
Academic Year: (2023 / 2024)**Review date: 09-06-2021**

Department assigned to the subject: Signal and Communications Theory Department**Coordinating teacher: MIAH , MD SIPON****Type: Electives ECTS Credits : 6.0****Year : 1 Semester : 2**

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

No requirements.

OBJECTIVES

The student should acquire the following competences:

- Capacity to design and analyze complex communication systems that combine different types of algorithms (resource allocation, signal processing).
- Capacity to design optimization problems, define their complexity, and obtain a solution using computing tools and signal processing algorithms.
- Learn simulation methods to evaluate the performance of communication systems and their optimization.

At the end of the course the student will be able:

- To handle with ease the mathematical and numerical tools necessary to design, analyze and optimize the elements of a communications system ((physical layer and resource allocation).
- To understand, design, analyze and evaluate complex communication systems that combine several kinds of algorithms.
- To be able to solve practical problems in the design of communication systems using analytical methods and simulation.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to optimization and search techniques.
2. Introduction to simulation and modeling of communication systems. Methods
3. Practical application to selected projects.
4. Project presentation and discussion.

LEARNING ACTIVITIES AND METHODOLOGY

Theoretical lessons and problems

The lessons are composed of theory and practical examples with the aim of providing a better understanding.

Lab practices

Simulation of the practical cases described during the theoretical lessons.

Practica case.

A practical case in the framework of the cellular communications is proposed for simulation and analysis.

ASSESSMENT SYSTEM

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

The final mark is obtained as a weighted sum described below:

BASIC BIBLIOGRAPHY

- A. Goldsmith Wireless Communications, Cambridge University Press, 2005
- Convex Optimization Stephen Boyd and Lieven Vandenberghe, Cambridge University Press, 2004
- Jeruchim et al. Simulation of Communications Systems, Plenum, 1984
- Nemhauser, G. L. and Wolsey, L. A. Integer and Combinatorial Optimization, Wiley-Interscience Series in Discrete Mathematics and Optimization, 1988
- T.S. Rappaport Wireless Communications , Prentice Hall , 1996

BASIC ELECTRONIC RESOURCES

- Stephen Boyd and Lieven Vandenberghe . Convex optimization (CVX): <https://web.stanford.edu/~boyd/cvxbook/>