

Academic Year: ( 2023 / 2024 )

Review date: 27-04-2023

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: MARTINEZ DE LA CASA DIAZ, SANTIAGO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 2

## OBJECTIVES

### BASIC COMPETENCES

CB7 That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study

CB8 That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments

CB9 That students know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialized and non-specialized audiences in a clear and unambiguous way

### GENERAL COMPETENCES

CG1 Knowledge and understanding of the theoretical foundations of both industrial processes and services, and communications.

CG2 Ability to model, identify basic requirements and analyze various processes.

CG4 Knowledge and understanding of the management principles applicable to productive and service environments.

CG6 Capacity to adapt to changes in requirements associated with new products, new specifications and environments.

### SPECIFIC COMPETENCES

CE1 Ability to design automatic process systems (production machinery, transport and storage systems and quality control) and the interconnection between their different modules (industrial protocols)

CE7 Ability to apply the communication of devices, both among them and globally, in the environment of Connected Industry 4.0

CE9 Ability to identify computer security requirements in connected industry environments

CE10 Programmatic data processing capabilities in solving particular problems of the connected industry

CE11 Ability to design customizable and adaptable mechanical parts and objects

### LEARNING RESULT

After completing this subject matter, the student will be able to:

- Analyze the new digital production systems under the model of IC4.0 and the study of demand. Know the new technologies of digital product production: additive production, rapid prototyping, total quality control, etc.
- Design new flexible production systems of low and medium complexity that are capable of producing on demand
- Manage the production of a medium-sized system and manage the supply

## DESCRIPTION OF CONTENTS: PROGRAMME

Common themes of the subjects:

- Concept of digital production
- Analysis and design of advanced production systems
- Simulation of the productive processes identifying the restrictions

- Analysis of the complete product cycle

Specific themes of the subjects:

Flexible and reconfigurable production systems:

- Flexible production systems
- Modular and reconfigurable systems
- Customization of production and on-demand production
- Optimization of production cycle times
- Simulation tools for flexible systems: digital twin

## LEARNING ACTIVITIES AND METHODOLOGY

TEACHING ACTIVITIES REGARDING TO THE SUBJECT:

AF1	Theoretical class
AF2	Practical class
AF4	Laboratory class
AF5	Tutorials
AF6	Group work
AF7	Student individual work
AF8	Exams

Activity Code	Nº Total Hours	Nº Classroom Hours	% Classroom /Student
AF1	12	12	100
AF2	6	6	100
AF4	3	3	100
AF5	2	2	100
AF6	25	0	0
AF7	25	0	0
AF8	2	2	100

## ASSESSMENT SYSTEM

The assessment system is:

- Individual or group work (SE2): 100%

<b>% end-of-term-examination:</b>	40
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	60

## BASIC BIBLIOGRAPHY

- Dorf, Richard, Kusiak, Andrew Handbook of Design, Manufacturing, and Automation, John Wiley&Sons inc., 1994
- Mike Wilson IMPLEMENTATION OF ROBOT SYSTEMS: AN INTRODUCTION TO ROBOTICS, AUTOMATION, AND SUCCESSFUL SYSTEMS INTEGRATION IN MANUFACTURING, Butterworth-Heinemann, 2014
- Tadej Bajd INTRODUCTION TO ROBOTICS, Springer Science & Business Media, 2013

## ADDITIONAL BIBLIOGRAPHY

- Horacio Ahuett-Garza Industry 4.0 and Smart Manufacturing, ScienceDirect, 2018