



Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Syllabus 2024-25 - 14513006 - Transmission Lines and Radiocommunications Systems (Líneas de transmisión y sistemas de radiocomunicaciones)

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 telemática (14513006)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Doble Grado Ing. de tecnologías de la telecomunicación e Ing. telemática (15213001)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 ACADEMIC YEAR: 2024-25
 COURSE: Transmission Lines and Radiocommunications Systems

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Transmission Lines and Radiocommunications Systems
 CODE: 14513006 (*) ACADEMIC YEAR: 2024-25
 LANGUAGE: English LEVEL: 2
 ECTS CREDITS: 6.0 YEAR: 4 SEMESTER: PC

2. LECTURER BASIC INFORMATION

NAME: ROA GÓMEZ, JUAN PEDRO
 DEPARTMENT: U134 - INGENIERÍA DE TELECOMUNICACIÓN
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 LANGUAGE: English LEVEL: 2

3. CONTENT DESCRIPTION

THEORETICAL CONTENTS :

CHAPTER 1 - TRANSMISSION LINES

Introduction to transmission lines
 Equivalent circuit of transmission lines
 Equations of transmission lines
 Primary and secondary parameters of transmission lines
 Lossy and lossless transmission lines
 Study of transmission lines in the time domain

CHAPTER 2: IMPEDANCE MATCHING IN TRANSMISSION LINES

The Smith chart
 Narrow band impedance matching
 Impedance matching with a single tuner in series and in parallel
 Impedance matching with discrete elements
 Noise, coupling and skin effect

Commercial lines and connectors

CHAPTER 3 - RADIOLINK FUNDAMENTALS

The transmitting antenna

The receiving antenna

Antenna parameters

Linear antennas: Hertz dipole and half wave dipole

Linear arrays

Practical antennas

Friis formula for the calculation of the received power

CHAPTER 4 - RADIOPROPAGATION

Propagation in space free

Propagation in real space

Radiopropagation mechanisms

Atmospheric refraction

Atmospheric absorption

PRACTICAL CONTENTS:

The practical block consist of compulsory practices in the laboratory of the matter treated in the subject.

1: Simulation and study of transmission lines

2: Analysis of impedance matching using the Smith Chart

3: Study of simple antennas

4: Simulation of a radiolink

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

A1. Lectures in large groups.

They are based on the explanation of the theoretical concepts of the subject through lectures, alternating with the explanation of examples and problems. Students will be provided with teaching material through the Learning Management System (LMS) platform to follow the classes. This material must be completed by the student with their own class notes and consultations in the bibliographic resources. In addition, students will be provided with the ability to keep up to date with new developments in science and technology, especially in this type of subject, so closely linked to such a dynamic environment as telecommunications, and specifically Telematics Engineering, emphasising the need for continuous training throughout their professional lives. Likewise, the ability to collect and interpret data and handle complex concepts within Telematics Engineering will be developed and promoted, in order to make judgements that involve reflection on ethical and social issues.

A2. Practical groups classes

They take place in the laboratory, and are based on the teacher's explanation of the practical activities in the laboratory and the students' performance of them. The student will be provided with teaching material and the script of the reports to be developed through the LMS platform.

As regards autonomous work, this will focus on the preparation of the documentation to be handed in for each practical, as well as completing the work started in the laboratory and which could not be finished in the corresponding session. Likewise, collaboration and teamwork will be encouraged through the design of the practicals themselves.

A3. Group Tutorials.

Group tutorials will be used to give seminars on different topics related to the subject, to clarify doubts raised by the students, as well as to attend and participate in different seminars, talks, conferences, workshops and/or conferences, designated by the teacher, with the aim of completing the training and obtaining general, transversal and/or specific competences defined for this activity, such as the value of continuous training, entrepreneurship or the review of technological innovations in the subject.

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

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5. ASSESSMENT METHODOLOGY

At the end of the term the students can choose between two assessment modalities: **CONTINUOUS ASSESSMENT** or **FINAL EXAM**.

■ Continuous Assessment

The Continuous Assessment modality will be carried out according to the outcomes of the activities planned in the **syllabus** and described in the section "Methodology and activities", in addition to those described in the section "Detailed description of the Continuous Assessment" that will be weighted by considering the aspects and percentages detailed in the above table.

In order to pass the course, students must obtain a grade equal to or higher than 5.0 out of 10 in the overall results, but with the condition of obtaining a grade equal to or higher than 4.0 in each of the individual aspects assessed. Otherwise, in the case of failing any of these two conditions (a grade equal to or higher than 5.0 out of 10 in the overall results, or equal to or higher than 4.0 in any of the assessed aspects), the student must follow the Final Exam modality.

■ Final Exam

In the FINAL EXAM modality, an exam will be held on the day set for the course within the exam period, which will cover all the course contents, ensuring that students have acquired the competences and learning outcomes established for the course. The two parts of this written exam are weighed as follows:

- Part 1: Attendance and participation, theoretical concepts and completion of study cases or exercises assignments (S1, S2, and S3): 70%.
- Part 2: Laboratory/ computer practical work (S4): 30%.

The specific conditions, as well as the material and/or documentation that may be used in the Final Exam will be established by the lecturer.

In order to pass the course, students must obtain a grade equal to or higher than 5.0 out of 10 in each of the two parts.

Students who have passed the S4 aspect (laboratory/computer practical work) of the course, through CONTINUOUS ASSESSMENT, with a grade equal to or higher than 5.0 out of 10, will not have to take Part 2 corresponding to this aspect in the exam. The same grade obtained in the CONTINUOUS ASSESSMENT will be assigned to this part.

The parts passed at each exam attempt will be maintained until the end of the academic year.

With this system will be evaluated the following learning skills:

C8, CBB4, CG.3, CG.4, CG.9

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

MAIN BOOKLIST:

- Transmission lines in digital and analog electronic systems [Recurso electrónico] : signal integrity. Edition: -. Author: Paul, Clayton R. Publisher: Hoboken, N.J. : J. Wiley & Sons ; [S.l.] : IEEE Press, c2010.
 - **Notes:** Temas 1 y 2
(Library)
- Radio propagation and adaptive antennas for wireless communication networks [Recurso electrónico] :. Edition: Second edition. Author: Blaunstein, Nathan. Publisher: Hoboken, New Jersey : John Wiley & Sons, [2014].
 - **Notes:** Temas 3 y 4
(Library)

ADDITIONAL BOOKLIST:

- Radio propagation and adaptive antennas for wireless communication networks [Recurso electrónico] :. Edition: Second edition. Author: Blaunstein, Nathan. Publisher: Hoboken, New Jersey : John Wiley & Sons, [2014].
 - **Notes:** Temas 3 y 4
(Library)

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

DETAILED INFORMATION

Goal 4. Quality education

Through the activities of this subject in large and small group classes, special emphasis is placed on the fact that telecommunication systems and services must be developed, implemented and maintained in a way that achieves resilient and robust industrialization, as well as as sustainable.

Furthermore, both with the training of content, abilities, skills and abilities, and with the development of the activities proposed to the students, personal initiative and the ability to solve problems autonomously are promoted in order to encourage innovation as a driving force for industrial development, especially in the field of telecommunications, as well as a wealth-generating element of a society.

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

Teaching methodology and learning activities

Learning activities	Format	Teaching methodology Description
A1. Lectures with big group of students	100% in person class	Participatory master class sessions, lasting one or two hours each, held in the classroom.
A2. Lectures with practical groups	100% in person class	Development of practical sessions, lasting two hours each, in laboratories.
A3. Tutorial lessons	100% in person class	Tutorial sessions, both collective and individual, will be carried out preferably online (synchronous and/or asynchronous). Tutoring sessions will be agreed between the person responsible for the subject/group and the students.

Schedule

The schedule can vary mainly due to the change from multi-modal scenario to the online one.

Evaluation system

There are no changes in the evaluation format (weights of each section) or in what is specified in the detailed evaluation.

Since the evaluation of the subject is continuous, there will only be an exam in the event that the student opts for the Single Test Evaluation, which is summarized in the following tables:

Ordinary call

Evaluation	Format	Description	Percentage
Final exam evaluation	In-person	This kind of evaluation is based in only one written exam that evaluates all the aspects of the subject, by assessing the students' acquisition of all the competences and learning outcomes established in the subject. This exam will take place during the Examination period on a date established by the centre.	S1, S2 and S3: 70% S4: 30%

Extraordinary call

Evaluation	Format	Description	Percentage
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	in the subject. This exam will take place during the Examination period on a date established by the centre.	S4: 30%
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Resources

Given that the attendance in the large group lectures and in the classes in practice groups is 100%, no exceptional resources are foreseen for them.

9. VIRTUAL TEACHING SCENARIO

Teaching methodology and learning activities

Learning activities	Format	Teaching methodology Description
A1. Lectures with big group of students. - Synchronous classes by videoconference. - Asynchronous classes based on videos and / or audiovisual content, forums, interactive material, etc	Online	The sessions of participative face-to-face classes, of one or two hours each, are replaced by other activities carried out through the Internet such as: - Classes by videoconference or in virtual classroom - Review of content on the Internet (forums, specialized websites)
A2. Lectures with practical groups	Online	Practical sessions are replaced by online training activities, of two hours each, by other activities carried out through the Internet such as: - Virtualized or simulation activities. - Joint programming in videoconference sessions and through the use of collaborative programming tools (github, etc.) - Visualization of videos with explanation of the practical contents.
A3. Tutorial lessons	Online	-Tutorial sessions, both collective and individual, will be carried out preferably online (synchronous and/or asynchronous). -Tutorial sessions will be agreed between the person responsible for the subject/group and the students.

Schedule

The schedule can vary mainly due to the change from multi-modal scenario to the online one.

Evaluation system

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Resources

Since all the teaching, either in the exposition classes in large groups or in the classes in practice groups, be taught online, the following resources will need to be used:

Common telematic resources (teachers and students):

- PC equipment or similar.
- Videoconference system or virtual classroom, such as Google Meet or BigBlueButton.
- Use of interactive tools: screen sharing to use comments as a virtual whiteboard in PDF presentations.
- Use of the teaching platform of the University of Jaén: messaging, forums, tasks, activities and means of evaluation.

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

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