

30127 - Automatic Systems

Syllabus Information

Academic year: 2024/25

Subject: 30127 - Automatic Systems

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
179 - Centro Universitario de la Defensa - Zaragoza

Degree: 425 - Bachelor's Degree in Industrial Organisational Engineering
563 - Bachelor's Degree in Industrial Organisational Engineering

ECTS: 6.0

Year: 3

Semester: First semester

Subject type: Compulsory

Module:

1. General information

This subject belongs to the basic training module to address the knowledge of the fundamentals of automation and control methods.

Industry Profile: This subject aims that the student knows and manages the necessary concepts for the analysis and development of controls of different industrial processes.

Defense Profile: The objective of this subject is that the student acquires knowledge and skills to model, analyze and develop automatic control systems with different mathematical techniques.

Industry Profile: These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 agenda (<https://www.un.org/sustainabledevelopment/es/>), so that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement:

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

Specific target:

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

Defense Profile: These approaches and goals are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning results of the subject provides training and knowledge, skills and competencies to contribute in a certain extent to their achievement:

Goal 9: Industry, innovation and infrastructure.

2. Learning results

The student, in order to pass this subject, must demonstrate the following results...

1. Identify the subsystems and their relevant interconnections to automate the overall operation of the system
2. Select the most appropriate modeling, analysis and design techniques according to the control requirements.
3. Apply the techniques and methods for the design of the control system meeting the performance specifications

3. Syllabus

INDUSTRY PROFILE

Theoretical contents

- 1.- Automatic control systems.
- 2.- Elements of a control system
- 3.- PLC architecture
- 4.- PLC's Configuration and Programming
- 5.- Industrial communications

Practical contents

- 1.- Process control (discrete)
- 2.- Communication buses (Profibus, Profinet)
- 3.- HMI- SCADA

DEFENSE PROFILE

- 1.- Modeling of mechanical, electrical and electromechanical systems, transfer functions
- 2.- Analysis of first-order, second-order and higher-order systems
- 3.- Control of linear systems by the root locus method
- 4.- Analysis and control of systems with frequency techniques
- 5.- Discrete event systems

4. Academic activities

INDUSTRY PROFILE

The subject consists of 6 ECTS credits, which represents 150 hours of student work in the subject during the semester, i.e. 10 hours per week for 15 weeks.

The student's activities in this subject are as follows:

- 25h of lectures (theoretical exposition and problem solving)
- 25h of laboratory practice (2h sessions)
- 10h assessment tests (written and practical)
- 90h personal study.

DEFENSE PROFILE

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

The workload is distributed as follows:

- 46-48h of lectures (theoretical exposition and resolution of exercises)
- 8-10h of laboratory practice in sessions of 2h
- 8h of assessment tests
- 90h of student study

5. Assessment system

INDUSTRY PROFILE

The elements and assessment criteria detailed for the company profile are as follows:

1. Continuous assessment:

- Practical assignments (all of them to be completed)
- Theoretical-practical tests 80%
- Proposed individual work 20%
- At least 80% of the face-to-face activities (internships, technical visits, classes, etc.) must be attended.

2. Final global test:

- Final theoretical/practical test 100 %

DEFENSE PROFILE

The assessment criteria for the defense profile are:

1. Continuous assessment:

- **Two partial theoretical-practical tests.** Each exam is divided into a part with multiple-choice questions, with an expected value of zero, and a part of development exercises. The two exams will have weights of 25% and 45% respectively on the final grade
- **Laboratory practices.** They will consist of 4-5 assessable sessions. They will have an overall weight of 30% in the final grade.

In order to pass the continuous assessment, it will be necessary to have a grade of at least 4.5/10 in each of the two partial exams and a weighted average of all the parts (first and second partial theoretical-practical tests, and laboratory practices) of at least 5/10.

2. Global testing:

- **First call.** It will consist of two parts equivalent to the two partial tests mentioned above, where will apply the same criteria, and a practical part. Continuous assessment tests already passed will be kept.
- **Second call.** It will cover all program topics including practical concepts. It is divided into a part of type test (with negative score for each error) and one of exercises. It will be necessary to reach a minimum of 25% of the grade of each of the parts.

Assessment instruments:	Weighting	RA-1	RA-2	RA-3
Theoretical and practical	25%	x	x	

test 1

Theoretical and practical test 2	45%		x	x
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Laboratory practices	30%	x	x	x
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6. Sustainable Development Goals

5 - Gender Equality

7 - Affordable and Clean Energy

9 - Industry, Innovation and Infrastructure