

Academic Year/course: 2021/22

## 29620 - Manufacturing Technology

### Syllabus Information

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**Academic Year:** 2021/22

**Subject:** 29620 - Manufacturing Technology

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

**Degree:** 430 - Bachelor's Degree in Electrical Engineering

**ECTS:** 6.0

**Year:** 3

**Semester:** First semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

### 1.1. Aims of the course

The subject and its expected results respond to the following approaches and objectives:

Manufacturing engineering is the "science whose object is the knowledge, application and development of optimal processes to obtain mechanical assemblies according to design specifications, based on the use of production factors and taking into account the purposes of the individual, company and society".

In this context, 4 fundamental pillars come together in this subject:

It is intended to provide the student with a broad knowledge base related to the fundamentals and characteristics of different manufacturing processes currently used in industrial environments such as molding, plastic deformation, machining or welding and assembly processes.

Given these knowledge, it will be sought that the student given a product to manufacture deepen aspects related to the design and development of mechanical components, structuring them in phases applying an appropriate methodology for their achievement.

In addition, the student will know and analyze different manufacturing systems that currently exist, as well as the technologies necessary for their development.

Finally, it is intended that the student knows and understands the foundations of Industrial Metrology as well as the application of industrial quality concepts and techniques in the field of product and process quality assurance.

The contents of Graphic Expression and Computer Aided Design, and of Resistance and Engineering of Materials that have been previously taught will contribute to a better understanding of the concepts and foundations that will be studied during the development of this subject.

### 1.2. Context and importance of this course in the degree

The Manufacturing Technologies subject belongs to the Common Industrial Branch module and is taught in the third in the first semester. Its contents will contribute to provide the student with the basis to face situations related to Manufacturing Technologies in their professional development and to solve different particular situations within the scope of the Degree in Electrical Engineering. The student before the manufacture of a product will be able to analyze different alternatives for the approach of the process taking into account technological and economic criteria, as well as the interactions with its design, and the manufacturing systems necessary for its development in real environments.

### 1.3. Recommendations to take this course

In this subject different manufacturing processes, Metrological control techniques as well as Quality models applicable in industrial environments are presented.

For pedagogical and content reasons, it is recommended to have taken the courses Graphic Expression and Computer Aided Design, and Resistance and Materials Engineering.

The study and continued work, from the first day of the course, are essential to overcome the subject with the maximum advantage. It is important to resolve any doubts that may arise as soon as possible, for which the student has the assistance of the teacher, both during classes and during the tutoring hours dedicated to it.

## 2. Learning goals

### 2.1. Competences

Upon passing the subject, the student will be more competent to ...  
Generic skills:

Ability to plan, budget, organize, direct and control tasks, people and resources (C2)

Ability to combine basic and specialized engineering knowledge to generate innovative and competitive proposals in professional activity (C3)

Ability to solve problems and make decisions with initiative, creativity and critical reasoning (C4)

Ability to analyze and assess the social and environmental impact of technical solutions acting with ethics, professional responsibility and social commitment, always seeking quality and continuous improvement (C8)

Specific competences:

Ability to apply basic knowledge of production and manufacturing systems (C26)

Ability to select manufacturing and measurement processes in the field of industrial production (C26)

Know the integrated quality models (C26)

## 2.2. Learning goals

The student, to pass this subject, must demonstrate the following results ...

Identify different manufacturing processes and systems, including advantages and disadvantages, and defects that your application may present.

Select the most suitable manufacturing processes based on knowledge of their capabilities and limitations and according to the technological and economic requirements of both the product and the market.

Interpret the metrological control guidelines used to ensure the quality of products and processes.

Knows the industrial quality models and is able to integrate manufacturing and measurement functions into them.

## 2.3. Importance of learning goals

- Acquire a broad knowledge base based on scientific, technological and economic criteria on the different manufacturing processes and systems.

- Identify its advantages and disadvantages.

- Selects the most suitable manufacturing processes based on knowledge of their capabilities and limitations and according to the technological, technical and economic requirements of both the product and the market.

- Interprets the metrological control guidelines used to ensure the quality of products and processes.

- Get to know various existing systems and levels of automation, selecting the most appropriate one based on productivity and flexibility criteria.

- Knows the industrial quality models and is able to integrate manufacturing and measurement functions into them.

# 3. Assessment (1st and 2nd call)

## 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that they have achieved the expected learning outcomes through the following assessment activities

The evaluation of the subject will be carried out globally. Thus, during the course of the subject, the student must demonstrate that he has achieved the learning results of a theoretical - practical type. For this, an evaluation system with two types of tests has been designed.

Test 1: Assumes 30% of the final grade.

To evaluate the practical contents of the subject, students have planned to prepare a set of reports, associated with the problem and practical sessions. These reports will be delivered within a maximum period of 1 week after your proposal

The criteria for evaluating these works will be: adequate content, good approach, extraction of interesting conclusions and good presentation.

To pass the course and demonstrate that the student has achieved the expected learning results, the grade obtained in each of the assignments must be equal to or greater than 4. The grade will be from 0 to 10 and this grade will represent 30% of the final grade.

In the case of non-delivery of the corresponding report and / or the grade obtained is less than 4, the student must take a practical exam in the laboratory corresponding to said part, being compulsory to pass said exam to pass the course.

Test 2: Assumes 70% of the Overall Rating.

Written test consisting of solving theoretical-practical questions and problems related to the subject, in which the learning outcomes described in this guide will be evaluated. It will be valued: the correct use of Spanish, the ability to synthesize, the clarity of the exposition, the coherence in the reasoning, the adequacy of the answer to what is asked and the degree of knowledge of the subject matter.

The grade will be from 0 to 10 and the result will represent 70% of the student's overall grade in the course. It will be necessary to obtain a minimum rating of 5 out of 10.

This test will take place after the end of the semester and will take place on the dates indicated in the exam calendar prepared by the center and will last 3 hours.

The overall grade of the subject will be obtained from the weighted average of the two tests, being necessary to pass a value higher than 5. The results obtained in the passed tests will be maintained until the end of the academic year.

Evaluation criteria

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The learning process that has been designed for this subject is based on the following:

The face-to-face teaching process will be developed in three main levels: theory classes, problems and laboratory, with increasing level of student participation.

In the sessions with the whole group, the most theoretical aspects are treated in the form of a master class and are completed with the study of technical problems and cases. The practical sessions are developed in smaller groups to work with specialized computer applications and manufacturing workshop equipment.

This process must be complemented with the non-presential work by the student through previous readings, the theoretical study of the subject and the resolution of problems.

### 4.2. Learning tasks

The program offered to the student to help him achieve the expected results includes the following activities ...

**PRESENIAL WORK: 2.4 ECTS (60 hours)**

1) Face-to-face class (type T1) (28 hours).

Expository sessions of theoretical and practical content. The concepts and foundations of manufacturing technologies will be presented, illustrating them with real examples, through the knowledge blocks that are exposed in the Program.

2) Classes of problems and resolution of cases (type T2) (14 hours).

Problems and cases will be developed with the participation of the students, coordinated at all times with the theoretical contents. Students will be encouraged to previously work on problems.

3) Laboratory practices (type T3) (18 hours).

There will be six three-hour practical sessions. Students will have the practice scripts in advance.

**NON-PRESENIAL WORK: 3.6 ECTS (90 hours)**

4) Study (type T7) (86 non-contact hours).

Personal study of the student of the theoretical part and realization of problems. Continuous student work will be promoted through the homogeneous distribution throughout the semester of the various learning activities. Tutorials are included here, such as direct attention to the student, identification of learning problems, orientation in the subject, attention to exercises and work ...

5) Assessment tests (type T8) (4 contact hours).

In addition to the qualifying function, the evaluation is also a learning tool with which the student checks the degree of understanding and assimilation achieved

### 4.3. Syllabus

Block 1. Introduction to manufacturing processes. Definitions and classification.

Block 2. Manufacturing processes and technologies:

- Processes to preform.
- Deformation processes.
- Material start-up processes.
- Union and assembly processes.

Block 3. Manufacturing systems: characterization and strategies.

Block 4. Metrology and industrial quality.

### 4.4. Course planning and calendar

Calendar of face-to-face sessions and presentation of works

Master classes and problems and practical sessions in the laboratory will be taught according to the schedule established by the center (times available on its website).

The rest of the activities will be planned according to the number of students and will be announced well in advance.

Each teacher will report their tutoring hours.

The dates of the exams and tests of official announcement will be set by the management of the center

The detailed calendar of the various activities to be carried out will be established once the University and the Center have approved the academic calendar (which can be consulted on the website of the center).

The relationship and date of the various activities, along with all kinds of information and documentation on the subject, will be published in the Digital Teaching Ring (ADD) of the University of Zaragoza.

For guidance:

Every week 3 hours of classes are scheduled.

About every two weeks the student will do a laboratory practice.

The additional activities that are scheduled (works, tests, seminars ...) will be announced in advance, both in class and in the ADD.

The dates of the exams and tests of official announcement will be set by the management of the Center.

#### **4.5. Bibliography and recommended resources**

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29620&Identificador=14503>