

## 340122 - ININ-K6007 - Industrial Informatics

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering  
 Teaching unit: 707 - ESAIL - Department of Automatic Control  
 Academic year: 2018  
 Degree: BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)  
 BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)  
 BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)  
 ECTS credits: 6 Teaching languages: Catalan, Spanish, English

### Teaching staff

Others: Francesc Xavier Parra Llanas

### Learning objectives of the subject

### Study load

Total learning time: 150h	Hours large group:	30h	20.00%
	Hours medium group:	0h	0.00%
	Hours small group:	30h	20.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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### Content

#### Theory

Degree competences to which the content contributes:

Description:

Objectives

- To introduce to the student in the world of the applications of computer science in the scope of the industry.
- To analyze the different elements that constitute an industrial computer science system, from the physical process to the integration of the industrial systems of control, happening through the study of the implementation and programming of the industrial computers.

Contents

1. INTRODUCTION
  - 1.1. The computer in the control systems.
  - 1.2. Historical evolution of the control systems.
  - 1.3. Structure of a control system. Type.
  - 1.4. Characteristics and needs of the control systems.
2. THE PHYSICAL PROCESS
  - 2.1. Type of process.
  - 2.2. Continuous processes, analogical control.
  - 2.3. Continuous processes, digital control.
  - 2.4. Digital processes.
3. THE INDUSTRIAL COMPUTER
  - 3.1. Hardware and architecture of the industrial computer.
    - 3.1.1. Technological evolution.
    - 3.1.2. Basic elements.
    - 3.1.3. Architecture.
    - 3.1.4. Interface with the process.
    - 3.1.5. Techniques of data transfer.
    - 3.1.6. Interfaces of communication.
    - 3.1.7. Systems based on bus.
  - 3.2. Software and programming of the industrial computer.
    - 3.2.1. Type of programming.
    - 3.2.2. Programming languages
  - 3.3. The PC: an example of industrial computer.
4. INDUSTRIAL COMMUNICATIONS
  - 4.1. Introduction: elements and concepts.
  - 4.2. The model of reference OSI: levels and protocols.
  - 4.3. The physical level.
  - 4.4. The level of data link.
  - 4.5. Communications networks.
    - 4.5.1. Local area networks.
    - 4.5.2. Industrial networks. Fieldbus, MAP and TOP.
    - 4.5.3. Public networks of communication.
5. INTERFICIES WITH the USER
  - 5.1. Elements of hardware
  - 5.2. Programming of graphical interfaces of user.

#### Laboratory

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Degree competences to which the content contributes:

Description:

Objectives

The fundamental objective is the implementation on a general purpose computer, control of a direct current motor. Specifically, the system control (engine DC) is respecting the remote control station. The final solution is achieved from the integration of different modules that are developed along the laboratory sessions

Contents

1. Introduction to the programming language C.
2. Construction of bookstores in C.
3. Programming of interruptions.
4. Programming of the port series.
5. Programming of the acquisition card.
6. Global integration of the system.

### Qualification system

The qualification of the subject takes into account all the work done along the course. The final qualification is obtained to apply the following formula:

$$NF = 0.2 EP + 0.4 EF + 0.2 PL + 0.2 EL$$

Where:

EP = mark of the partial examination.

EF = mark of the final examination.

PL = mark of the laboratory practices.

EL = mark of the laboratory examinations.

NF = final mark of the subject.

### Bibliography