

60032 - Communication physics

Syllabus Information

Academic year: 2024/25

Subject: 60032 - Communication physics

Faculty / School: 100 - Facultad de Ciencias

Degree: 538 - Master's in Physics and Physical Technologies
589 - Master's in Physics and Physical Technologies

ECTS: 5.0

Year: 1

Semester: Second semester

Subject type: Optional

Module:

1. General information

The purpose of this subject is to help the student to become familiar with theoretical concepts and experimental techniques used in the design and characterization of a communication system. Topics covered include electromagnetic radiation generation, propagation and detection, signal modulation and coding, properties of communication channels and the main transceiver architectures.

2. Learning results

- To determine the evolution of the characteristic parameters of an electromagnetic signal as a function of the propagation channel.
- To estimate the deformation of an electromagnetic signal in its propagation.
- To select the most suitable antenna type according to its transmitting and receiving properties.
- To distinguish the suitability of transceiver architectures according to the channel-signal context.
- To model a simplified high-speed serial communication system and extract the error rate from the signal-to-noise ratio.
- To calculate the fundamental parameters of an analogue receiver from the analysis and simulation of its structure.
- To interpret the specifications of a complete communication system.

3. Syllabus

The contents of the subject cover the following topics:

1. Introduction
2. Communications theory
3. Electromagnetic signal propagation: advanced treatment
4. Antennas
5. Main blocks in the transmitter of a communications system
6. Main blocks in the receiver of a communications system

4. Academic activities

The program offers the students help to achieve the expected results and comprises the following activities:

- Lectures, seminars on specific tools, presentation sessions and group problem-solving classes.
- Laboratory sessions.
- Personal work
- Study, presentation and discussion of selected topics in class.

5. Assessment system

The student must demonstrate achievement of the intended learning results through the following assessment activities:

- Resolution of exercises derived from the theoretical classes, their delivery on the set deadlines and possible presentation in class. Exercises not submitted on time will be graded with 0 points. This activity will be graded from 0 to 10 points and will represent 40% of the student's grade in the subject.
- Practical exercises, solving of the questionnaire corresponding to each practical session and its delivery on the corresponding deadlines. Questionnaires not submitted on time will be graded with 0 points. This activity will be graded

from 0 to 10 points and will account for 40% of the student's grade in the course.

- Production of proposed thematic works and their possible presentation in class, on a pre-established date. The student will be able to choose among different thematic works, of bibliographic and/or theoretical-practical nature, proposed by the teachers. This activity will be graded from 0 to 10 points and will represent 20% of the student's grade in the course.

In order to pass, it is essential to obtain at least 4 points in each of the assessed activities.

Passing the subject by means of a single global test.

The student who has not passed the subject with the proposed activities or who wishes to obtain a higher grade is entitled to a global test, which will take place during the period set for the exams. This test will consist of a theoretical and practical exercise.

6. Sustainable Development Goals

4 - Quality Education

9 - Industry, Innovation and Infrastructure

11 - Sustainable Cities and Communities