Universidad Zaragoza

Academic Year/course: 2023/24

29827 - Industrial Robotics

Syllabus Information

Academic year: 2023/24
Subject: 29827 - Industrial Robotics
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
326 - Escuela Universitaria Politécnica de Teruel
Degree: 440 - Bachelor's Degree in Electronic and Automatic Engineering
444 - Bachelor's Degree in Electronic and Automatic Engineering
ECTS: 6.0
Year: 3
Semester: Second semester
Subject type: Compulsory
Module:

1. General information

The objective of the subject is to train the student in the fundamentals of manipulation robotics applied to production processes . This requires approaching the discipline from two different perspectives: that of the user (robot selection/integration and application programming) and that of the robot designer (kinematic/dynamic modeling of manipulators, trajectorygeneration and servo control).

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations' Agenda 2030 https://www.un.org/sustainabledevelopment/es/ The acquisition of the learning results of the subject will contribute to some extent to the achievement of target 8.2 of Goal 8, and targets 9.1 and 9.4 of Goal 9.

2. Learning results

- To know in depth the drive, sensory and control subsystems of an industrial robot.
- To know the technical fundamentals to approach the design of the control system and programming of an industrial robot.

  Acquire skills to model and program an industrial robot.
- Evaluate the convenience and feasibility of robotizing production processes, taking into account economic, quality and safety aspects.
- To know how to design a robotic cell, selecting the robot and integrating it with other elements of the production process, and to design the robotic application using the programming language supplied with the robot.

3. Syllabus

- Introduction to industrial robotics.
- Industrial robot technologies.
- Kinematics of manipulators.
- Robot programming.
- Generation of trajectories.
- Dynamic modeling and servo control.
- Flexible robotics: perception and adaptation to the environment.
- Selection and implementation.

4. Academic activities

Distribution of activities to be carried out during the semester:

- Lectures (30 horas).
- Problem solving and case studies (15 hours).
- Laboratory practices (15 hours).
- Teaching assignments (24 hours).
- Study (60 hours)
- Assessment tests (6 hours)

At EUPT, the degree is offered in two different modalities: on-site and blended learning. For the presential modality all of the above applies. On the other hand, students who choose the blended mode in the EUPT will have from the beginning of the

subject the work material (moodle platform) and the bibliographical references that will allow them to follow the course independently. In the week in which the on-site students carry out a practice of laboratory or tutored work session, the professor will make the adaptations in the sessions and will enable the means (tutorials) to address the doubts that may arise to the students of the blended learning modality.

5. Assessment system

In accordance with the regulations of the University of Zaragoza, the assessment of this subject is global. It will be based on 3 rating items:

At Campus Río Ebro (Zaragoza).

1. Evaluation of the practical laboratory work (20%): carried out throughout the course (in each practical session), based on the previous study, the development of the work during the session, on the possible elaboration of reports or in the possible resolution of specific questions in the assessment tests.

2. Evaluation of the teaching assignments (30%): based on the report submitted and (if applicable) the oral presentation made according to the calendar of presentations to be established.

3. Individual written test (50%), to be taken in the official exams and consisting of theoretical and practical questions and problems.

In order to be able to average among them, a minimum score of 4 out of 10 must be reached in all of them. In the case of that a student has not performed (or has not passed the minimum grade) during the term any of the activities evaluated in items 2 and 3 (or if they wish to improve the grade obtained during the subject), each official exam call will include individual tests to evaluate the above mentioned items.

Teruel Campus.

1. Individual written test (40%): to be taken in the official exams and composed of theoretical and practical questions and problems.

2. Evaluation of the practical laboratory work (20%): carried out during the term (in each practical session), based on the previous study, development of the work, elaboration of reports, resolution of questions, etc.

3. Evaluation of the teaching assignments (40%): based on the report submitted and the oral presentation made according to the calendar of presentations to be established.

In the case of that a student has not performed (or has not passed the minimum grade) during the term any of the activities evaluated in items 2 and 3 (or if they wish to improve the grade obtained during the subject), each official exam call will include individual tests to evaluate the above mentioned items.