28836 - Advanced Automation and Control Engineering

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	Second semester
Subject Type	Optional
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.

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* 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 roups, 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, which represent 150 hours of student's work during the semester, which would equal to10 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 study

5.3.Syllabus

Theoretical contents

1.- Industrial communications

- Physical standards
- Flow control technique
- Network topology
- Métodos de acceso al medio
- Networks interconnections (gateways)

2.- Industrial communication networks AS-i

3.- Industrial communication networks PROFIBUS

4.- Industrial communication networks PROFINET

5.- Introduction to supervision

- SCADA (WinccFlexible)
- Monitoring and data acquisition devices

Practical content

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1.-Profibus-DP network

- PLC(s7-300) as master and ET200 as slave
- PLC(s7-300) as master and frequency converter (MM440) as slave

2.- WinccFlexible

- Introduction
  - Operator panels types
  - Creating a project
  - Establish connections or communication parameters
- Variables
  - Creating variables, data types and adressing
- Images
  - Creating images, System image.
  - Navigation between images.
  - Text fields.
  - Input/Output fields.:numeric, graphical and symbolic.
  - Graphic librares.
  - Use of buttons, switches, bars and other controls.
- Message management
- Recipes
- Configurations transfering.
  - Updating an operator panel's operating system.
  - Communication transfering.
- Configuring and programming a "Flexible Cell"
  - Grafcet.
  - Defining the different functional stages of the cell
  - Defining the different operation modes
  - SCADA system.
  - Communicating the different stages through PROFIBUS.

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

BB	Guerrero, Vicente. Comunicaciones industriales / Vicente Guerrero, Luis Martínez, Ramón L. Yuste. - 1ª ed Barcelona : Marcombo, cop. 2010
BB	Kuo C. Benjamín.. Sistemas de control

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automático/Benjamin C. Kuo. - 7ª edición
Pearson Educación, 1996