

60931 - Optical and microwave communications systems

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	533 - Master's Degree in Telecommunications Engineering
ECTS	5.0
Course	1
Period	Second semester
Subject Type	Compulsory
Module	---

1. Basic info

1.1. Recommendations to take this course

1.2. Activities and key dates for the course

2. Initiation

2.1. Learning outcomes that define the subject

2.2. Introduction

3. Context and competences

3.1. Goals

3.2. Context and meaning of the subject in the degree

3.3. Competences

3.4. Importance of learning outcomes

4. Evaluation

5. Activities and resources

5.1. General methodological presentation

The learning process designed for this subject is based on the following:

M1. Lectures . Presentation of the main contents of the subject, combined with the active participation of students. This activity will take place in the classroom in person. This methodology, supported by the work of the student (M14) is designed to provide the students with the theoretical foundations of the subject.

M8: Classroom practices . Sessions where problem solving and practical cases proposed by the teacher, related to the

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lectures, are performed by the students. It is expected that the students will expose individually or in groups authorized by the teacher. This activity will take place in the classroom in person. It may be required the use of laptops/tablets by the students.

M3: Laboratory practices Students will perform 5 practices in sessions of 2 hours in the L.3.02 Laboratory (Optics Laboratory) placed in the Ada Byron Building. There, training series in small groups will be held to consolidate some of the concepts developed throughout the classes. This activity will be conducted at the Laboratory in person. Students must complete questionnaires where the results obtained in experiments and reasoned discussion of these should be reflected.

M10: Tutoring . Personalized attention to students with the aim of reviewing and discussing the materials and topics presented in both theoretical and practical classes.

M11: Evaluation . Set of theoretical and reporting practices or works used in the evaluation of student progress. The detail is in the corresponding activities section.

5.2.Learning activities

The program that the student is offered to help you achieve the expected results includes the following activities
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Lectures will be given 2 hours weekly in the classroom, according to the calendar and structured as shown in the course syllabus

Practical Classes will be given 1 hour weekly dedicated to problem solving, counseling, critical sessions and joint exhibitions. Sometimes it will follow some aspects seen in lectures.

Organization of practical classes:

Advisory practical sessions aim to help students resolve doubts and questions that have arisen during the preparation of the theoretical part.

Laboratory Sessions: 4 laboratory practices, two hours each, will be developed in the laboratory 3.02 (optics laboratory)

Applied homework or practical research: throughout the semester applied homework to be developed by students in groups of 2 may be considered.

Individual tutorials: Students may ask individual tutorials for both monitoring practice or theoretical classes. A request for appointment should be agreed with the corresponding teacher.

5.3.Program

The distribution into thematic units of the subject is as Follows:

1. Introduction to optical communications systems

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- Analysis and design of conventional optical systems
- Limitations on transmission bit rate and distance: key devices

2. The wavelength degree of freedom: DWDM systems.

- Systems presenting wavelength division multiplexing
- Key devices in DWDM systems
- Limitations on DWDM systems: spectrum and transmission bit rate
- Insertion and drop of fixed channels: OADMs

3. New generation systems based on advanced modulation schemes.

- Using phase: devices
- Coherent systems. Limitations.
- Using Polarization
- Spectrum Optimization Techniques

4. Exploiting the resources: all optical networks.

- Flexibility in optical networks: ROADMs and their role in the design of optical networks
- ROADMs types and manufacturing technologies
- Channel, wavelength & fiber switching
- Flexible optical networks and their management layer

5. Other optical systems for new generation networks

- Radio over fiber systems
- Optical access networks

5.4.Planning and scheduling

Schedule of the sessions and presentation of works

Throughout the semester the following distribution of activities will take place:

- Weekly sessions of lectures integrated with practical problema solving classes.

- 2 hours laboratory practice sessions in small groups developed at the Laboratory of Optics (L3.02) located on the third floor of the Ada Byron building.

In any case, lectures and problem classes are held according to the schedule set by the school, as well as the laboratory practice sessions

Overall evaluation exams will be governed by the dates set by the EINA.

5.5.Bibliography and recommended resources

- Agrawal, Govind P.. Lightwave technology : telecommunication systems / Govind P. Agrawal Hoboken : Wiley-Interscience, cop. 2005
- Kartalopoulos, Stamatios V.. DWDM : networks, devices and technology / Stamatios V. Kartalopoulos Hoboken, New Jersey : Wiley Interscience, cop. 2003
- Agrawal, Govind P.. Applications of nonlinear fiber optics [Recurso electrónico] / Govind P. Agrawal . 2nd ed. Amsterdam ; Boston : Elsevier ; Burlington, MA : Academic Press, cop. 2008
- Saleh, Bahaa E. A.. Fundamentals of photonics / Bahaa E. A. Saleh, Malvin Carl Teich . - 2nd ed. Hoboken : Wiley

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and Sons, cop. 2007

- Bibliography based on literature that will be offered through the Moodle platform