29828 - Industrial Automation

Información del Plan Docente

Academic Year	2018/19
Subject	29828 - Industrial Automation
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

1.1.Aims of the course

The subject and its expected results respond to the following approaches and objectives:

The objective of the subject is to train the student in the key aspects related to industrial automation: advanced programming of programmable automata, industrial communications, human-machine interfaces, supervision systems, etc.

It is intended that after passing the subject the student has sufficient capacity for analysis, design and maintenance of automation systems of medium / large size. Also during the practical sessions has had a contact with real devices in all aspects cited.

1.2.Context and importance of this course in the degree

Within the Degree in Electronic and Automatic Engineering this subject is located in the second semester of the third year. In addition to the basic subjects of the first courses, the student must have completed the aforementioned Signals and Systems, Automatic Systems, and Control Engineering (in addition to a few subjects of the Electronic branch with which some content could perhaps be linked), for what should have a broad background. This subject is the last compulsory type of specific training in which the aspects that are his own are treated, and he finishes preparing for the technological options of the branch Automation and robotics.

1.3.Recommendations to take this course

Knowledge of modeling and control of discrete event systems is required, particularly those taught in the previous subjects Signals and Systems and Automatic Systems (or similar knowledge).

The personal effort, based on the study and continuous work, and from the first day of the course, is fundamental to overcome the subject.

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It is important to resolve any doubts that may arise as soon as possible, for which the student has the advice of the teacher, both during the classes and in the hours of tutoring intended for it. Specific consultations can be made through email.

2.Learning goals

2.1.Competences

Upon passing the subject, the student will be more competent to ...

Applied knowledge of industrial computing and communications

Ability to design control systems and industrial automation

Ability to conceive, design and develop engineering projects, as well as for the drafting and signing of projects in the field of industrial engineering aimed at the Degree

Ability to combine basic knowledge and specialized engineering to generate innovative and competitive proposals in the professional activity

Ability to solve problems and make decisions with initiative, creativity and critical reasoning

Ability to apply information technologies and communications in Engineering

Ability to communicate and transmit knowledge, skills and abilities in Spanish

Ability to use the engineering techniques, skills and tools necessary to practice it

Ability to work in a multidisciplinary group and in a multilingual environment

Capacity for information management, management and application of technical specifications and legislation necessary for the practice of Engineering

Ability to learn continuously and develop autonomous learning strategies

2.2.Learning goals

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

Knowledge of automated industrial technologies and facilities.

Knowledge of the architecture and programming languages of programmable automata

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Knowledge and implementation of the control of discrete systems

Knowledge and application of industrial communications and fieldbuses

Knowledge and application of supervision systems

Knowledge of safety and regulations in automated systems

2.3.Importance of learning goals

The aspects dealt with in this subject train the student to tackle medium and large-scale automation projects, in all their phases and at all levels (from the plant level to the link with the technologies that support high-level management of the company). In this sense it can be said that after passing the subject, the student is competent to go to the job market demonstrating ease in industrial automation issues, being able to consider a finalist subject that virtually leaves the formation of the almost imminent Electronics and Automation Engineer closed.

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he has achieved the expected learning outcomes through the following assessment activities

In accordance with the regulations of the University of Zaragoza, the evaluation of this subject is of a global nature. Given the relevance in the subject of the acquisition of practical skills, through the use of computer environments and in the laboratory, throughout the course will be evaluated such work in each session, based on the previous study, development of work, preparation of memories, resolution of issues, etc.

In each official call, the evaluation will comprise three parts:

EINA DE ZARAGOZA

Individual written test (30%). CT rated from 0 to 10.
Practices (30%). CP rated from 0 to 10.
Evaluation of a practical work (40%). CTP rated from 0 to 10.
Both practical and practical work can be overcome throughout the course. In any case, a specific individual test will be carried out during the evaluation period for students who have not passed them during the course, or who wish to upload a grade.

Some of the laboratory practices will be qualified at the end of the practical session itself. For this, the previous preparation, the personal work of the student during the laboratory session, and the final solution provided by him will be valued.

To pass the subject is essential to obtain a minimum of 40% in each of the three parts. Only in this case, the global qualification of the subject will be (0.30 * CT + 0.30 * CP + 0.40 * CTP). In another case, the overall rating will be the minimum between 4 and the result of applying the previous formula. The subject is exceeded with an overall score of 5 points out of 10.

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Practices (30%). CP rated from 0 to 10.
Evaluation of a practical work (40%). CTP rated from 0 to 10.
Both practical and practical work can be overcome throughout the course. In any case, a specific individual test will be carried out during the evaluation period for students who have not passed them during the course, or who wish to upload a grade.

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4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process that is designed for this subject is based on the following:

The teaching process will involve three main levels: lectures, problems and laboratory, with increasing

level of student participation.

* In the lectures the theoretical basis of the automated systems will be presented, illustrated with

numerous examples.

* In the classes of problems and issues such cases will be developed involving students.

* Laboratory practices will be developed in small groups where students perform the simulation,

implementing and analysing real automation and control systems.

* In addition, to encourage continuous and autonomous student work, additional learning activities to do

throughout the semester will be performed.

4.2.Learning tasks

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The program offered to the student for achieving the expected results includes the following activities ...

Class work: 2.4 ECTS (60 hours)

1) In-person class (type T1) (30 in-person hours).

Lectures of theoretical and practical content. The concepts and fundamentals of automatic systems are presented, illustrated with real examples. Student participation through questions and brief discussions will be encouraged.

2) Classes of problems and cases resolution (type T2) (15 in-person hours).

Problems and cases involving students, coordinated at all times with the theoretical contents will be

developed. Students are encouraged to work the problems previously. Some of these hours may engage in

learning activities assessable as specified in each course.

3) Lab (type T3) (15 in-person hours).

In practice the student will address issues specific of this subject from the practical point of view: Advanced programming automation systems, industrial communications, human-machine interfaces, supervision systems, PC based control, etc. That is, after the necessary phase of problem analysis and solution design, apply the theoretical concepts studied in the theoretical classes and problems, and put into practice on actual equipment, similar to that existing in the industry. The student will have a script of practice that must be prepared in advance. Each practice will be qualified in the laboratory.

Non-in-person work: 3.6 ECTS (90 hours)

4) Practical work (T6 type) (40 hours).

Activities that the student will perform alone or in groups and that the teacher will propose throughout the teaching period. In this course each student will work, in groups and individually, several evaluable activities.

5) Study (type T7) (46 non-in-person hours).

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Student Personal study of the theoretical part and realization of problems. The ongoing work of the student will be encouraged by the homogeneous distribution of the various learning activities throughout the semester. This includes tutorials, as a direct support for the student, identification of learning problems, orientation in the subject, advising to exercises and assignments ...

6) Evaluation tests (T8) (4 in-person hours).

In addition to the qualifying function, evaluation is also a learning tool with which the student checks the degree of understanding and assimilation reached.

4.3.Syllabus

The contents developed are:

- Automation Technologies. Programmable logic controllers.

- Automation Technologies. Sensors and Actuators.

- PLC programming. Languages and implementation of formal models.

- The marches and stops modes study guide: Gemma.

- Operation and safety of the automation systems

- Introduction to Industrial Communications.

- Fieldbuses and Industrial Ethernet

- Supervision systems.

- Industrial Security.

Practices in EINA, Zaragoza:
* Basic implementation of Gemma
* Advanced Implementation of Gemma

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* Industrial communications
* Terminals operation and dialogue
* Supervision Systems

Practices in EUP, Teruel:
* Basic implementation of Gemma
* Advanced Implementation Gemma
* Industrial communications
* Terminals operation and dialogue
* Supervision Systems

4.4.Course planning and calendar

Lectures and problem classes and practice sessions are held in the laboratory according to schedule set by the center (schedules available on their website).

Each teacher will inform its hours of tutoring.

The other activities will be planned depending on the number of students and will be announced in good time. It will be available on http://moodle.unizar.es

4.5.Bibliography and recommended resources