Universidad Zaragoza

Academic Year/course: 2024/25

29916 - Mechanics

Syllabus Information

Academic year: 2024/25
Subject: 29916 - Mechanics
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 435 - Bachelor's Degree in Chemical Engineering
ECTS: 6.0
Year: 2
Semester: Second semester
Subject type: Compulsory
Module:

1. General information

The goal of the subject **Mechanics** is to train students in the approach and resolution of the **kinematics** and **dynamics** of **mechanical systems**. Thus, the ability to model a mechanical system will be developed, considering its **parameters of movement** and its kinematics, as well as the present **actions** and those that constitute an unknown of the dynamic problem. Finally, the mathematical model for the simulation of the movement must be proposed.

Previous knowledge in **Physics I**, **Mathematics I**, **Mathematics II** and **Graphic Expression** is recommended for this subject.

2. Learning results

In order to pass this subject**, students must demonstrate the following results**:

Modeling of mechanical systems by means of **schematization** and **definition of variables**.

Knowledge of **motion composition** applied to mechanical systems.

To know how to define and identify the **motion parameters and degrees of freedom** of a mechanical system.

Understanding and application of the **forces** generated **in** the **interaction between solids**.

Understanding and application to mechanical systems of the concepts of **center of masses** and **inertia tensor**.

Application of **vector theorems** to mechanical systems and interpretation of results.

Application of the **mechanical characteristics of** electric, pneumatic and hydraulic **drives**.

Knowledge and application of **mechanical systems modeling software**.

3. Syllabus

CINEMATICS	DYNAMICS
1. Kinematics of the material point.	8. Active forces.
2. Vector bases and orientation.	9. Passive or linkingforces
3. Composition of movements.	10. Dynamics of the particle.
4. Kinematics of the rigid solid.	11. Mass geometry.
5. Slip-free rolling.	12. Vector Theorems
6. Motion parameters.	13. Theorem of the Energy.
7. Flat movement.	

4. Academic activities

In order to cover the subject syllabus and help students achieve the intended learning results, the following activities are offered :

CLASS WORK:

1) **Master class** (type T1) (30 hours).

2) **Problem classes** (T2 type) (15 hours).

3) **Laboratory practicals** (type T3) (15 hours).

PERSONAL WORK:

4) **Teaching assignments** (type T6) (25 hours).

5) **Study** (type T7) (60 hours).

6) **Assessment tests** (type T8) (5 hours).

5. Assessment system

The subject will be passed either through **Continuous Assessment (Assessment Type 1)**, or through the **Global Tests** in **Official Call (Assessment Type 2)**. Each type of assessment includes the activities indicated.

TYPE 1 ASSESSMENT.

1) **Group work** (15 % of the overall grade)

Choose between solving a collection of problems or carrying out a multidisciplinary project with Problem Based Learning methodology.

2) **Qualification of learning** in the **practice** sessions (15 % qualification)

3) **First Midterm Exam** (35 % grade)

The first midterm exam will be held on a date announced well in advance and will account for 35% of the grade. A **minimum grade of 4.5/10** must be obtained **to average** with the other grades.

4) **Second midterm Exam** (35 % grade)

The second midterm exam will be held in the time slot arranged by the Center for Continuous Assessment. A **minimum grade of 4.5/10** must be obtained to average with the rest of the evaluable activities.

TYPE 2 ASSESSMENT.

In the **two official calls**, the global assessment will be carried out with the following tests:

1) **Final** test (70% of the overall grade). **Minimum grade to average 4.5/10.**

2) **Examination** of **learning** in **practice sessions** (15% grade).

3) **Examination** of **short questions** on **group work problems** (15% grade).

6. Sustainable Development Goals

3 - Good Health & Well-Being
7 - Affordable and Clean Energy
9 - Industry, Innovation and Infrastructure