

## 29828 - Industrial Automation

### Información del Plan Docente

<b>Academic Year</b>	2016/17
<b>Academic center</b>	110 - Escuela de Ingeniería y Arquitectura 326 - Escuela Universitaria Politécnica de Teruel
<b>Degree</b>	440 - Bachelor's Degree in Electronic and Automatic Engineering 444 - Bachelor's Degree in Electronic and Automatic Engineering
<b>ECTS</b>	6.0
<b>Course</b>	3
<b>Period</b>	Second semester
<b>Subject Type</b>	Compulsory
<b>Module</b>	---

### **1.Basic info**

#### **1.1.Recommendations to take this course**

#### **1.2.Activities and key dates for the course**

### **2.Initiation**

#### **2.1.Learning outcomes that define the subject**

#### **2.2.Introduction**

### **3.Context and competences**

#### **3.1.Goals**

#### **3.2.Context and meaning of the subject in the degree**

#### **3.3.Competences**

#### **3.4.Importance of learning outcomes**

### **4.Evaluation**

### **5.Activities and resources**

#### **5.1.General methodological presentation**

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.

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\* 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.

### 5.2.Learning activities

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.

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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).

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.

### 5.3.Program

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.

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- 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
- \* 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

### 5.4.Planning and scheduling

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>

### 5.5.Bibliography and recommended resources

- 1. Piedrafita Moreno, Ramón. Ingeniería de la automatización industrial / Ramón Piedrafita Moreno . - 2a ed. amp. y act. Madrid : Ra-Ma, D.L. 2003 [cop. 2004]
- 2. Autómatas programables y sistemas de automatización / Enrique Mandado Pérez ...[et al.] . - 2ª ed. Barcelona : Marcombo, cop. 2009
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- 4. Ponsa Asensio, Pere. Automatización de procesos mediante la guía GEMMA / Pere Ponsa Asensio, Ramon Vilanova Edicions UPC, 2005
- 5. Tanenbaum, Andrew Stuart. Redes de computadoras / Andrew S. Tanenbaum, David J. Wetherall ; traducción, Alfonso Vidal Romero Elizondo ; revisión técnica, Cyntia E. Enríquez Ortiz . - 5ª ed. México : Pearson Educación, 2012

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- 6. Stallings, William. Comunicaciones y redes de computadores / William Stallings ; traducción, Jesús Esteban Díaz Verdejo ... [et al.] ; revisión técnica, Raúl V. Ramírez Velarde, M. en C. Jaquelina López Barrientos . - 7ª ed. Madrid [etc.] : Prentice Hall, D.L. 2004
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- 8. Rodríguez Penin, Aquilino. Comunicaciones industriales / Aquilino Rodríguez Penin Marcombo, S.A., 2008
- 9. Comunicaciones industriales : principios básicos / Manuel-Alonso Castro Gil ... [et al.] . - 1ª ed. Madrid : Universidad Nacional de Educación a Distancia, 2007
- 10. Rodríguez Penin, Aquilino. Sistemas SCADA : [notas de diseño, normativa, seguridad y comunicaciones industriales, primeros pasos con InTouch] / Aquilino Rodríguez Penin . - 2ª ed. Barcelona: Marcombo ; México D. F. : Alfaomega, D. L. 2007