Production and manufacturing systems

Academic Year: (2019 / 2020) **Review date: 10-12-2019**

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: MARCO ESTEBAN, MIGUEL

Type: Compulsory ECTS Credits : 3.0

Year : 2 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

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

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.

- Unit4: 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. Dangereus 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 asignature.

ASSESSMENT SYSTEM

- 2 Exams (30%)
- 1 Homework (10%)
- 1 Final exam (60%) - Evaluation min: 4/10

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- 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