

Academic Year: (2022 / 2023)

Review date: 20-01-2023

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: OLMEDA SANTAMARIA, ESTER

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

OBJECTIVES

- Acquire an overview of the working methods used in mechanical design.
- Form criteria on the selection of materials, application of failure theories, choice of the safety factor and, in general, of the factors that influence the design and dimensioning of the elements and enable decision making.
- To know the concept of tribological phenomenon and its industrial solutions.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Design for static strength. Failure theories.
2. Design by fatigue.
 - 2.1 Fatigue's theory (Goodman, Soderberg, Gerber)
 - 2.2 Shaft theory
3. Gears
 - 3.1 Gear transmission calculation
 - 3.2 Gear fatigue
4. Tribology and Lubrication.
5. Roller bearings
6. Belts transmission calculation
7. Springs
8. Brakes and clutches
 - 8.1 Drum brakes
 - 8.2 Disc brakes
 - 8.3 Clutches

LEARNING ACTIVITIES AND METHODOLOGY

- Master classes and, where appropriate, classes to resolve doubts in small groups, presentations of students, individual tutorials and personal work of the student, aimed at acquiring theoretical knowledge.
- Lab practices and problem classes in small groups, individual tutorials and personal work of the student; oriented to the acquisition of practical skills related to the program of the subject.
- Group work: selection of a machine and calculation of its elements. Group tutorials, presentation of group report and individual questions.

ASSESSMENT SYSTEM

The student will be assessed according to the Bologna criteria. Specifically, the continuous evaluation will be carried out by means of a four-monthly work, as well as a final examination. Continuous assessment cannot be made up.

In the ordinary call, in order to pass the subject, the student must obtain a total score equal to or greater than 5, having to obtain in the final exam a minimum score of 3,5 out of 10.

Percentage weight of the Final Exam: 40%.

Percentage weight of the rest of the continuous evaluation: 60%.

The accomplishment and overcoming of the practices of laboratory is obligatory to approve the subject.

In the extraordinary exam of Machine Technology subject, the student examines the whole course. The grade of the exam of each student will be the best between:

- The grade achieved in the extraordinary exam. The minimum grade to pass is 5.0.
 - The grade computed by the sum of the grades of the continuous evaluation (60%) and the extraordinary exam (40%).
- In this case, a minimum of 3,5 points out of 10 is required in the extraordinary exam. The minimum grade (the sum) to pass is 5.0.

In addition, those students who have not passed the laboratories have to take an exam. If this exam is failed, the extraordinary exam will be also FAIL.

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

BASIC BIBLIOGRAPHY

- Bernard J. Hamrock et al Elementos de máquinas, McGraw-Hill, 2000
- J.I. Pedrero TECNOLOGÍA DE MÁQUINAS (TOMO 1), UNED.
- R. Aviles Análisis de fatiga en máquinas, Thomson, 2005
- Richard G. Budynas y J. Keith Nisbett Diseño en ingeniería mecánica de Shigley, Mc Graw Hill, 2008