

## 29720 - Manufacturing Technology I

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 29720 - Manufacturing Technology I

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 330 - Complementos de formación Máster/Doctorado  
434 - Bachelor's Degree in Mechanical Engineering

**ECTS:** 6.0

**Year:** 434 - Bachelor's Degree in Mechanical Engineering: 3

330 - Complementos de formación Máster/Doctorado: XX

**Semester:** First semester

**Subject type:** 434 - Compulsory

330 - ENG/Complementos de Formación

**Module:**

### 1. General information

#### Objectives of the subject

The objective of the subject is to learn aspects related to machining processes, metrology and quality control involved in the production of mechanical components. That is, the design and development of the product manufacturing processes according to design specifications and within the requirements of quality, costs and delivery times, as well as the equipment (systems) to carry out these processes according to different levels of automation and flexibility. This subject focuses on the planning of machining processes, so present in the final shaping of products and means of production, and on industrial quality models, in which manufacturing and measurement functions are integrated.

**Sustainable Development Goals** of the Agenda 2030 <https://www.un.org/sustainabledevelopment/es/>( ): Goal 8: Target 8.2; Goal 9: Target 9.4; Goal 12: Target 12.5

#### Recommendations for taking the subject

It is advisable to have computer equipment, preferably a laptop with Windows 10 (minimum), in order to be able to install the CAD/CAM application that will be used in class and at home, as well as safety shoes for access to the workshop for machining practices.

### 2. Learning results

1. Identify different manufacturing processes and systems, including advantages and disadvantages, and shortcomings that may be present in their application.
2. Select the most suitable manufacturing processes based on the knowledge of their capabilities and limitations and according to the technological, technical and economical requirements of the product and the market requirements.
3. Interpret the metrological control guidelines used to ensure the quality of products and processes.
4. Know industrial quality models and be able to integrate manufacturing and measurement functions into them and relate them to other management systems.

### 3. Syllabus

#### Agenda

1. Manufacturing concept and general classification of manufacturing processes.
2. Fundamentals of machining processes
3. Cutting mechanics and machining economy
4. Manufacturing systems. Tools. Machine tool programming.
5. Process planning. CAPP
6. Metrology
7. Quality

#### Laboratory/workshop practicals

1. Turning and grinding processes
2. Drilling, milling and EDM processes.
3. CNC/CAM programming of machine tools.
4. Geometric measurement with conventional systems and with three-coordinate measuring systems.
5. Measurement and calibration in dimensional metrology.

6. QFD and FMEA.

#### 4. Academic activities

The proposed methodology seeks to encourage the student's continuous work. In the sessions with the full group, the more theoretical aspects are dealt with in the form of lectures and are completed with the development of problems and the study of technical cases. The practical sessions are developed in smaller groups to work with specialized computer applications and manufacturing workshop and laboratory equipment of metrology. Teamwork is encouraged for the planning of machining processes, up to CAM programming of the components. There is also teamwork in the Metrology and Quality practice sessions.

**Face-to-face activities:** 2.4 ECTS (60 hours)

1) **Class** (28 hours).

2) **Problem classes** (14 hours, integrated with theory in the full group schedule).

3) **Laboratory practices** (18 hours, in sessions of 3 hours duration).

**Non-face-to-face activities:** 3.6 ECTS (90 hours)

4) **Study and team work** (85 non face-to-face hours).

5) **Assessment tests** (5 hours)

#### 5. Assessment system

The tracking of the subject is recommended. In order to achieve this, a gradual assessment system is offered.

The tests of the gradual assessment free up material in the official calls if the indicated minimums are indicated.

1) Assessment of the practical sessions on metrology and quality (15% of the final grade, minimum grade 4/10)

This block consists of the preparation of a set of reports related to the practical sessions.

Failure to submit reports on time and/or obtaining grades lower than 4.0 in any report, means a negative assessment and in such a case, it must be recovered in the global exam of practices.

$N_{pract}$  = average of practice report grades, if all exceed the minimum mark of 4/10

2) Control on Metrology/Quality (30% of the final grade, minimum grade 4/10 in the exam and 3/10 in the problem). It is performed in the global test.

3) Team work on component machining (30% of the final grade, minimum grade 5/10)

The work consists of planning the machining of 2 components (one focused on turning processes and the other on milling processes). It is carried out in teams of 3 or 4 students, who must write a report, deliver the CAM files and make a final presentation. The assessment contains a fixed part of group and an individual part, which is assigned according to the answers in the presentation session and the opinion of the team members.

The deadline for submitting the work is provided in the ADD at the beginning of the term. In the first weeks the students must form the work groups and then the pieces are assigned, being able to ask for the