

## 60983 - Radionavegation and guidance systems

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 60983 - Radionavegation and guidance systems

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 623 - Master's Degree in Telecommunications Engineering

**ECTS:** 3.0

**Year:** 2

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

The objective of this subject is to provide the student with a specialized vision of the most relevant aspects of the systems and algorithms applied in radio navigation and guidance systems, to learn advanced techniques for the optimal global design of medium-high complexity algorithms to improve the performance of basic positioning systems and the application of different technologies to improve final performance, as well as to learn about positioning in mobile, wireless and wireless systems and their applications.

In order to follow the subject normally, it is advisable to know and manage adequately the basic techniques of radio communication systems design acquired in the subject Antenna and Radio Communication Systems Design, the basic principles of radiolocation and the architecture of satellite communications systems acquired in the subject Radiolocation Systems and Satellites, and to know the basic aspects of signal processing techniques for communications and advanced communications.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>) and the activities planned in this subject will contribute to some extent to the achievement of Objectives 7.3, 7b, 8.2, 9.1 and 9.5 of the corresponding goals.

### 2. Learning results

- To master advanced concepts of terrestrial and satellite radio navigation systems
- To understand the different transmit and receive architectures for device navigation and guidance.
- To know advanced processing algorithms for global positioning in terrestrial environment using different positioning technologies.
- To apply the most appropriate radio navigation technique in different scenarios (indoors, outdoors, etc.).

### 3. Syllabus

#### Theory and practice:

Topic 1. Introduction and review of navigation fundamentals.

Topic 2. Advanced Navigation Algorithms and Systems

Topic 3. En Route Navigation.

### 4. Academic activities

Times and dates defined by EINA.

- Participative lecture, problem solving, case studies and laboratory practices: 30 hours, in classroom and/or laboratory.

#### Other activities:

- Tutored group work (information search, case resolution, report writing, meetings).

- Personal work (study, problem solving and writing practice reports).

### 5. Assessment system

The subject will be evaluated as follows:

- PF: Final test. This test will have a weight of 25% of the overall grade, graded from 0 to 10 points. This test evaluates all the learning results defined for the subject.
- PL: Laboratory practices and assignments (75%). Graded from 0 to 10 points. The laboratory practices, which must be carried out by each student during the academic year, will be assessed through the reports presented by the students and/or orally.

Obtaining a grade equal to or higher than 4.5 points in PL will exempt the student from taking the final practical exams. Students who do not achieve this grade must take the final test of tutored work and/or the final test of laboratory practices.

To pass the subject, 5 points out of 10 in the final grade are required.

The student will have a global test in each one of the calls established throughout the academic year. The dates and times of the tests will be determined by the School.