

30318 - Digital Communications

Syllabus Information

Academic year: 2024/25

Subject: 30318 - Digital Communications

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 438 - Bachelor's Degree in Telecommunications Technology and Services Engineering
581 - Bachelor's Degree in Telecommunications Technology and Services Engineering

ECTS: 6.0

Year: 581 - Bachelor's Degree in Telecommunications Technology and Services Engineering: 3

438 - Bachelor's Degree in Telecommunications Technology and Services Engineering: 2

Semester: First semester

Subject type: Compulsory

Module:

1. General information

The Digital Communications subject aims at the knowledge and understanding of the different blocks that integrate a digital communications system, completing the concepts that have been acquired in the subject of Communication Theory. The main objectives of the course are to achieve the learning outcomes in this guide.

2. Learning results

- Understand the basics of information theory.
- Know the basic techniques for coding sources of both analog and discrete nature.
- Master the basics of channel coding. Know the techniques of block-type channel coding and of convolutional type. Understand the principles underlying the Viterbi algorithm.
- Understand the need for proper frequency, phase, symbol, and frame synchronization for proper operation of a digital communications system.
- Know the basic systems of frequency, phase, symbol and frame synchronization in digital communications systems.
- Understand the need for channel equalization and know the basic techniques.
- Understand the concepts underlying digital multicarrier modulations and spread spectrum communications.

3. Syllabus

- UNIT 1. SYNCHRONIZATION IN DIGITAL COMMUNICATIONS SYSTEMS
- UNIT 2. BASIC ASPECTS OF INFORMATION THEORY AND SOURCE CODING
- UNIT 3. CHANNEL CODING
- UNIT 4. CHANNEL EQUALIZATION
- UNIT 5. MULTIPULSE AND MULTICARRIER MODULATIONS

4. Academic activities

- **Participative lectures: 40 hours**
Presentation by the teacher of the main contents of the subject.
- **Problem solving and case studies: 10 hours**
Problem solving and case studies of the fundamentals presented in the lectures.

- **Laboratory practices: 10 hours**

Carrying out a set of laboratory practices to consolidate the theoretical concepts developed in the lectures. The planning includes 5 sessions of two-hour duration.

- **Study and personal work. 84 hours**

- **Assessment tests. 6 hours**

5. Assessment system

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

E1: Laboratory practicals (30% of the grade, minimum grade 4 out of 10)

The laboratory practices of the course represent 30% of the final grade. Its assessment will be based on the reports provided by the students and on the attitude and performance in the laboratory.

E2: Intermediate written test (35% of the grade, minimum grade of 4.5 out of 10)

During the term there will be a written test that will be weighted 35% of the final grade. Obtaining a grade greater than or equal to 4.5 out of 10 in this test will exempt students from taking this part of the final exam (E3.1). In any case, they will be able to take this part to improve their grade.

If the student has not passed any of the evaluation activities E1 or E2 during the semester, she will have the opportunity of a global test in the two official exams.

E3: Final exam (70% of the grade, minimum grade of 4.5)

The final exam will consist of a written test divided into two parts (E3.1 and E3.2), both with the same weighting.

6. Sustainable Development Goals

8 - Decent Work and Economic Growth

9 - Industry, Innovation and Infrastructure