



Universidad de Jaén
School of Engineering of Linares

Mathematical methods of telecommunications

2024-2025

Grado en Ingeniería Telemática

Grado en Ingeniería de Tecnologías de la Telecomunicación

Doble Grado Ingeniería de Tecnologías de la Telecomunicación e Ingeniería Telemática



GRATIS



Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Syllabus 2024-25 - 14311006 - Mathematical Methods of Telecommunications (Métodos matemáticos de las telecomunicaciones)

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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Full version (Spanish)

English

DEGREE: Grado en Ingeniería de telecomunicación (14311006)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Doble Grado Ing. de tecnologías de la telecomunicación e Ing. telemática (15211006)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Grado en Ingeniería telemática (14511006)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 ACADEMIC YEAR: 2024-25
 COURSE: Mathematical Methods of Telecommunications

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Mathematical Methods of Telecommunications
 CODE: 14311006 (*) ACADEMIC YEAR: 2024-25
 LANGUAGE: English LEVEL: 3
 ECTS CREDITS: 6.0 YEAR: 1 SEMESTER: SC

2. LECTURER BASIC INFORMATION

NAME: GARCÍA ZAMORA, DIEGO
 DEPARTMENT: U124 - MATEMÁTICAS
 FIELD OF STUDY: 595 - MATEMÁTICA APLICADA
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 LANGUAGE: - LEVEL: 3

3. CONTENT DESCRIPTION

Chapter 1. Vector analysis.

- Lesson 1. The Euclidean space.
- Lesson 2. Scalar and vector fields.
- Lesson 3. Line integral.
- Lesson 4. Surface integral.

Chapter 2. Complex Variable.

- Lesson 5. The complex plane.
- Lesson 6. Complex variable functions.
- Lesson 7. Derivability in complex sense.
- Lesson 8. Moebius transformations.
- Lesson 9. Integration of complex variable functions.
- Lesson 10. Residue Theorem.

Chapter 3. Differential equations.

- Lesson 11. Ordinary differential equations.
- Lesson 12. Linear differential equations.
- Lesson 13. Equations in partial derivatives.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

With these activities, the CGB1 competence will be developed and will contribute to achieving the learning results. 1,2,11,12,13,14.

- Lectures in large group (M2): Theoretical aspects of the subject will be developed as well as general practical examples that help to understand the theory.
- Classes in practical groups (M10, M11): 15 face-to-face hours will be devoted to problem solving. The other 15 face-to-face hours will be devoted to practical classes with ICT.

At the end of the term, if possible, one or two seminars will be given in English, preferably by Visiting Professors. These seminars will cover aspects of 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 CBB1 competence achieved 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. The aspects considered are detailed below:

- Theoretical concepts of the subject (from 0 to 6 points). Written exam on the theoretical and applied aspects of the subject. Likewise, a continuous evaluation system may be proposed in order to obtain the 6 points.
- Completion of work, cases or exercises (from 0 to 2 points). Participation in activities proposed by the teaching staff throughout the term.
- Laboratory/field practices/use of ICT tools (from 0 to 2 points). Exam in the computer classroom. A continuous evaluation system may also be proposed in order to obtain the 2 points.

In accordance with article 18 of the Regulations of the Academic regime and evaluation of the students of the University of Jaen, an ordinary call will be considered to be exhausted when the evaluation tests in which the student has 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:

- Ecuaciones diferenciales: con aplicaciones y notas históricas. Edition: -. Author: Simmons, George Finlay.. Publisher: McGraw-Hill ([Library](#))
- Curso de matemáticas superiores para ingenieros . Edition: -. Author: Krasnov, M.. Publisher: Mir [etc.] ([Library](#))
- Introducción a las ecuaciones en derivadas parciales: texto para estudiantes de ciencias e ingeniería . Edition: -. Author: Stephenson, G.. Publisher: Reverté ([Library](#))
- Variable compleja y aplicaciones . Edition: 7ª ed.. Author: Brown, James Ward.. Publisher: McGraw-Hill ([Library](#))

ADDITIONAL BOOKLIST:

- An introduction to ordinary differential equations . Edition: -. Author: Coddington, Earl A.. Publisher: Dover Publications ([Library](#))
- Matemáticas avanzadas para ingeniería. Edition: 2ª. ed. Author: James, Glyn. Publisher: Prentice Hall ([Library](#))

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

DETAILED INFORMATION

The course "Mathematical Methods in Telecommunications" contributes significantly to Sustainable Development Goal 4, which seeks to ensure inclusive and equitable quality education and promote lifelong learning. This course, through its syllabus, develops analytical skills and advanced techniques crucial to the field of telecommunications. Overall, the course offers an advanced and relevant mathematical education, providing students with the necessary skills to face technological challenges in telecommunications, thus promoting inclusive and equitable quality education and fostering lifelong learning.

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

- **Activities.**
 - **Theory sessions.** Attendance at 50%. 30 sessions of participative lectures, each lasting one hour, held in the classroom and retransmitted by videoconference to the rest of the group. Periodic rotation of students.
 - **Practical sessions.** Attendance at 50%. Development of 30 practical sessions, of two hours duration each, in laboratories applying the rotation in reduced groups of 50%. Retransmission of practical classes to the rest of the group.

- **Tutorials.** Face-to-face + Online. Some tutoring sessions will be face-to-face and others online (synchronous and asynchronous).
- **Evaluation System.** In a multimodal scenario, the final exam test will be face-to-face. In the multimodal scenario, the evaluation system remains the same as in a face-to-face scenario.
- **Resources.** In the multimodal scenario, the electronic resources will be those made available by the EPSL.

9. VIRTUAL TEACHING SCENARIO

- **Activities.**
 - **Theoretical classes.** 30 sessions of participative lectures, each lasting one hour, conducted by videoconference.
 - **Practical sessions.** Substitution of the 30 practical sessions by online training activities.
 - **Tutorials.** Non face-to-face, by videoconference.
- **Evaluation.** The final exam will be carried out online.
- **Evaluation.** In the non face-to-face scenario, the evaluation system remains the same as in the face-to-face scenario.
- **Resources.** In the non face-to-face scenario, the videoconference with Google-meet and the communication through forums created in 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 Jaén 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

