

30016 - Machine Design Criteria

Syllabus Information

Academic year: 2023/24

Subject: 30016 - Machine Design Criteria

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

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

ECTS: 6.0

Year: 2

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

This subject focuses on two basic points; on the one hand, knowledge and application of the different design criteria that can be used in the development of a mechanical component or assembly, as well as the different design methodologies. On the other hand, to become familiar with the most representative machine elements and their characterization, knowing how to identify and calculate the type of actions involved and assess the different alternatives that can be proposed in their design.

These approaches and objectives are aligned with the Sustainable Development Goals (SDG) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), specifically, the learning activities planned in this subject will contribute to the achievement of Targets 3.6 of Goal 3, Targets 8.2 and 8.4 of Goal 8, Targets 9.2, 9.4 and 9.5 of Goal 9, and Targets 12.5 and 12.8 of Goal 12.

2. Learning results

- Apply the different design criteria that can be used in the development of a mechanical component or assembly.
- Evaluate and critique different mechanical designs against these criteria
- Develop your designs based on these criteria
- Organize the design process, and execute it with the most appropriate methodology
- Characterize and apply the most representative machine elements
- Compare and critique the application of machine elements based on requirements
- Identify and calculate the actions involved in different machine elements
- Evaluate different alternatives that can be considered in the design of machines

3. Syllabus

The program is as follows:

- Design methodology
- Analysis of the influence of the manufacturing process on design
- Design tolerances
- Other conditioning factors in the mechanical design: type of stress, drive, materials, etc.
- Design according to stiffness criteria
- Design according to weight and volume criteria
- Ecological design
- Other design criteria: assembly, transport, etc.
- Characterization of connection, transmission, support and conversion elements in machines:
 - Strapping
 - Elastic crimps
 - Screws

 - Watertight joints
 - Power screws
 - Axes
 - Pegs
 - Gears
 - Belts
 - Bearings

4. Academic activities

The subject has 6 credits, which is equivalent to 150 hours of student work, assigned as follows:

Lectures: sessions with the professor in which the course syllabus will be explained: 30 hours

Problems: 15 hours

Laboratory practices: 15 hours

Performance of work: 27 hours

Study of the subject; class preparation; practical activities: 60 hours

Assessment tests. 3 hours

5. Assessment system

The subject will be assessed by the continuous assessment system by means of the following activities:

- Intermediate tests (20%): Intermediate tests will be given throughout the teaching period. The result of these tests will give the student the possibility of the elimination of the corresponding subject in the finaltest for the two official convocations of the final exam.
- Laboratory Practices (15%): Individualized completion of an internship questionnaire related to the subject matter of the practical sessions.
- Tutored Works (10%): There will be a tutored work consisting of the resolution of different practical cases throughout the term, which will be evaluated with the correct completion of one of them in the exam.
- Exam (between 55% and 100%): Composed of practical exercises and theoretical questions that evaluate the results of learning of the subject. It will be carried out with an exam in each of the official calls. The exam may represent 55% of the grade when the student has passed the intermediate tests and the part corresponding to the assessment of the laboratory practices. The student will always have the option to take the exam in its entirety, even if they have passed the intermediate tests and laboratory practice parts, but the presentation to these parts will imply the waiver of the grade previously obtained corresponding to the part to which they retake.

Following the regulations of the University of Zaragoza, a global assessment test will also be scheduled in each call, to be held on the date set by the center, for those students who do not opt for this continuous assessment system. The test will consist of an assessment exam of theoretical practical contents that will constitute 100% of the final grade.