

Academic Year: (2023 / 2024)

Review date: 14-07-2023

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: CANTERO GUISANDEZ, JOSE LUIS

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Students must have completed the subject of the Master in Industrial Design Engineering: Advanced manufacturing systems and processes

OBJECTIVES

KNOWLEDGE

- K2C: Understanding the digitalization process of production and machine learning.
- K2F: Knowledge of tools, reference architectures and key technologies within the industry 4.0-5.0 paradigm.
- K2G: Knowledge of process sensorization systems and automated quality control systems.

SKILLS:

- S2F- Capacity to monitor manufacturing processes and signal processing.
- S2G- Application of digital design and production tools under the I4.0-I5.0 model (additive production, rapid prototyping, total quality control, etc.)
- S2C- Management of design tools based on finite elements for their application in simulation of forming and mechanical behavior of advanced materials.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Digitization and integration of production systems.
2. Optimization and control of machining processes:
 - to. Digital twins and predictive tools based on numerical modelling.
 - b. Monitoring of manufacturing processes and signal processing.
 - c. Application of Artificial Intelligence tools.
3. Automated quality control.

LEARNING ACTIVITIES AND METHODOLOGY

Training activities will include:

- Lectures with mainly theoretical content.
- Practical classes in a conventional or computer classroom. Problems, practical cases and presentations by groups of students of proposals for digitization projects in production systems and processes will be carried out.

ASSESSMENT SYSTEM

To pass the subject it is mandatory to attend and carry out the laboratory practices.

- Practices (20%).
- Presentation of proposals for digitization projects and other practical projects (60%).
- Partial exam (20%).

ORDINARY FINAL EVALUATION:

Option 1: Evaluation without final exam (continuous evaluation note = 100%).

Option 2: Evaluation through the final exam. The note will be the maximum of the two following:

- Note of the final exam (60%) and note of the continuous evaluation (40%).
- Note of the continuous evaluation (100%).

EXTRAORDINARY FINAL EVALUATION:

The note will be the maximum of the two following:

- Note of the final exam (60%) and note of the continuous evaluation (40%).

- Not of the final exam (100%).

% end-of-term-examination:	0
% of continuous assessment (assignments, laboratory, practicals...):	100

BASIC BIBLIOGRAPHY

- Chandrakant D. Patel, Chun-Hsien Chen Digital Manufacturing Key Elements of a Digital Factory, Elsevier, 2023
- Masoud Soroush, Michael Baldea, Thomas F. Edgar Smart Manufacturing. Concepts and Methods, Elsevier, 2020