

## 31018 - Communications Lab

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 31018 - Communications Lab

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 581 - Bachelor's Degree in Telecommunications Technology and Services Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

The main objective of the Communications Laboratory course is to provide students with the knowledge and relevant tools to develop and understand communication systems that involve the processing of different types of signals (optical signals, high frequency, biomedical signals, etc.) and the handling of associated opto-electronic devices and radiofrequency systems.

Students will acquire technical and analytical skills that are fundamental in the field of telecommunications. This will be accomplished through various practical experiences that also allow students to become familiar with some of the main applications in the field of signals and communications.

### 2. Learning results

- Ability to program and edit codes for analyzing signals of various natures
- Ability to develop methods for spectrally characterizing and identifying signals
- Ability to develop blind source separation methods
- Ability to manipulate optical fibers and active devices such as optical transmitters, amplifiers, and detectors.
- Use general-purpose and optics- and high-frequency-specific measurement equipment.
- Plan an experiment, designing the specific procedure for processing the results obtained and drawing conclusions from them.
- Use computer environments specifically designed for simulating communication systems.
- Ability to read and understand technical and scientific documents
- Capacity to clearly present technical concepts related to a communication system

### 3. Syllabus

Based on practical cases focusing on topics such as radar, biomedical signals, optical communications, etc., students will work on essential skills relevant to various communication systems:

- Array processing and spatial filtering
- Introduction to spectral estimation and time-frequency analysis
- Study of blind source separation methods
- Development of linear prediction algorithms
- Characterization of optical fiber transmission parameters
- Characterization of active and passive devices needed to create optical links
- Experimental analysis of optical transmission systems
- Use and programming in optical network simulation environments
- Handling of equipment for RF system characterization: VNA, spectrum analyzer
- Characterization of active and passive circuits in radiofrequency and microwaves

### 4. Academic activities

**Lectures:** will take place in the classroom or laboratory itself (6 hours spread over the semester).

**Laboratory practices:** will be held in the laboratory in small groups in 2-hour sessions. Two sessions per week are required (4 hours per week). Total: 48 hours

**Presentations:** will be held in the classroom, individually or in groups (6 hours).

Personal study and work: 90 hours.

## **5. Assessment system**

The subject will be evaluated in the modality of global evaluation through the following activities:

- Laboratory practices (75% of the grade).
- Presentations (25% of the grade).

If the student has not passed any of these activities during the semester, they will have the opportunity to pass the subject through a global test in the two official calls.

## **6. Sustainable Development Goals**

3 - Good Health & Well-Being

9 - Industry, Innovation and Infrastructure