28831 - Automation and Industrial IT

Información del Plan Docente

Academic Year   2017/18

Faculty / School   175 - Escuela Universitaria Politécnica de La Almunia

Degree   424 - Bachelor's Degree in Mechatronic Engineering

ECTS   6.0

Year   4

Semester   First semester

Subject Type   Compulsory

Module   ---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The teaching organization will be carried out following the following guidelines:

* Theoretical classes: Theoretical activities imparted in a fundamentally expository way by the teacher, in such a way as to expose the theoretical supports of the subject, highlighting the fundamental content, structuring it in themes and relating those themes to each other.

* Practical classes: The teacher explains and helps in understanding the use and management of necessary software for configuring and programming control devices (PLC's)

* Laboratory practices: Students will perform tests, measurements, assemblies, etc. in the laboratories arranged in groups, following a script provided by the teacher.

* Individual tutorials: They will be carried out in the department through a personalized attention to the student, with the goal of solving the doubts and difficulties the student faces. These tutorials can be carried out either face-to-face or virtually.

5.2.Learning tasks

The course consists of 6 ECTS credits, which represent 150 hours of student's work during the semester, which would equal to 10 hours every week during the 15 weeks the semester lasts.

The degree of experimentation is deemed high.

The student's activities in this semester, organised by duration are as follows:

* 25 hours of master classes (theoretical teaching and problem solving)
* 25 hours of laboratory practice, arranged in 2 hour sessions
* 10 hours of tests (written and practical)
* 90 hours of personal studying

5.3.Syllabus

Theoretical / Practical contents

1.- PLC inner architecture

* RAM, ROM, ALU, PSW.
* Digital I/O
* PAE and PAA
* Brands
* Scan cycle

2.- PLC configuring and programming

* Programming languages (KOP, AWL and FUP)
* Timers and counters
* Flanks
* Arithmetical and comparation operations
* Jumps
* Functions and configurable functions
* Data blocks and function blocks.
* Organization blocks
* Built-in functions

3.- Analog inputs and outputs

4.- Industrial sensors and detectors

- Inductive and capacitive sensors
- Photocells
- Temperature, distance, pressure,etc. sensors
- Encoders (absolute and incremental)
- Load cells (strain gauges)

5.- Industrial communications and distributed control fundamentals

- Introduction to industrial communications
- Communication elements
- Physical standards
- Network topologies
- Industrial protocols

6.- Industrial buses

- MPI communications
- Decentralized periphery
- Industrial buses (basic concepts)

Practical contents

1.- Process control (discrete)

- Simulation models basic industrial processes.

2.- Three-phase asynchronous motor speed variation

Commercial inverters configuring and programming (SIMATIC MM440)

- Three-phase asyncronous motor speed control

5.4.Course planning and calendar

Face-to-face sessions calendar and project presentation

The schedule of the master classes and laboratory practices will be established by the center at the beginning of each course. (This schedule will be published on the center website.)

The rest of activities (assignments hand-in, evaluation tests, etc...) will be planned according to the necessary groups and will be communicated to the students in advance at the beginning of the course

5.5.Bibliography and recommended resources

THE UPDATED BIBLIOGRAPHY OF THE SUBJECT CAN BE CONSULTED THROUGH THE LIBRARY WEB PAGE
http://psfunizar7.unizar.es/br13/eBuscar.php?tipo=a

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Guerrero, Vicente. Comunicaciones
industriales / Vicente Guerrero, Luis

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Martínez, Ramón L. Yuste. - 1ª ed
Barcelona : Marcombo, cop. 2010
Kuo C. Benjamín.. Sistemas de control
automático/Benjamin C. Kuo. - 7ª edición
Pearson Educación, 1996