

28832 - Robotics

Syllabus Information

Academic year: 2023/24

Subject: 28832 - Robotics

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia

Degree: 424 - Bachelor's Degree in Mechatronics Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject type: Compulsory

Module:

1. General information

Robotics is an engineering discipline in its own right, so this subject serves as an introduction to it, which students can complete on their own or in a master's degree program.

The main objective will be to make the student aware of the problems they will face if professionally engaged in robotics, what are some of the known solutions to those problems and what issues remain unsolved. Robotics is a discipline that encompasses all the previous knowledge of the career.

Alignment with the SDGs:

- Goal 7: Ensure access to affordable, secure, sustainable and modern energy.

and, in particular, with the targets:

- 7.3: By 2030, double the global rate of energy efficiency improvement.

2. Learning results

To pass this subject, students shall demonstrate they has acquired the following results:

- Understand concepts related to industrial automation and control.
- Programming and commissioning robotic systems.
- Master modeling, analysis and design tools for control and automation systems.
- Acquire the fundamentals of industrial communications.

3. Syllabus

Theory

- Introduction to robotics
- Robot morphology
- Mathematical tools for spatial localization
- Robot kinematics
- Robot dynamics
- Kinematic control
- Dynamic control
- Trajectory control

Practical classes:

- Calculation of direct and inverse kinematics with programs
- Trajectory control
- Design practice of a robotic system

4. Academic activities

Face-to-face activities:

- Theoretical classes: The theoretical concepts of the subject are explained and illustrative practical examples are given to support the theory.
- Practical classes: Problems and case studies will be carried out as a complement to the theoretical concepts studied.

Non-face-to-face activities:

- Study and assimilation of the theory presented in the lectures.
- Understanding and assimilating problems and case studies solved in class.
- Resolution of proposed problems.
- Carrying out of group practices and preparation of reports.
- Preparation of written tests for continuous assessment and final exams.

The subject consists of 6 ECTS credits, which represents 150 hours of student work in the subject.

5. Assessment system

Students must demonstrate that they have achieved the intended learning results by means of the following assessment activities

- Practical work (30%). These assignments include 2 laboratory practicals and a complex design exercise. From each of the practices the student will be asked to submit a report that will serve as a basis for the assessment. To pass the subject, students must obtain a final grade of 5 or higher in the laboratory practicals.
- Theoretical-practical written tests (70%) in which questions and/or problems in the field of engineering of similar complexity to those used during the subject will be posed. The quality and clarity of the strategy of resolution, the concepts used to solve the problems, the absence of errors in the development and in the solutions, and the correct use of terminology and notation will be evaluated. In each of the theoretical-practical written tests, students must obtain a grade equal to or higher than 5 in order to pass.

The student will be able to choose between a split assessment, carried out in the form of two written tests and the delivery of the practices scripts during the term, or a global test at the end of the term (consisting of one exam per midterm) and the delivery of the practice scripts.