

## 30149 - Radar Systems

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 30149 - Radar Systems

**Faculty / School:** 179 - Centro Universitario de la Defensa - Zaragoza

**Degree:** 563 - Bachelor's Degree in Industrial Organisational Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject type:** Optional

**Module:**

### 1. General information

The subject introduces Radar Systems and the basic principles of their operation. The different types of existing radars are studied, as well as the characteristics and elements that they should have depending on the application. The electromagnetic signals, the techniques for capturing and detecting them and the most common signal processing methods in this type of systems are analysed. In addition, the operation of some radars with special features is presented in more detail.

### 2. Learning results

1. Defines the principles of operation of RADAR systems
2. Describes the mechanisms of electromagnetic wave propagation
3. Identifies the different existing RADAR systems, specify their applications and limitations, and explain their operating principles
4. Describes the most common techniques used for RADAR signal processing
5. Recognizes and describes the different technologies used in the design of RADAR systems: antennas, emitters, duplexers, data presentation displays, etc,
6. Defines the basic principles of secondary surveillance radars and IFF-SIF interrogators
7. Defines the concepts of Electronic Countermeasure (ECM), Electronic Countermeasure (ECCM) and Electronic Protective Measures (EPM)

### 3. Syllabus

The program of the subject is divided into the following thematic blocks:

1. Introduction to Radar Systems
2. Basic concepts and pulsed radar
3. Continuous wave radars
4. Interference from the environment
5. Special radars: Tracking Radars and Secondary Radars
6. Introduction to Electronic Warfare

### 4. Academic activities

The methodology followed for the teaching-learning process that has been designed for this subject is based on the following:

- Theoretical-practical classes that allow transmitting knowledge to the students, encouraging their participation, in which practical cases will be solved and theory will be taught without an explicit separation between the two.
- Personalized attention both in small groups and individualized tutoring.
- Continued study and personal work by the student from the beginning of the subject.
- Assessment tests.

## 5. Assessment system

### FIRST CALL

#### Continuous assessment

1. Midterm test on topics 1-2 of the subject (30% final grade). RA-1, RA-2, RA-3, RA-4 and RA-5 are evaluated.
2. Midterm test at the end of the term on topics 3-6 (30% final grade). RA-1, RA-3, RA-4, RA-6 and RA-7 are evaluated.
3. Exercises and individual and group work on the contents of the subject (40% final grade). RA-1, RA-2, RA-3, RA-4, RA-5, RA-6 and RA-7 are evaluated.

#### Global test:

Students who do not pass the subject by continuous evaluation or who would like to improve their grade, will have the right to take the overall test set in the academic calendar, prevailing, in any case, the best of the grades obtained. This global test will be equivalent to the continuous evaluation tests described above and will have a weight of 100% in the final grade.

### SECOND CALL

#### Global test:

Students who do not pass the subject in the first exam may sit for a Global Test set in the academic calendar for the second exam. This global test will be equivalent to the continuous evaluation tests described above and will have a 100% weight in the final grade.

Assessment instruments:	Weighting	RA-1	RA-2	RA-3	RA-4	RA-5	RA-6	RA-7
First midterm	30%	X	X	X	X	X		
Second midterm	30%	X		XX			X	X
Exercises and assignments	40%	X	X	X	X	X	X	X

## 6. Sustainable Development Goals

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