



Universidad de Jaén

School of Engineering of Linares

Optical technologies

2024-2025

Máster Universitario en Ingeniería de Telecomunicación



GRATIS



Acceso Mayores 40

Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Movilidad (Coordinador)

P.O.D.

Solicitud bilingüismo

Syllabus 2024-25 - 74212003 - Optical Technologies (Tecnologías ópticas)

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:

Máster en Ingeniería de Telecomunicación

FACULTY:

SCHOOL OF ENGINEERING OF LINARES

ACADEMIC YEAR:

2024-25

COURSE:

Optical Technologies

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Optical Technologies

CODE: 74212003

ACADEMIC YEAR: 2024-25

LANGUAGE: English

LEVEL: 3

ECTS CREDITS: 4.0

YEAR: 1

SEMESTER: SC

2. LECTURER BASIC INFORMATION

NAME: PÉREZ DE PRADO, ROCÍO JOSEFINA

DEPARTMENT: U134 - INGENIERÍA DE TELECOMUNICACIÓN

FIELD OF STUDY: 800 - TEORÍA DE LA SEÑAL Y COMUNICACIONES

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LANGUAGE: English

LEVEL: 3

3. CONTENT DESCRIPTION

THEORY

Block 1. FUNDAMENTALS OF OPTICAL WAVE AND OPTICAL ELECTROMAGNETIC

- Introduction to Photonics.
- Electromagnetic fields and waves.
- Gauss Beam.
- Diffractive optics.

Block 2. PHOTONIC COMMUNICATIONS TECHNOLOGIES

- Basic photonic devices for optical communication systems.
- Passive photonic technologies for optical networks.
- Specialty fibers.

Block 3. FUNDAMENTALS OF OPTICAL PHOTONICS

- Optical photonics.
- Photons and atoms.
- Amplifiers lasers.
- Lasers.
- Photonic crystals.

PRACTICAL SESSIONS

Block 1. LASER LIGHT. GAUSSIAN BEAM CHARACTERIZATION.

Block 2. ELECTROMAGNETIC CHARACTERIZATION OF OPTIC FIBERS AND SYSTEMS. OPTICAL NETWORKS.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

A1 - Lectures in large group

The methodology to be followed in the lectures in large group lectures will be a mixture of theory introduction and exposing general examples with a practical perspective in the classroom designated for the subject in the middle.

The student must follow the teacher's presentation/explanation with the material provided for this purpose, slide show/notes, which must be completed with your own notes and the subsequent revision of the recommended basic bibliography.

Active, respectful and responsible participation, either to raise questions or to respond to requests or questions from the teacher, will be evaluated positively in a corresponding factor.

The autonomous student work should focus on the review of the concepts, theoretical and practical aspects taught in class, conducting exercises and studying them with the material provided by the teacher, student notes and bibliography.

Furthermore, control lectures will be held to monitor the progress and assimilation of the concepts by students.

A2 - Classes in groups of practices

Firstly, work in small group classes will be based on practical activities in the laboratory. The student's work will focus on developing applications or learning tasks designated by the teacher, culminating with the achievement of the targets for each practice. Secondly, small group classes consist of solving exercises, study cases and practical issues about the subject.

Attendance and active, respectful and responsible participation, either to raise questions or to respond to requests or questions from the teacher, it will be evaluated positively in a corresponding factor.

With regard to self-work, it will focus on the development of the software/projects/documentation/exams/expositions for every practice and to complete the work that has been initiated in the laboratory and that could not be completed in the corresponding session.

Furthermore, control/exposition sessions in the small group classes will be held to monitor the progress and assimilation of the concepts by 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

DETAILED INFORMATION

At the end of the semester, the student has to 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.

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

MAIN BOOKLIST:

- FTTX Concepts and Applications. Edition: -. Author: G. Keiser ([Library](#))
- Fundamentals of photonics. Edition: -. Author: Saleh, Bahaa E. A.. Publisher: New York [etc.]: John Wiley and Sons, cop. 1991 ([Library](#))
- Optical fiber communications. Edition: 3rd ed. Author: Keiser, Gerd. Publisher: Boston [etc.]: McGraw-Hill, 2000 ([Library](#))
- Photonic Crystals [Recurso electrónico] : Physics and Practical Modeling. Edition: -. Author: Sukhoivanov, Igor A. Publisher: Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg, 2010 ([Library](#))

ADDITIONAL BOOKLIST:

- Digital and analog fiber optic communications for CATV and FTTx applications. Edition: -. Author: Brillant, Avigdor. Publisher: Bellingham : SPIE Press ; Hoboken : John Wiley, 2008 ([Library](#))

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

Igualdad de género

Industria, innovación e infraestructura

DETAILED INFORMATION

Goal 4. Quality education

Throughout all the activities of the subject, fundamental aspects in relation to inclusion and equity will be addressed, which will also be part of the evaluation of the participation aspects. Thus, it will be promoted, both in large group expository classes, as well as in small groups, to use inclusive language both at the written and oral level and to attend to activities of various kinds focused on being equitable with the different learning capacities of the student.

.Furthermore, on the one hand, in large group classes the ability to collect and interpret data and handle complex concepts in the field of telecommunications will be developed and enhanced, to make judgments that involve reflection on ethical and social issues. On the other hand, in small group classes special emphasis will be placed on the need for continuous training and undertaking this activity independently throughout one's professional life, as well as the ability to stay up to date with new developments. in the field of telecommunications, taking a more technical approach.

Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation

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.

Goal 5: Achieve gender equality and empower all women and girls

In accordance with this objective, the language used by the teacher, all the contents and all the activities of this subject, whether in large or small groups, will be based on respect for gender equality, trying to encourage participation by equal in these activities of the entire student body without distinction of gender, as well as, when possible, making visible the presence of women in engineering to encourage their participation in future generations.

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.

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
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%

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 - Visualization of videos with explanation of the theoretical contents. - Review of interactive material on the subject. - 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. - Visualization of videos with explanation of the practical contents. - Review of interactive material about practices. - Online content review (forums, specialized websites, etc.)

Schedule

The schedule can vary mainly due to the change from multi-modal scenario to the online one. In this modality, the replacement of hardware practices by software practices with simulators of optical systems and other analyses of optical schematics and problem solving and case studies is contemplated.

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	Online	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
Final exam evaluation	Online	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%

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

Campus Las Lagunillas s/n | 23071 - Jaén

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