

## 29727 - Theory of Structures and Industrial Construction

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 29727 - Theory of Structures and Industrial Construction

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

**Degree:** 434 - Bachelor's Degree in Mechanical Engineering

**ECTS:** 6.0

**Year:** 3

**Semester:** Second semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The objective of the subject of *theory of structures and industrial constructions* is that the graduate in Mechanical Engineering acquire the knowledge and skills necessary to perform structural calculations and design industrial buildings.

For this, the student must be able to choose the most appropriate structural typology for each real problem, know how to elaborate a mathematical model of it and be able to analyze it in order to calculate the displacements and stresses that occur. In this way, will be able to verify the validity of the adopted design or, if necessary, propose the necessary modifications to improve it.

### 2. Learning results

1. Know the constructive arrangement of the different systems that make up an industrial structure.
2. It is capable of pre-dimensioning the most common structural typologies.
3. Understand and know how to apply different methods of calculation and analysis of articulated structures.
4. Understand and know how to apply different methods of calculation and analysis of rigid node structures.
5. Understand and know how to solve the problem of global stability of structures.
6. Know and know how to apply the general regulations on structures and building as set out in the Technical Building Code

### 3. Syllabus

1. Introduction to the theory of structures.
2. Analysis, design and construction of articulated structures.
3. Analysis, design and construction of porticoed or rigid node structures.
4. Computational analysis of structures.

### 4. Academic activities

Theory classes. Exposition of the theoretical concepts of the subject, illustrated with examples: 30 hours.

Types of problems. Performance of problems carefully selected to cover all relevant aspects of the subject: 15 hours.

Practices. They are organized so that the student becomes familiar with the different structural typologies and learns to handle basic structural calculation tools and to apply the regulations on industrial constructions: 15 hours.

Subject work. The student will have to solve a structural analysis project autonomously throughout the term: 20 hours.

Personal study. 67 hours.

Assessment 3 hours.

### 5. Assessment system

**A continuous assessment** of the subject is proposed, consisting of the following activities:

Subject work (Weighting: 35%)

-Analysis, design and testing of a structure.

**Practices** (Weighting: 20%)

- Six practical sessions will be held to enable the student to handle structural calculation programs, apply the regulations on industrial constructions and understand the way in which the different structural typologies.
- Some sessions will require the presentation of certain preparatory calculations before beginning.

**Examination** (Weighting: 45%)

- The complete content of the subject will be evaluated. It may consist of short theoretical-practical questions and problems of longer development.
- In order to pass the subject, the student must obtain in this test a minimum of 4 points out of 10

Alternatively, a **global assessment** can also be performed:

**Examination** (Weighting: 80%)

- The complete content of the subject will be evaluated. It may consist of short theoretical-practical questions and problems of longer development.
- In order to pass the subject, the student must obtain in this test a minimum of 4.5 points out of 10.

**Practice Exam** (Weighting: 20%)

- If the student has satisfactorily completed the internship in the regulated sessions, they will be exempted from this exam.