

## 30045 - Calculation and Selection of Machine Elements

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 30045 - Calculation and Selection of Machine Elements

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 436 - Bachelor's Degree in Industrial Engineering Technology

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject type:** Optional

**Module:**

### 1. General information

This is an **elective** within the "**Machines and Vehicles**" specialty. Bearing in mind the objectives of the degree and in particular those of the intensification, the aim is to train the student to be able to assume the highest technical responsibilities in the field of machine design.

The aim of this subject is to:

- Develop in the students the ability to **calculate, select and apply** to the machines, the different **elements** that compose them.
- Train the student for the design of elements applying **fatigue calculation**.

These approaches and objectives are aligned with some of the Sustainable Development Goals, SDGs, of the 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>) and certain specific targets:

- Goal 8. Objective 8.2
- Goal 9. Objective 9.5
- Goal 12. Objective 12.2.

### 2. Learning results

The importance of the proposed learning results lies in the fact that they bring together the theoretical knowledge acquired in previous subjects, applying them in a practical way to solve real problems

1. Knows and applies the principles of machine analysis and calculation
2. Knows how to apply the failure criteria for mechanical sizing.
3. Establishes models for the analysis of machine elements.
4. Calculates, sizes and selects machine elements for an application

### 3. Syllabus

The subject consists of the following units:

- Fatigue calculation of machine elements
- Drive shafts
- Power transmission screws
- Cylindrical, bevel and worm gears
- Loads generated in power transmission
- Bearings

### 4. Academic activities

The teaching process is divided into: theory and problem classes, seminars, laboratory and assignments. Learning will be based on the understanding of theoretical and practical concepts and their subsequent application in problem solving. Attendance to all learning activities is of special relevance for acquiring the competences of the subject.

- **Theory classes and problems** (45h)
- **2 Laboratory Practices** (12h)
- **3 Seminar** (3h)
- **4 tutored practical work.**
- **5 Other activities: Tutoring.**

## 5. Assessment system

The student will have a **global evaluation** of the subject (10 points) with the following structure:

- 1) A written examination of theoretical and practical questions (2 points)
- 2) A written examination of problems (8 points), divided into two parts.
  - Part I: Problems on the content taught during the term (5.5 points)
  - Part II: Problem related to continuous evaluation activities and practices (2.5 points)

### **Continuous evaluation activities:**

- 1) Problem solving: There will be two practical exercises throughout the term (2 points). These works can be done individually or in groups of two students.
- 2) Laboratory practices: Attendance to practices is not considered mandatory. Those who attend may submit the corresponding scripts for evaluation (0.5 points)

The **final grade** of the subject obtained by the student will be the **maximum** of the following two grades:

- The sum of the grade obtained in the Global Evaluation: Theoretical and practical questions + Part I of problems + Part II of problems.
- The sum of the following grades: Theoretical-practical questions + Part I of problems + Activities of Continuous evaluation.

In both cases, in order to pass the subject, the final grade must be equal to or higher than 5 points.