

Academic Year: (2023 / 2024)

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Department assigned to the subject:

Coordinating teacher:

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Elasticity and strength of materials
- Mechanics of Structures
- Production and Manufacturing Systems

OBJECTIVES

- Knowledge and ability to apply strategies of the methods of work employed in mechanical design.
- Develop material selection criteria, application to failure theories, safety factor choice, in general, the factors that influence the design and dimensioning of the elements and training to decision-making.
- Know the concept of tribological phenomena and industrial solutions.
- Acquire the theoretical basis concerning the processes, systems, tools and more commonly used in the manufacture of parts.
- Set the machines, tools, equipment and optimal technological parameters for a given manufacturing process.
- Know the need for checks and to ensure the quality and safety of products.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction of machine design.
2. Design for static strength.
 - 2.1 Failure theories for ductile materials.
 - 2.2 Failure theories for fragile materials.
3. Design by fatigue.
 - 3.1 Fatigue's theory (Goodman, Soderberg, Gerber).
 - 3.2 Shaft theory.
 - 3.3 Gear fatigue.
4. Tribology and Lubrication.
5. Introduction to Manufacturing Technology. Processes and systems.
6. Manufacturing foundry.
 - 6.1 Casting by gravity.
 - 6.2 Injected casting.
7. Manufacture by chip removal.
 - 7.1 Introduction to machining.
 - 7.2 Cutting time and Production cost.
 - 7.3 Turning.
 - 7.4 Milling.
 - 7.5 Drilling, Polishing.
8. Manufacturing deformation.
 - 8.1 Forging, Stamping.
 - 8.2 Extrusion, Lamination.

- 8.3 Bending, Deep drawing.
- 9. Other manufacturing processes.
 - 9.1 Cutting alternative processes (Laser, Plasma).
- 10. Measure techniques.
 - 10.1 Uncertainties and tolerances.

LEARNING ACTIVITIES AND METHODOLOGY

Training activities will include:

- 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.

ASSESSMENT SYSTEM

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

The student will be assessed according to the criteria of Bologna. There are continuous assessment tests and a final exam. To pass the course, students must obtain a total score equal to or greater than 5, having to get on the final exam a minimum grade of 3.5 out of 10.

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

% of continuous assessment: 40%.

The realization and overcoming the labs is mandatory to pass the course.

The students that do not realize the labs but do the final exam, must do an exam about the labs.

The continuous assessment can not be make up for.

BASIC BIBLIOGRAPHY

- Richard G. Budynas; J. Keith Nisbett Shigley's Mechanical Engineering Design, Mc Graw Hill.
- Robert L. Norton Machine Design, Prentice Hall, 2013
- Serope Kalpakjian Manufacturing Engineering And Technology, Addison-Wesley Pub.