Universidad Zaragoza

Academic Year/course: 2024/25

60816 - Manufacturing Technologies

Syllabus Information

Academic year: 2024/25
Subject: 60816 - Manufacturing Technologies
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 532 - Master's in Industrial Engineering
ECTS: 6.0
Year: 1
Semester: First semester
Subject type: Optional
Module:

1. General information

The objective of the subject is the learning of aspects related to machining processes (principles, machines, tooling, tools, CNC programming...), dimensional metrology, and quality management techniques applied to the control of processes and products throughout their entire life cycle to ensure the efficiency of industrial processes and meet the product requirements in the market.

2. Learning results

- To acquire a broad knowledge based on scientific, technological, and economic criteria about the different manufacturing processes and systems.
- To identify the advantages and disadvantages of different manufacturing processes and systems, as well as the defects that their application may present and the means to control and prevent them.
- To select the most suitable machining manufacturing processes based on the knowledge of their capabilities and limitations, and according to the technological, technical, and economic demands of both the product and the market.
- To recognize and apply the basic considerations to set up a process sheet.
- To interpret the metrological control guidelines used to ensure the quality of products and processes.
- To know various existing automation systems and levels, selecting the most suitable according to productivity and flexibility criteria.
- To know the models of industrial quality and be able to integrate the functions of manufacturing and measurement into them.
- To acquire a critical attitude towards solutions already used, in a way that encourages the student to delve into the study and analysis of the subjects of this discipline and to propose innovation strategies.

3. Syllabus

Theoretical-practical syllabus:

1. Metrology.
2. Quality.
3. Fundamentals of machining processes.
4. Mechanics of cutting and machining economy.
5. Manufacturing systems.
6. Process planning.

Laboratory practices:

1. Measurement and calibration in dimensional metrology.
2. Geometric measurement with conventional systems and with three-coordinate measuring systems.
3. QFD and FMEA.
4. Turning, drilling and milling processes.
5. Grinding and electroerosion processes. Tools.
6. Machine tool programming.

4. Academic activities

- **Master class** (28 hours).

Expository sessions of theoretical and practical content that cover the concepts and fundamentals of manufacturing

technologies.

- **Problem solving** (14 hours).

They are integrated with theory classes to facilitate their learning as well as to provide a practical and applied view of the subject.

- **Laboratory practices** (18 hours).

Six practical sessions in workshops and laboratories of three hours each, which complement those parts of the subject that require the use of specific equipment.

- **Study and personal work** (85 hours).
- **Assessment tests**(5 hours)

5. Assessment system

Gradual assessment
Students can opt for a gradual assessment, but if they do not pass any of the tests, they are entitled to undergo global assessment. It's divided into:

- Evaluation of practical sessions: 30% of the final grade.
  - After each practice, the student must submit a report and/or answer a small quiz.
  - If the student does not deliver the reports within the deadlines and/or obtains grades below 4.0, they will not pass that test.
- Solving theoretical-practical issues and problems: 70% of the final grade.
  - This block is divided into two: quality (40%) and manufacturing (60%). A minimum grade of 4.0 is required in each of them to average (in a weighted manner) with the practical block. If this part is evaluated under the gradual assessment mode, a number of written tests will be established during the semester.

Overall assessment
It will consist of a written test including:

- Solving theoretical-practical issues and problems: 70% of the final grade (minimum 4.0 out of 10 to average). This part has the same division, conditions, and percentages as those indicated for its equivalent in the gradual assessment.
- Evaluation of practices: 30% of the final grade (minimum 4.0 out of 10 to average).

On the other hand, the second call for exams will be carried out through a comprehensive test conducted in the period established for this purpose in the academic calendar.

6. Sustainable Development Goals

9 - Industry, Innovation and Infrastructure
12 - Responsible Production and Consumption