

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

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

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:

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

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%).

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