods problems and solutions . Edition: 2nd ed.. Author: Jain, M. K.. Publisher: New Age International P Ltd., Publishers ([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

Theory sessions on the contents of the program.

50% face-to-face

30 participatory master class sessions, lasting one hour each, held in the classroom and broadcast by videoconference to the rest of the group. Periodic rotation of students.

Practical sessions.

50% face-to-face

Development of 30 practical sessions, lasting two hours each, in laboratories applying rotation in small groups of 50%.

Retransmission of practical classes to the rest of the group. Tutorials.

Face-to-face + Online

Some tutorial sessions will be held in person and others online (synchronously and asynchronously).

ASSESSMENT SYSTEM

In a multimodal setting, the final exam will be face-to-face.

In the multimodal scenario, the evaluation system remains the same as that of a face-to-face scenario.

RESOURCES

In the multimodal scenario, the electronic resources will be those made available by the Linares EPS.

9. VIRTUAL TEACHING SCENARIO

Theory sessions on the contents of the program

30 participatory master class sessions, lasting one hour each, held by videoconference.

Practical sessions

Replacement of the 30 practical sessions with online training activities. Half of them will be asynchronous and the other half will be synchronous. In both cases, Mathematica will be used in online classes.

Tutorials.

Not face-to-face, by videoconference.

EVALUATION SYSTEM

The final exam will be held online.

In the non-face-to-face scenario, the evaluation system remains the same as that of a face-to-face scenario, except for the delivery of assignments and/or exercises that, if they have not been evaluated during the course, will be replaced by an online presentation.

RESOURCES

In the remote scenario, videoconferencing with Google-meet and communication through forums created on the virtual platform will be used.

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