

Academic Year: ( 2022 / 2023 )

Review date: 31-05-2022

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: ALONSO MARTIN, FERNANDO

Type: Compulsory ECTS Credits : 3.0

Year : 4 Semester : 1

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Industrial Automation

**OBJECTIVES**

- o Advanced knowledge in automated processes.
- o Professional application of acquired knowledge.
- o Problem-solving capability in an autonomous way.
- o Capability of designing automated processes.
- o Knowledge of design and simulation tools of automated processes.
- o Ability to analyse, design, simulate, and optimize automated processes.

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Introduction to the course
  - a. Rules and evaluation
  - b. Review of concepts
  - c. General terms definitions (PLC, SCADA, RTU (remote terminal unit), DCS (distributed control system),  $\zeta$ )
  - d. Industry 4.0
2. Flexible manufacturing systems and Lean manufacturing
  - a. History
  - b. Principles
  - c. Pros and cons
  - d. Examples of application
3. Information management
  - a. CIM architectures
  - b. CIMOSA (Computer Integrated Manufacturing Open System Architecture)
  - c. Communication protocols
  - d. Field buses
  - e. Industrial Ethernet
  - f. Cloud information management
4. Material management
  - a. Strategies for material management
  - b. Automated storage and retrieval systems
  - c. Automated guide vehicles
5. SCADA systems
  - a. Requirements and definition
  - b. Components and architectures
  - c. Human-machine interface
  - d. Security
6. Analysis and simulation tools
  - a. Goals
  - b. Methods
  - c. Tools
  - d. Examples
7. Quality management
  - a. What is quality management?
  - b. Quality planning
  - c. Quality control
  - d. Quality improvement
  - e. Quality assurance

f. Examples

#### LEARNING ACTIVITIES AND METHODOLOGY

Theoretical lessons and doubts solving sessions, support sessions and student personal work; this is aimed at the acquisition of theoretical knowledge.

Laboratory and problem solving sessions, support sessions and student personal work; this is aimed at the acquisition of practical abilities.

#### ASSESSMENT SYSTEM

Continuous assesment: 50% (minimal mark: 2,5)

- o Project: 20%
- o Labs: 20%
- o Class participation: 10%

End-of-term exam: 50% (minimal mark: 2,5)

**% end-of-term-examination:** 50

**% of continuous assessment (assigments, laboratory, practicals...):** 50

#### BASIC BIBLIOGRAPHY

- - Slides and problems available in Aula Global, -.
- David Bailey, Edwin Wright Practical SCADA for industry, Elsevier, 2003
- J. Balcells y J.L. Romeral. Autómatas Programables., Marcombo..
- J. R. Tony Arnold, Stephen N. Chapman, Lloyd M. Clive Introduction to Materials Management, SIXTH EDITION , Pearson Prentice Hall.
- James A. Regh Computer Integrated Manufaturing (third edition), Prentice Hall, 2004
- Piedrafita Moreno, Ramón. Ingeniería de la automatización industrial, Ra-Ma, 2003

#### ADDITIONAL BIBLIOGRAPHY

- Mike Wilson Implementation of robot systems : an introduction to robotics, automation, and successful systems integration in manufacturing, Elsevier.