Design and analysis of automated processes

Academic Year: (2020 / 2021) **Review date: 29-09-2020**

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: CASTRO GONZALEZ, ALVARO

Type: Compulsory ECTS Credits : 3.0

Year : 4 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Industrial Automation

OBJECTIVES

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

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

Specific competences
- 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), ¿)
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)
- Project: 20%
- Labs: 20%
- 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. Balcels 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.