

Academic Year: (2023 / 2024)

Review date: 20-12-2023

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: GOMEZ AMADOR, ANA MARIA

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Engineering Graphics
- Machine Mechanics
- Production and Manufacturing Systems
- Machine Theory
- Strength of Materials
- Materials Technology

OBJECTIVES

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

1. Understanding of the specific technical documents, concepts and methodology for product design.
2. The ability to apply their knowledge and understanding to identify, formulate and solve product design problems using established methods.
3. The ability to apply their knowledge and understanding to develop and realise designs and components to meet defined and specified requirements.
4. The ability to combine theory and practice to solve problems in product design.
5. Function effectively as an individual and as a member of a team.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to the mechanical design process
2. Phases of the design process. VDI 2221. Design process tools: DOE, QFD, FMEA, etc.
3. Materials selection
4. Security and regulations: Products security. CE Marking, Risk assessment and Machinery Directive
5. CAD-CAM-CAE systems
6. 3D Printing
7. Ergonomics applied to design
8. Mechanical components: straps and bearings. Acoustics
9. Industrial design practical cases

LEARNING ACTIVITIES AND METHODOLOGY

Lectures will be explained in big groups, exercises for understanding the lectures will be solved and compulsory labs will be carried out.

ASSESSMENT SYSTEM

Students will be evaluated following the Bologna criteria. Specifically, the continuous assessment will be scored and the final exam will be carried out.

To pass the course, students must obtain a total score equal to or greater than 5.

In ordinary session, the course final grade will be equal to the sum of the the continuous assessment test (part 1, scored on 4 points) + the score of the ordinary final exam (part 2, scored on 6 points).

In the extraordinary call, the final grade will be the highest score among the following options:

- a) Extraordinary Exam scored on 10 points.
- b) Continuous assessment grade (scored on 4 points) + Extraordinary Final Exam scored on 6 points (a minimum of 3 out of 10 is required for the questions / exercises corresponding to part 2).

The execution of the laboratory sessions will also be subject to evaluation and its completion is mandatory to pass the subject (practice attendance + lab session report delivery).

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

BASIC BIBLIOGRAPHY

- AENOR Marcado CE para máquinas, AENOR, -
- Ashby, Michael F. Materials Selection in Mechanical Design, Elsevier, 2005
- Prat, Albert Control y mejora de la calidad, Editoriales UPC, 1998
- Ribas, Carles Selección de Materiales en el Diseño de Máquinas, Editoriales UPC, 2008
- Ribas, Carles Diseño Concurrente , Edicions UPC, 2002
- Richard Budynas, Keith Nisbett Shigley's Mechanical Engineering Design, McGraw-Hill Education, 2014
- Ullman, David The Mechanical Design Process, The McGraw-Hill, 2010
- Ulrich, Karl Product Design and Development, McGraw-Hill Education, 2015