

Academic Year: ( 2024 / 2025 )

Review date: 31-05-2024

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: DIAZ ALVAREZ, ANTONIO

Type: Compulsory ECTS Credits : 3.0

Year : 2 Semester : 2

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

It is not necessary to have passed any subject of the grade.

**SKILLS AND LEARNING OUTCOMES**

CB1. Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study.

CB2. Students are able to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem solving within their field of study.

CB3. Students have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgements which include reflection on relevant social, scientific or ethical issues.

CB4. Students should be able to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

CB5. Students will have developed the learning skills necessary to undertake further study with a high degree of autonomy.

CG10. Being able to work in a multi-lingual and multidisciplinary environment

CE4 Módulo CRI. Basic and applied knowledge of production and manufacturing systems, metrology and quality control.

CE6 Módulo CRI. Ability for the analysis, design, simulation and optimization of processes and products.

CE14 Módulo CRI. Knowledge of information systems for industrial organization and direction, logistic and productive systems, and quality management systems.

CT1. Ability to communicate knowledge orally as well as in writing to a specialized and non-specialized public.

CT2. Ability to establish good interpersonal communication and to work in multidisciplinary and international teams.

CT3. Ability to organize and plan work, making appropriate decisions based on available information, gathering and interpreting relevant data to make sound judgement within the study area.

CT4. Motivation and ability to commit to lifelong autonomous learning to enable graduates to adapt to any new situation.

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

RA1.1 knowledge and understanding of production and manufacturing systems, metrology and control of quality.

RA1.2 a systematic understanding of the key aspects and concepts of production and manufacturing systems

RA1.4 awareness of the wider multidisciplinary context of engineering.

RA2.1 the ability to apply their knowledge and understanding to analyse engineering products, processes and methods;

RA4.3 workshop skills on production and manufacturing systems.

RA5.1 the ability to select and use appropriate equipment, tools and methods;

RA5.3 an understanding of applicable techniques and methods in production and manufacturing systems and of their limitations;

**OBJECTIVES**

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

1. knowledge and understanding of the key aspects of production and manufacturing systems, metrology and control of quality.
2. the ability to apply their knowledge and understanding to identify, formulate and solve problems related to production and manufacturing systems, metrology and control of quality using established methods;
3. the ability to apply their knowledge and understanding to analyse engineering products, processes and methods;
4. an understanding of design methodologies of production and manufacturing systems, and an ability to use them.
5. workshop and laboratory skills in production and manufacturing systems.
6. the ability to select and use appropriate equipment, tools and methods to solve problems related to production and manufacturing systems, metrology and control of quality;
7. an understanding of applicable techniques and methods in production and manufacturing systems, metrology and control of quality, and of their limitations;

## DESCRIPTION OF CONTENTS: PROGRAMME

Chapter 1: Introduction.

Unit 1: Manufacturing and production systems, general concepts.

Unit 2: Classification of manufacturing processes: casting: solidification, plastic deformation, machining, joining processes.

Unit 3: Organizational Company chart. Associated documents.

Chapter 2: manufacturing time and costs.

Unit 4: Production time: productive and unproductive time

Unit 5: Direct and indirect production costs. Manufacturing cost estimates.

Chapter 3: Measurement systems and quality control of production processes.

Unit 6: measurement technics and systems for quality control

Unit 7: production tolerances. Verification tolerances.

Unit 8: quality control of production processes.

Chapter 4: Design for manufacturing.

Unit 9: concurrent engineering.

Unit 10: production processes limitation.

Chapter 5: environmental aspects in production processes.

Unit 11: environmental aspects in production processes. Dangerous waste, Minimization of waste.

Chapter 6: definition of manufacturing processes.

Unit 12: Aspects to consider for production processes definition: geometry, material, tolerances, production batches.

Chapter 7: Automated production systems.

Unit 13: Automated rigid production systems: transfer.

Unit 14: Automated flexible production systems: CNC machines, Robots, flexible cells.

Unit 15: CAD-CAM-CAE systems. Integrated production systems. CIM.

## LEARNING ACTIVITIES AND METHODOLOGY

- Lectures with theoretical content primarily.
- Practical classes in classroom in small groups, students group exhibitions, practical cases, individual tutorials and personal work about acquisition of knowledge theoretical.
- Lab and classes of problems in small groups, individual tutorials and personal work, oriented the acquisition of practical skills related to the program asigature.
- Laboratory practices: 2 sessions of 2 hours

Note: To pass the subject it is mandatory to attend and carry out the laboratory practices obtaining an APTO grade.

## ASSESSMENT SYSTEM

**% end-of-term-examination:** 60

**% of continuous assessment (assignments, laboratory, practicals...):** 40

- 2 Exams (30%)

- 1 Homework (10%)

- End-of-term-exam: 60% final grade (minimum value: 4/10). Note: To pass the subject it is mandatory

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

to attend and carry out the laboratory practices obtaining an APTO grade.

#### BASIC BIBLIOGRAPHY

- Professor of manufacturing Notes of Production and manufacturing systems, Dpto. of Mechanical Engineering, 2015
- REGH, A.R. Computer-Integrated Manufacturing, Prentice Hall, 2001
- SINGH, N. Systems Approach to Computer-Integrated Design and Manufacturing, Ed. John Wiley & Sons, 1996
- Serope Kalpakjian Manufacturing Engineering And Technology, Addison-Wesley Pub, 2001