

## 28811 - Mechanical Engineering

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 28811 - Mechanical Engineering

**Faculty / School:** 175 - Escuela Universitaria Politécnica de La Almunia

**Degree:** 424 - Bachelor's Degree in Mechatronics Engineering

**ECTS:** 6.0

**Year:** 2

**Semester:** First semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The purpose of this subject is for students to acquire the competences of the module common to the industrial branch "**Knowledge of the principles of the theory of machines and mechanisms**" (According to the Order CIN/351/2009).

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>) so that in certain way, the acquisition of the learning results of the subject will contribute to achieve the following :

**Goal 4:** Ensure inclusive, equitable and quality education and promote learning opportunities.

**Goal 9:** Build resilient infrastructure, promote sustainable industrialization and foster innovation.

The subject "Mechanical Engineering" is mandatory and belongs to the *Mechanics Module* within the Mechatronics Engineering Degree. In the current *study plan*, it has a workload of 6 ECTS and is taught in the first semester of the second year.

### 2. Learning results

**To perform** the kinematic and dynamic analysis of mechanical assemblies, machines and mechanisms analytically or by means of numerical simulation, analyzing the results obtained.

Through the achievement of the relevant learning results, the necessary ability to understand the operation of machines and mechanisms, which will be absolutely essential for the design and implementation of any mechanical application, within the field of Mechatronics Engineering.

### 3. Syllabus

According to the verification report of the degree in "Brief description of the contents of the subject", the following appears:

- Kinematics of mechanisms.
- Mechanisms dynamics.
- Vibrations of mechanisms.

For this reason, these five topics of the subject have been programmed:

**Topic 1:** Structural Analysis of Flat Mechanisms.

**Topic 2:** Kinematic Analysis of Flat Mechanisms.

**Topic 3:** Dynamic Analysis of Flat Mechanisms.

**Topic 4:** Kinematic Analysis of Gears and Gear Trains.

**Topic 5:** Theory of Mechanical Vibrations.

### 4. Academic activities

In order to carry out the time distribution, we use as a measure the teaching week, in which the students must dedicate a total of **10 hours/week** to the study of the subject.

- Theory classes and examples (2h/week): sessions to develop the content of the subject.
- Problem-solving classes [1h/week]: solving problems of varying complexity.
- Practical classes with software [1h/week]: solving with software of mechanical analysis
- Tutored activities (2h/week)
- Study and preparation of evaluation tests [2 hours/week]
- Resolution of continuous assessment exercises [2 hours/week]

### 5. Assessment system

**At the beginning** of the subject, students will choose one of the following two assessment methodologies:

- A **continuous assessment system**, which will be carried out throughout the learning period. Characterized by the obligation to take and pass the following tests, partial exams or academic work proposed in the subject, within the deadlines established for this purpose. In this case, the student does not have to take a final exam.
- A global **assessment test**, reflecting the achievement of the learning results, at the end of the teaching period. Characterized by not performing or not passing the practical tests, mid-term exams or proposed academic work in the subject. In this case, the student must take a final exam.

**Continuous assessment system: Explanation**

Concept	Percentage	Assessment Criteria
<b>A: Written Tests.</b> Three compulsory written tests will be carried out 1st SP on topics 1 and 2 2nd SP on item 3 3rd SP on topics 4 and 5	50%	Minimum grade for each test $\geq 3.0$ Minimum grade for Block (A) $\geq 4.0$
<b>B: Continuous Assessment Exercises.</b> A total of 5 continuous evaluation exercises will be carried out (one for each of the following subject) on a mandatory basis	30%	Minimum grade for each exercise $\geq 3.0$ Minimum grade for Block (B) $\geq 4.0$
<b>C: Simulation Practices.</b> Three compulsory practice sessions will be conducted 1st Practice on topic 2 2nd Practice on topic 3 3rd Practice on topic 4	20%	Minimum grade for each practical $\geq 3.0$
<b>Average grade of the subject = <math>50\%A+30\%B+20\%C \geq 5.0</math></b>		

A minimum grade of 5.0 must be obtained in order to pass the subject and all prerequisites mentioned above must be fulfilled. Students who have passed the subject by means of this dynamic, will be able to opt in the ordinary call to raise a grade (presenting to the total of the subject).

In case of failure to pass with the previous system, there will be two additional two additional calls.

(Ordinary and Extraordinary) performing a Global Evaluation Test, which reflects the achievement of the learning results. This test will be a single test with theory and exercises representative of the entire syllabus of the subject contributing 100% to the final grade of the subject.