IEE2573 TELECOMMUNICATIONS LABORATORY

Credits and contact hours: 5 UC credits / 5 hours (5h. Laboratory experiences)

Instructor's name: Enrique Álvarez

Course coordinator's name   To be defined

Textbook: Introduction to Digital and Analog Communications, 2 Edition – S. Haykin and M. Moher

Course Catalog Description: This course allows the student to study different topics of telecommunications such as analog modulations (AM and FM), transmission lines, wireless communications, codification, antennas and digital communications, by developing Matlab projects and one final project consisting on the simulation of a complete digital communication system implemented using microcontrollers. Additionally, typical laboratory instruments such as the spectrum analyzer and antenna sets are used for demonstrative experiences.

Prerequisite Courses: IEE2513 Communications, IEE2183 Electrical Measurements Laboratory

Co-requisite Courses: To be defined

Status in the Curriculum: Elective

Course Learning Outcomes:
1. Lear how to use laboratory instruments such as the spectrum analyzer.
2. Adquire advanced skills in simulation using scientific computation softwares such as Octave and Matlab.
3. Design and simulate using microcontrollers a complete digital communication system considering each stage and generating Pb vs SNR curves.

Relation of Course to ABET Criteria:
a. Knowledge of mathematics, science and engineering
b. Design and conduct experiments: analyze and interpret data
c. Design a system, component, or process
e. Identify, formulate, and solve engineering problems
i. Recognition of the need for, and an ability to engage in life-long learning
k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. Experience 1 – Analog Modulations
1.1. Spectrum analyzer
1.2. AM and FM modulations
1.3. Costas Loop
2. Experience 2 – Transmission Lines
2.1. Impedance matching
2.2. Step response
3. Experience 3 – Wireless Communications
3.1. Friis equation and shadow decaying
3.2. Link Budget
3.3. Antennas
4. Experience 4 – Digital Communications
4.1. Microcontrollers
4.2. M-QAM
4.3. PB vs SNR curves
4.4. Codification methods