# Mechanical Technology

**Academic Year: ( 2022 / 2023 )** **Review date: 19-01-2023**

**Department assigned to the subject: Mechanical Engineering Department**

**Coordinating teacher: CANTERO GUISANDEZ, JOSE LUIS**

**Type: Compulsory ECTS Credits : 6.0**

**Year : 3 Semester : 2**

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Production and Manufacturing Systems

## OBJECTIVES

By the end of this subject, students will be able to have:

1. A systematic understanding of the key aspects and concepts of manufacturing processes.
2. The ability to apply their knowledge and understanding to identify, formulate and solve problems of manufacturing processes using established methods;
3. The ability to apply their knowledge and understanding to analyse engineering products, processes and methods.
4. The ability to select and apply relevant analytic and modelling methods in problems related with manufacturing processes.
5. The ability to select and use appropriate equipment, tools and methods to define manufacturing processes.
6. The ability to combine theory and practice to solve manufacturing problems.
7. An understanding of applicable techniques and methods, and of their limitations in the manufacturing field;
8. Function effectively as an individual and as a member of a team;
9. Demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to professional ethics, responsibilities and norms of engineering practice;

## DESCRIPTION OF CONTENTS: PROGRAMME

Chapter 1.Introduction of Mechanic Technology.
Lesson 1. Manufacture systems and processes. Manufacture costs.
Lesson 2. Products¿ design and manufacture. Definition of manufacturing processes.

Chapter 2. Metrology and quality control.
Lesson 3. General concepts of Metrology. Dimensional Metrology.
Lesson 4. Quality control in manufacturing activities.

Chapter 3. Molding manufacturing
Lesson 5. Molding manufacturing systems and processes: molds.

Chapter 4: Plastic products manufacturing
Lesson 6. Plastic products manufacturing systems and processes.

Chapter 5. Plastic deformation manufacturing
Lesson 7. Introduction of plastic deformation. Hardening by deformation.
Lesson 8. Lamination.
Lesson 9. Presses.
Lesson 10. Punching and shearing. Other cutting processes.
Lesson 11. Bending
Lesson 12. Drowning.
Lesson 13. Profiling.
Lesson 14. Extrusion, forging and stamping.

Chapter 6. Manufacture by chip removal.

Lesson 15. Machining processes classification. Cutting parameters.
Lesson 16. Cutting tools. Wear. Taylor.
Lesson 17. Machining times and costs.
Lesson 18. Turning processes: machines, tools and operations.
Lesson 19. Mill processes: machines, tools and operations.
Lesson 20. Drill processes: complementary operations.
Lesson 21. Rectify and other finish processes.

Chapter 7. Automated manufacturing
Lesson 22. Flexibles and rigids manufacturing systems automatization.
Lesson 23. CNC machines. Control systems. Axis and reference systems.
Lesson 24. ISO programmation: Functions.
Lesson 25. ISO programmation: fixed cycles, tools tables.
Lesson 26. CAD/CAM/CAE systems.

Chapter 8. Additive manufacturing

Chapter 9. Welding

## LEARNING ACTIVITIES AND METHODOLOGY

In the classes will be taught the contents described in the program of the subject. In addition, during the course the students have to make and pass the following practices:

- Practice 1: Modeling by shape deformation I. Tools.
- Practice 2: Modeling by shape deformation I. Numeric modeling.
- Practice 3: Modeling by machining: Cutting tools and tool-machines CNC.
- Practice 4: Tool-machines CNC programming.

## ASSESSMENT SYSTEM

CONTINUOS EVALUATION:
- 2 continuous assessment test during the course (4 points).
- A work in groups related with the contents of the subject (1.5 points).

FINAL EXAM:
- A final evaluation exam mainly containing practical (4.5 points). It is required to obtain a minimum score of 4 points out of 10.

PRACTICES:
There will be 4 practices during the course. To pass the subject it is mandatory to attend and carry out the laboratory practices obtaining an APTO grade.

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| **% end-of-term-examination:** | 45 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 55 |

## BASIC BIBLIOGRAPHY

- Serope Kalpakjian Manufacturing Engineering And Technology, Addison-Wesley Pub.

## ADDITIONAL BIBLIOGRAPHY

- Benhabib, Beno Manufacturing: design, production, automation and integration, Marcel Dekker. 2003.

- Heinrich Gerling Alrededor de las Máquinas Herramientas, Reverté.

- James Bralla Handbook of product design for manufacturing: A practical guide to low-cost production, Mc Graw-hill Book.

- Jean-Baptiste Waldner CIM. Principles of Computer-Integrated Manufacturing, J. Wiley & Sons.