

## 29753 - Industrial building

### Syllabus Information

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**Academic Year:** 2019/20

**Subject:** 29753 - Industrial building

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

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

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject Type:** Optional

**Module:** ---

## 1.General information

### 1.1.Aims of the course

The aim of the course is to learn general aspects of the industrial construction, its construction technology, its typological and constructive implementation, and the layout of facilities related to the manufacturing process within the building and the industrial plot.

To this end, it is analysed the historical evolution of industrial architecture, along with the development of the manufacturing processes, materials, and technologies available for construction. In turn, the main types of industrial activities are described, as well as the characteristics of its industrial buildings and auxiliary spaces.

The analyses of the business needs, the most important regulations for the plant layout, and the distribution of industrial plot, are also part of the themes. The course finishes with the presentation of various structural types of industrial buildings, analyzing its design and operating principles, the building materials used, and the major construction technologies.

### 1.2.Context and importance of this course in the degree

Within the optional module of *Diseño y cálculo de estructuras* of the Mechanical Engineering degree, the subject represents one of the five possible subjects to be studied.

The subject has been designed as an initial and self-contained approach to the industrial building field, useful for the future professional.

This course is also offered in the Industrial Engineering degree, which favors the coexistence of different and complementary approaches for the resolution of the technical problems suggested, thus enriching the learning of the students of both degrees.

### 1.3.Recommendations to take this course

This subject has no prerequisites.

## 2.Learning goals

### 2.1.Competences

- Apply knowledge related to health and safety in construction labors, risk prevention, and development of plans and projects.
- Apply graphic techniques, including the management of CAD/CAM/CAE.
- Calculate and design structures and industrial constructions.
- Conceive, design and develop of engineering projects.
- Solve problems and make decisions with initiative, creativity and critical thinking.
- Transmit knowledge, skills and abilities in Spanish language.
- Use the techniques, skills and tools of industrial engineering.
- Manage information and implement the technical regulations necessary for the practice of Industrial Engineering.
- Constant learning and developing of independent learning strategies.

### 2.2.Learning goals

1. Knowledge of the construction technology principles and its regulatory codes.
2. Ability to identify materials and elements used in the prefabricated industrial buildings, its properties and applications.
3. Knowledge and understanding of the operation principles of different structures, their adaptation to industrial buildings, and its functional implementation for the business needs.
4. Knowledge of the criteria for selecting an industrial layout and for the arrangement on it, depending on the manufacturing and organizational requirements.
5. Knowledge and ability to design structures and industrial constructions.
6. Knowledge applied to the health and safety in construction and to the risk prevention due to fire on the industrial building.

### **2.3.Importance of learning goals**

Within the professional practice of Mechanical Engineering, the industrial building sector has an important specific weight. It is therefore necessary to provide the student with general knowledge related to industrial buildings, which allow the proper performance of their functions.

For this purpose, this course presents a compendium of contents that address from the knowledge and operation of the main technologies and structural types used in the construction of industrial buildings, to the study of the regulations and layout procedures for the manufacturing implementation.

## **3.Assessment (1st and 2nd call)**

### **3.1.Assessment tasks (description of tasks, marking system and assessment criteria)**

The student will be assessed through a progressive assessment mode consisting of:

- Development and defense of a continuous work with portfolio format along the course. The work scope will range from the layout of an industrial business (considering the normative regulations for fire protection) to the selection of structural types and materials for its construction, by using the theoretical and practical contents of the subject.
- The critical and active participation in the class development and autonomous resolution of practical work related to the contents covered.

The final grade of the progressive assessment mode will be:

- Continuous work on the portfolio: 7 points
- Autonomous work: 3 points

Non-progressive assessment mode:

Students who choose not to perform the progressive assessment mode will be evaluated by a single global exam at the end of the course (a theoretical and practical test) to be performed on the date established by the academic calendar of the EINA.

## **4.Methodology, learning tasks, syllabus and resources**

### **4.1.Methodological overview**

The course methodology tries to strengthen the continuous work of the student and focuses on the most fundamental design aspects of industrial buildings. For this purpose various teaching methodologies were developed:

- Theoretical knowledge through participatory lecture, given to the entire group in the weekly teaching hours allocated.
- Knowledge application by means of practical classes coordinated with the theoretical advance of the course and supervised by teachers of the subject. These sessions take place in smaller groups to enhance student learning and develop various technical case studies.
- After each practice session, practical work will be required. This practical work will become part of the student portfolio.
- The tutorials will serve to review both the acquisition of theoretical knowledge by the student and his practical work.

To follow the theoretical and practical sessions, the students will have the teaching materials developed by the teachers of the subject.

### **4.2.Learning tasks**

The learning activities are developed through participatory lectures, group practical sessions and tutorial appointments.

### **4.3.Syllabus**

The course will address the following topics:

1. Industrial architecture

2. Industrial buildings
3. Layout
4. Structural models of precast concrete
5. Structural typologies and selection criteria
6. Planning, control and construction of industrial buildings

#### **4.4.Course planning and calendar**

The theoretical teaching of the subject will be developed through lectures. The theoretical teaching will be complemented by laboratory classroom practices (distributed along the course according to the schedule established by the EINA) and tutored autonomous works. All these activities will be supported through the Moodle application, by using the *Anillo Digital Docente* of the University of Zaragoza.

The dates set for the practice classes and work presentations will be communicated to students at the beginning of the course, and by the Moodle application of the subject, considering the academic calendar for each course center. The non-progressive assessment exam will be held on the date indicated in the academic calendar of the EINA.

Practical works related to the practical sessions and the proposed works will be requested, thus developing the portfolio of the course. These works will be made after completion of each subject of the course. The portfolio assessment shall constitute the final mark of the subject (for the progressive assessment mode).

The student must check the dates for conducting practices and presentation of works. It shall be informed of these dates at the beginning of the course and by the *Anillo Digital Docente* application.

The exams (for a non-progressive assessment of the subject), will be held on the dates established by the EINA.

#### **4.5.Bibliography and recommended resources**