

Academic Year: (2022 / 2023)

Review date: 20-05-2022

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: ALONSO MARTIN, FERNANDO

Type: Compulsory ECTS Credits : 3.0

Year : 5 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Industrial Automation

OBJECTIVES

Basic competences

- o Advanced knowledge in automated processes (CB1).
- o Professional application of acquired knowledge. (CB2).

General competences

- o Problem-solving capability in an autonomous way (CG1).
- o Capability of designing automated processes (CG3).
- o Knowledge of design and simulation tools of automated processes (CG9).

Specific competences

- o Ability to analyse, design, simulate, and optimize automated processes (ECRT6).

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), λ)
 - 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 (assignments, 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.