

61072 - Optical and microwave communications systems

Syllabus Information

Academic year: 2024/25

Subject: 61072 - Optical and microwave communications systems

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 658 - Master in Telecommunications Engineering

ECTS: 6.0

Year: 1

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

This subject aims to train students to acquire the necessary skills for the exercise of the profession of telecommunications engineer in the field of optical and high frequency transmission systems, with special interest in the latest trends in optical networks.

2. Learning results

HA_01: Ability to plan, calculate and design products, processes and installations in all areas of telecommunications engineering.

HA_04: Capacity for mathematical modelling, calculation and simulation in technological and engineering centres of companies, particularly in research, development and innovation tasks in all areas related to Telecommunications Engineering and related multidisciplinary fields.

HA_07: Capacity for the start-up, direction and management of manufacturing processes of electronic and telecommunications equipment, guaranteeing the safety for people and goods, the final quality of the products and their homologation.

HA_12: Ability to implement cable, line and satellite systems in fixed and mobile communication environments.

HA_22: Ability to apply advanced knowledge of photonics and optoelectronics, as well as high frequency electronics.

CP_05: Innovation and Creativity.

CP_06: Permanent self-learning

CP_07: Ability to communicate (orally and in writing) the conclusions - and the knowledge and ultimate reasons that support them - to specialised and non-specialised audiences in a clear and unambiguous way.

3. Syllabus

1. Introduction to optical communications systems
2. Transmission rate and distance limitations: key devices
3. The degree of freedom of the wavelength: DWDM systems.
4. New generation systems based on advanced modulations.
5. Exploiting resources: all-optical networking
6. Other new generation optical systems

4. Academic activities

Theoretical classes: 3 hours of theoretical classes will be given weekly, according to the class schedule and structured in the topics related to the subject program (43 hours).

Problem classes: Dedicated to problem solving, consulting, critical sessions and joint expositions (9 hours).

Laboratory practices: 4 laboratory practices of two hours each will be developed (8 hours)

This course is English Language Friendly, meaning: the course syllabus is also available in English. Study and class materials are in English. The course faculty is willing to provide tutoring in English. Students are allowed to take their assessment tests in English.

5. Assessment system

The subject will be evaluated as follows:

1. **Partial theory tests (topics 1 to 3) (35%, minimum of 4 out of 10):** Gradual evaluation of subject matter consisting of

several partial tests. It is intended to ensure that the student has the basic knowledge to be able to undertake the resolution of more complex problems.

2. **Laboratory practices (15%, minimum of 5 out of 10):** they will be evaluated taking into account the attitude of the students and some questionnaires with the results obtained in their experiments in the laboratory and the reasoned discussion of the same.
3. **Problems or deliverable work (10%):** Problems and practical issues that are proposed and presented in the classroom, but can be developed or performed outside the classroom by students individually or in groups.

Students who have not obtained the minimum grade in the partial tests or laboratory practices or have not submitted the proposed work must take a test related to them in the global evaluation test.

4. **Exam on the second part (topics 4 to 6) (40%, minimum of 4 out of 10):** final written test to assess the knowledge acquired by the student and, in particular, their ability to apply it to solve practical problems and questions.

The student will have a global test in each one of the calls for exams established throughout the academic year. Dates and times will be determined by the School.

6. Sustainable Development Goals

- 4 - Quality Education
- 8 - Decent Work and Economic Growth
- 9 - Industry, Innovation and Infrastructure