

61070 - Radar, radionavegation and satellite systems

Syllabus Information

Academic year: 2024/25

Subject: 61070 - Radar, radionavegation and satellite systems

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 658 - Master in Telecommunications Engineering

ECTS: 6.0

Year: 1

Semester: First semester

Subject type: Compulsory

Module:

1. General information

In the context of radar systems, the student is expected to understand the basic principles of continuous wave and pulsed wave radar systems, and the characteristics that current radar systems should have depending on the application. With regard to satellite communications systems and radio navigation systems, the student is expected to understand their topology based on the physical and mathematical principles necessary for the transmission of the transmission of information or for the determination of position, as the case may be, and to understand the limitations and difficulties of implementation with real devices.

2. Learning results

HA_01: Ability to design, calculate, and develop products, processes, and installations in all areas of telecommunications engineering.

HA_04: Ability for mathematical modeling, calculation, and simulation in technological centers and corporate engineering, particularly in tasks related to research, development, and innovation in all fields related to Telecommunications Engineering and allied multidisciplinary areas.

HA_07: Ability to initiate, manage, and oversee the manufacturing processes of electronic and telecommunications equipment, ensuring the safety of people and property, the final product quality, and its certification.

HA_11: Ability to develop radiocommunication systems: design of antennas, equipment, and subsystems, channel modeling, link calculation, and planning.

HA_12: Ability to implement cable, line, and satellite systems in fixed and mobile communication environments.

HA_14: Ability to design radionavigation and positioning systems, as well as radar systems.

CP_06: Continuous self-learning.

CP_07: Ability to communicate (orally and in writing) conclusions, and the knowledge and rationale underpinning them, to specialized and non-specialized audiences clearly and unambiguously.

3. Syllabus

Block 0. Introduction.

* Presentation of the subject.

* Basic knowledge required

Block I. Radar Systems.

* Introduction to radar.

* Basic concepts and technologies of radar systems: pulsed and continuous wave

* Interference from the environment and its treatment

* Advanced radar techniques

Block II. Satellite Communications Systems and Radiolocation

* Fundamentals of Orbital Mechanics and Geodesy.

* Satellite subsystems and space environment.

* Channel and Link calculation.

* Communication Techniques in Satellite Communications Systems: physical layer and Multiple Access.

4. Academic activities

Theoretical classes: 3 hours of theoretical classes will be given weekly, according to the class schedule and structured in the topics related to the subject program (43 hours).

Problem classes: Dedicated to problem solving, consulting, critical sessions and joint expositions (9 hours).

Laboratory practices: 4 laboratory practices of two hours each will be developed (8 hours)

This subject is English Language Friendly (ELF) in at least one group. The study and class material is available in English and the teachers will attend office hours and prepare and evaluate students in English if they don't speak Spanish.

5. Assessment system

The subject will be evaluated as follows:

1.Laboratory practices (25%, minimum of 5 out of 10): The laboratory practices to be carried out by each student will be evaluated through the reports submitted by the students and/or orally.

Students who have not obtained the minimum grade in the laboratory practices will have to take a test related to them in the global assessment test.

Final exam (75%, minimum of 4.5 out of 10): This is a written test that may include problem solving as well as theoretical and practical questions. This test evaluates all the learning results defined for the subject.

The student is entitled to a global test in each of the exams established throughout the academic year. Dates and times will be determined by the School.

6. Sustainable Development Goals

8 - Decent Work and Economic Growth

9 - Industry, Innovation and Infrastructure