

31009 - Optical communications and radiofrequency laboratory

Syllabus Information

Academic year: 2023/24

Subject: 31009 - Optical communications and radiofrequency laboratory

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 Optical Communications and Radiofrequency Laboratory subject is to provide the student with the skills and technical knowledge required for the manipulation and characterization of opto-electronic and radiofrequency devices and systems associated to communications systems.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the 2030 Agenda of United Nations (<https://www.un.org/sustainabledevelopment/es/>) and certain specific targets, such that the acquisition of the learning results of the subject will contribute to some extent to the achievement of targets 7.1, 7.3 and 7.b of Goal 7, target 8.2 of Goal 6, targets 9.1, 9.4, 9.5 and 9.c of Goal 9 and target 11.a of Goal 11.

2. Learning results

- Handle optical fibers including their preparation and alignment in an injection system and the correct use of the different types of connectors.
- Power active devices such as transmitters, amplifiers and optical detectors.
- Use radiofrequency equipment: vector network analyzer (VNA), spectrum analyzer, etc
- Use general measuring devices (oscilloscope, signal generator, optical spectrum analyzer, etc.).
- Use specific optical measuring equipment such as OTDR (optical time domain reflectometer), OSA (optical spectrum analyzer), etc.
- Handle optical devices specific to optical communications (multiplexers, couplers, attenuators, etc.) or of a general nature (monochromators, filters, polarizers, etc.).
- Apply the standards for the characterization of devices and optical fibers.
- Perform characterization of active and passive RF and microwave circuits.
- Plan an experiment, designing the specific procedure to process the results obtained and draw conclusions from them.
- Use specific computer environments for simulation of radiofrequency and optical communications systems.

3. Syllabus

- Handling and preparation of different types of optical fibers.
- Characterization of fiber optic parameters
- Characterization of active devices: transmitters, amplifiers and optical detectors.
- Characterization of passive devices: multiplexers, couplers, attenuators, etc.
- Experimental analysis of optical transmission systems.
- Use and programming in optical network simulation environments.
- Handling of equipment for the characterization of RF systems: VNA spectrum analyzer
- Characterization of active and passive radiofrequency and microwave circuits.

4. Academic activities

- **Lecture sessions:** held in the classroom or in the laboratory (12 hours distributed during the semester).
- **Laboratory practice sessions:** conducted in small groups, lasting 2 hours. Two sessions are required each week (4 hours per week).

5. Assessment system

The subject will be assessed in the **global** assessment modality by means of the following activities:

- **Laboratory practices** (50% of the grade).
- **Supervised assignments** (30% of the grade).
- **Final exam** (20% 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 by means of a global test in the two official exam calls.