

Academic Year: ( 2019 / 2020 )

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Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: CESPEDES MARTIN, JAVIER

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Lineal Systems  
Communication Theory

## OBJECTIVES

Knowledge and management of the different techniques of digital communications (linear and non-linear, multi-carrier and spread spectrum), the structure of receivers in distorted channels.

The student will acquire knowledge about the principles of contemporary telecommunication systems. With an integrating and systemic character, the student acquires the ability to analyze and design complete telecommunication systems according to the fundamental quality parameters and requirements. He/She will also be able to evaluate the pros and cons of different technological alternatives. (PO a, c, e, h, j, k)

The student will learn the fundamentals of digital communication techniques, emphasizing the design of transmitters-encoders and receivers-decoders of digital communications systems for reliable and efficient transmission.

Also, the student will be capable of communicating efficiently in written and oral form, the procedure followed to solve problems of design of mobile communication systems. (PO g)

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to telecommunication systems and digital communications: classification, basic concepts of networks, systems and services, regulation.
2. Linear modulation techniques: low-pass and band-pass PAM; bandwidth and noise analysis.
3. Phase and frequency modulation techniques: phase non linear modulation; frequency and continuous phase modulation.
4. Multipulse modulation: multicarrier modulation.
5. Channel Coding
6. Fixed communication systems
7. Satellite communication systems
8. Mobile communication systems (introduction to 4G and New Radio)

## LEARNING ACTIVITIES AND METHODOLOGY

Two types of learning activities will be used: theory lectures and study cases.

ECTS credits include the work to be carried out by the student either personally or in groups.

### THEORY LECTURES (4ECTS)

Theory lectures are taught using the blackboard or other audiovisual media in order to illustrate some concepts. In these sessions the theoretical concepts will be illustrated with practical exercises.

In these lectures the student will acquire the basic knowledge of the course. It is important to highlight that these sessions will require the initiative and participation from the student (some concepts will have to be studied personally with some indications, particular cases will have to be developed)

#### Laboratories

In order for the student to acquire an integrated and systemic view of telecommunication systems, He/She will practice deeper, through personal work, in specific telecommunication systems. In these part the student will have to use the knowledge acquired in previous subjects, of a more specific character, about the different techniques and technologies that are applicable to telecommunication systems.

#### ASSESSMENT SYSTEM

<b>% end-of-term-examination/test:</b>	60
<b>% of continuous assessment (assigments, laboratory, practicals...):</b>	40

Assessment includes:

- Partial tests of continuous assessment.
- Laboratory practices.
- Final test.

The final mark is obtained as a weighted sum of the marks of the final exam (60%) and continuous evaluation (40%).

A minimum of 4 points over 10 need to be reached.

#### BASIC BIBLIOGRAPHY

- J.G. Proakis Digital Communications, McGraw-Hill, 2001