

25873 - Mechanism Design

Syllabus Information

Academic year: 2024/25

Subject: 25873 - Mechanism Design

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 558 - Bachelor's Degree in Industrial Design and Product Development Engineering

ECTS: 6.0

Year: 2

Semester: First semester

Subject type: Compulsory

Module:

1. General information

- 1.- To train the student in the basic principles of Mechanism design so that they are able to analyze and understand the operation of mechanisms present in the design of products.
- 2.- Define the specifications and basic requirements that must be met by the mechanical system that is part of a product and obtain a design based on those specifications.
- 3.- To know different procedures and methods, being able to compare them, evaluating the best suitability of one or the other against specific problems of different mechanical systems.
- 4.- To know the different mechanical elements and their functionality in order to have criteria when selecting them for the design of a mechanism.

To be able to take this subject with the maximum profit, it is important to have taken the following subjects Physics I having clear knowledge about operations with vectors and the concept of momentum.

2. Learning results

1. Know how to calculate the velocity and acceleration of any point of a two-dimensional mechanism and the forces acting on it or its different parts.
2. Know how to draw free solid diagrams in both static and two-dimensional dynamics, including possible forces of friction.
3. Know how to calculate the minimum stress at which the motion of a system would occur and determine what type of motion would occur.
4. Be able to schematize a product mechanism and the connectivity between components
5. Know different types of mechanisms and their suitability of application according to the type of product for which they are intended.
6. Know the methods of synthesis of mechanisms and design a mechanism for given conditions
7. Be able to validate a design made using kinematic criteria.
8. Be able to understand the kinematics of a product mechanism using energetic or Newtonian methods.
9. Know simulation programs suitable for the synthesis and analysis of flat mechanisms

3. Syllabus

1. Basic concepts of mechanisms
2. Mechanism position analysis
3. Kinematic analysis of hinged bar mechanisms
4. Gear transmission mechanisms
5. Pulley drive mechanisms
6. Power screw drive mechanisms
7. Cam mechanisms
8. Dynamic analysis of mechanisms by Newtonian methods
9. Dynamic analysis of mechanisms by energetic methods

4. Academic activities

- Lectures where the basic concepts that make up the subject will be developed. (29 hours)
- Problem solving classes that allow to verify the understanding of the subject and at the same time contribute to develop in the

student a more engineering point of view. (15 hours)

- Laboratory and field practices to deepen in the concepts developed (15 hours)

- Personal study (88 hours)

Assessment tests (3 hours)

In addition, the teaching staff will be available to the student during tutoring hours to resolve any doubts that may arise during the subject.

5. Assessment system

There will be a global assessment test in each of the two calls available for the subject.

This assessment test will consist of the following activities:

Directed practical work, included in the module work, to be done in group consisting of the design and analysis of a mechanism that includes knowledge developed throughout the subject. (20% of the final grade).

Module work grade (10%)

Individual objective written test consisting of one or more application exercises. (60% of the final grade).

Practical sessions. They will be evaluated by means of a question directly related to the activities developed in the practical sessions. This question will be attached to the individual objective written test. (10% of the final grade).

In order to pass the subject, it will be necessary to obtain a minimum grade of 5 out of 10 in each of the assessment instruments, independently, except for the module work grade.

6. Sustainable Development Goals

9 - Industry, Innovation and Infrastructure