

Academic Year: ( 2023 / 2024 )

Review date: 12-04-2023

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: VAZQUEZ LOPEZ, MANUEL ALBERTO

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 2

## OBJECTIVES

The student must acquire the following competences:

- Knowledge to apply information theory methods, adaptive modulation, and channel coding, as well as digital signal processing advanced techniques applied to communication systems.
- Knowledge to apply analytic and algorithmic tools to deal with estimation and classification problems and, in general, with information processing problems.

## DESCRIPTION OF CONTENTS: PROGRAMME

- Communications: advanced receivers and modulation techniques
- Introduction to Information Theory
- Channel coding
- Distributed signal processing
- Dynamic models

## LEARNING ACTIVITIES AND METHODOLOGY

Three teaching activities are proposed: Theoretical classes, exercise classes and laboratory exercises. ECTS credits account for the time the student must work on his own or as part of a team.

### THEORETICAL CLASS AND EXAMPLES

The theoretical class will be given in the blackboard, with slides or by any other means to illustrate the concepts learnt. In these classes the explanation will be completed with examples. In these sessions the student will acquire the basic concepts of the course. It is important to highlight that these classes require the initiative and the personal and group involvement of the students (there will be concepts that the student himself should develop).

### CLASS EXERCISES

Before the exercise class, the student will have available the exercise formulation. The student should solve the exercises proposed in order to assimilate the concepts obtained in the theoretical class in a more complex environment and to self-evaluate his knowledge.

### LABORATORY EXERCISES

Basic concepts learnt during the course are applied in the laboratory and by means of simulation. The student should participate actively in the exercise implementation.

### TUTORIAL SESSIONS

The student can request a tutorial session to solve any difficulty that might arise during the course.

## ASSESSMENT SYSTEM

The continuous assessment will determine 100% of the total course grade, and will be evaluated throughout the academic year by means of midterm exams, written technical reports, and laboratory exercises.

% end-of-term-examination:	0
% of continuous assessment (assignments, laboratory, practicals...):	100

## BASIC BIBLIOGRAPHY

- Artés, A., Pérez González, F., Cid, J., López, R., Mosquera, C., Pérez Cruz, F. Comunicaciones digitales, Pearson.
- Cover, T.M., Thomas, J.A. Elements of Information Theory, Wiley-Interscience.
- Theodoridis, S Machine Learning - Learning From Data, Elsevier, 2015

#### ADDITIONAL BIBLIOGRAPHY

- Loeliger, H.A. An Introduction to Factor Graphs, Signal Processing Magazine, Jan 2004, IEEE.
- null Communications Magazine, IEEE.
- null Communications of the ACM, ACM.
- null Proceedings of the IEEE, IEEE.
- null Signal Processing Magazine, IEEE.