# 220204 - Advanced Automation and Control of Industrial Processes

### Coordinating unit:
205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering

### Teaching unit:
707 - ESAII - Department of Automatic Control

### Academic year:
2019

### Degree:
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Teaching unit Compulsory)

### ECTS credits:
2.5

### Teaching languages:
Catalan

## Teaching staff

**Coordinator:**
JOSEP CUGUERÓ ESCOFET

**Others:**
- ENRIQUE JAVIER AJENJO ESCOLANO
- RAMON COMASOLIVAS FONT
- JAUME FIGUERAS JOVE
- FERNANDO GUILLERMO SANABRIA ORTEGA

## Degree competences to which the subject contributes

### Specific:
1. Ability to design and project control systems and advanced automated production processes.

## Teaching methodology

The course methodology consists of:
- Class sessions.
- Laboratory sessions.
- Self study.

In the class sessions, professors will introduce the theoretical foundations of the subject, concepts, methods and illustrate them with examples and exercises to ease their understanding.

In laboratory sessions, professors guide students in applying theoretical concepts to solve experimental set-ups, based on critical thinking. Activities are proposed with the aim to promote the discussion and use the basic tools necessary to perform an automation system.

Students work on the material provided by the professors.

## Learning objectives of the subject

Develop students' critical analysis and sufficient ability in automation technology selection and control strategies necessary to solve real problems in the field of advanced production and control of industrial processes.
## Study load

<table>
<thead>
<tr>
<th>Total learning time: 62h 30m</th>
<th>Hours large group: 15h 24.00%</th>
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<tbody>
<tr>
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<td>Hours medium group: 0h 0.00%</td>
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<td>Hours small group: 7h 30m 12.00%</td>
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<td>Self study: 40h 64.00%</td>
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Last update: 25-07-2019
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## Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Learning time</th>
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</table>
| **Module 1: Introduction to PLC** | PLC Introduction, CIM pyramid concept. PLCs classification. Data Format. Internal Structure of a PLC. Memory map of a PLC connectivity with sensors and actuators. Scan cycle concept. Structures of multi PLC CPU. PLCs Programing. | **Learning time:** 21h  
Theory classes: 4h  
Laboratory classes: 2h  
Self study: 15h |
| **Module 2: PLCs programming** | The PLC programming standard IEC 1131-3 Programming Languages: IL, ST, LD, FBD Design and structure of a program: SFC SFC Examples on programming of PLCs | **Learning time:** 20h 30m  
Theory classes: 7h  
Laboratory classes: 3h 30m  
Self study: 10h |
| **Module 3: Industrial communications** | Introducció: Arquitectura CIM del sistema d'automatització i control industrial. Models de referència del sistema de comunicacions: models OSI i TCP/IP. Aspectes de nivell físic, enllaç, xarxa, transport i aplicació. | **Learning time:** 21h  
Theory classes: 4h  
Laboratory classes: 2h  
Self study: 15h |

## Qualification system

The final grade of the course is calculated in the following way:
- Practical activity, specification and programming of the control system: 50%
- Final written exam: 50%
According to school regulations, no additional assessment activities are needed.
Bibliography

Basic:


Complementary: