

Academic Year: ( 2024 / 2025 )

Review date: 18-09-2024

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

### GOALS OF THE SUBJECT:

The main objective of the subject is to learn and apply concepts of Connected Industry 4.0 in the process of designing and implementing automated production systems. To do this, they will learn to use tools for the development of digital twins, industrial communications and virtual commissioning.

### 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:

- 1) Master classes on concepts, design and virtual commissioning of production systems in Connected Industry 4.0
- 2) Practical classes to learn the use of virtual development tools for automated flexible production systems
- 3) The student must develop an individual work guided by the teacher
- 4) Students will develop group work guided by the teacher
- 5) Students will carry out personalized tutorials to solve questions related to the development of the proposed activities

## ASSESSMENT SYSTEM

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

The evaluation of the subject is carried out as follows:

- Assessment of individual work in class (60%)
- Evaluation of group work (40%)

#### 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