## Smart Factories

**Academic Year: ( 2023 / 2024 )**                                        Review date: 24-05-2023

**Department assigned to the subject: Systems Engineering and Automation Department**

**Coordinating teacher: MARTINEZ DE LA CASA DIAZ, SANTIAGO**

**Type: Electives  ECTS Credits : 3.0**

**Year : 1 Semester : 2**

## OBJECTIVES

The objectives of the subject are:
- Acquire basic knowledge of the theoretical foundations of both industrial and service processes, as well as communications.
- Acquire the ability to model, identify basic requirements and analyze various processes. This objective will be achieved through the virtual design of automatic process systems (production machinery, transport and storage systems and quality control), the interconnection between its different modules (industrial protocols) and intelligent control.
- Apply AI technologies to adapt to changes in requirements associated with new products, new specifications and environments

LEARNING RESULT
After completing this subject matter, the student will be able to:
- Design a digital Smart Factory (Digital Twin)
- Use distributed industrial communications
- Manage the production and the supply with IA

## DESCRIPTION OF CONTENTS: PROGRAMME

The subject is divided into two blocks, one theoretical and one practical.

In the theoretical block the following basic concepts related to production systems are taught:

1) Smart Factories models and structures:
- Definitions.
- Fundamental objectives
- Main structures
- Organizational models
- Main applications and examples

2) Industrial production technologies:
- Structures of production systems
- Industrial sensors and actuators
- Industrial communications
- Control of industrial systems

The practical block explains the development of a digital twin of a production system and the application of AI algorithms for its study and control:

3)Virtual design of automated systems
-Digital Twin development

4) Application of artificial intelligence in production systems

## LEARNING ACTIVITIES AND METHODOLOGY

In the theoretical block, theoretical classes will be held to explain the fundamental concepts (AF1). In these sessions, the teacher will present these concepts (MD1).

The practical block will be developed through theoretical and practical classes so that the student

applies the concepts explained (AF2, AF3, AF6, AF7).

The concepts explained will be put into practice through a personalized individual/group work (MD5).

Tutorials will be held at the student's request (AF5)

## ASSESSMENT SYSTEM

Individual/goupal work will be carried out taking into account the development milestones detailed in the calendar of activities (SE2)

**% end-of-term-examination:**     0

**% of continuous assessment (assigments, laboratory, practicals…):**     100