

Academic Year/course: 2021/22

## 28763 - Engineering: Pre-Fabricated Sections

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 28763 - Engineering: Pre-Fabricated Sections

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

**Degree:** 423 - Bachelor's Degree in Civil Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject Type:** Optional

**Module:**

## 1. General information

### 1.1. Aims of the course

The course and its expected goals respond to the following approaches and objectives:

At the end of this course, the student:

- You will know the field of prefabricated elements.
- You will know the characteristics of the structures built with prefabricated elements.
- Will be able to design, analyze and dimension prefabricated structural elements.
- Will be able to raise the general process of prefabrication of a structural element: execution, transport and assemblage.

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

The course of "Engineering of Precast Elements" is very important in the training offered by the degree, in addition to providing useful training in the professional life of the Civil Engineer in relation to precast structures.

The need for the course within the degree program is justified by the increase in prefabricated structures under construction.

The student must have previous knowledge of structures.

### 1.3. Recommendations to take this course

It is recommended to have previous knowledge of structures. The student, before starting this course, should be able to:

- Solve both isostatic and hyperstatic structures, obtaining the different forces requested.
- Solve stresses in pure, compound and simple flexion problems.
- Design structural concrete sections.

## 2. Learning goals

### 2.1. Competences

**Upon passing the course, the student will be more qualified to ...**

#### **Generic capacities**

G01. Organization and planning.

G02. Solve problems.

G03. Take decisions.

G04. Oral and written communication.

- G05. Analysis and synthesis.
- G06. Information management.
- G07. Teamwork.
- G08. Critical thinking.
- G09. Multidisciplinary teamwork.
- G10. Work in an international context.
- G11. Adapt to new situations.
- G12. Leadership aptitude.
- G13. Adapt to social and technological innovations.
- G14. Reason and present their own ideas.
- G15. Communicate with words and pictures.
- G16. Search, analyze and select information.
- G17. Self-learning.
- G18. Understand advanced aspects of the study area.
- G19. Apply their knowledge in solving problems and think out arguments in the study area.
- G20. Search and interpret data, analyze and think about relevant topics.
- G21. Transmit information and ideas to all kinds of public.
- G22. Acquire learning techniques to expand their studies later.
- G23. Respect fundamental rights, gender equality, accessibility for disabled people and respect the values of democracy and peace
- G24. Promote entrepreneurship.
- G25. Knowledge in information and communication technologies.

#### **Specific competences**

E01. Knowledge of the typology and calculation bases of the precast elements and their application in the manufacturing processes.

## **2.2. Learning goals**

### **The student, to pass this course, must achieve the following goals ...**

Have an overview of the use of precast in building and civil works.

Learn about the prestressed concrete technique with prestressed reinforcement.

Know the concepts and methods of design and calculation of precast.

Calculate precast concrete elements and evaluate the decrease in prestressing force over time.

Know the lifting machines used in the assembly of prefabricated.

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

This course offers fundamental engineering training in the civil engineer job.

Achieving the learning results gives the ability to understand the design, manufacturing, transportation and assembly of the precast.

This knowledge is very important in the training of the student due to the increasing use of precast in construction.

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

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

**The student must demonstrate that they have achieved the expected learning outcomes through the following assessment activities:**

#### **Continuous assessment**

Throughout the course there will be several mandatory exercises. Its value is 30% of the total course. The teacher will propose the practical exercises, which the students must do during the determined time. Students will deliver the practice on the date scheduled for their evaluation. Once delivered, the practice will be resolved in class.

The continuous assessment will be completed with a theoretical-practical test whose value is 70% of the total of the course.

Students whose average mark is equal to or greater than 5.0 points will pass the course in continuous assessment.

It will also be necessary to have attended 80% of the face-to-face activities.

#### **Final assessment**

Students who do not pass the course in continuous assessment will have to take a theoretical-practical final test, which will

be scored from 0 to 10 and it will be necessary to obtain a minimum score of 5 points to pass the course.

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

### 4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, tutorials, and autonomous work and study. A strong interaction between the teacher/student is promoted. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

If due to health reasons the in-person teaching-learning process is not possible, it shall be carried out telematically.

### 4.2. Learning tasks

This course is organized as follows:

- **Lectures:** Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the course are displayed, highlighting the fundamentals, structuring them in topics and or sections, interrelating them.
- **Practice sessions:** The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.
- **Tutorials:** Carried out giving individual, personalized attention with a teacher from the department, these tutorials may be on-site or online.
- **Autonomous work and study**
  - Study and understanding of the theory taught in the lectures.
  - Understanding and assimilation of the problems and practical cases solved in the practice sessions.
  - Preparation of seminars, solutions to proposed problems, etc.
  - Preparation of the written tests for continuous assessment and final exams.

This course has 6 ECTS credits, which represents 150 hours of student work in the subject during the term, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the course file in the Accreditation Report of the degree, taking into account the level of experimentation considered for this course is moderate.

#### Activity / Weekly school hours

Lectures / 4

Other Activities / 6

### 4.3. Syllabus

This course will address the following topics:

- Topic 1. Prefabrication. Current possibilities.
- Topic 2. Concept and system of prestressed concrete
- Topic 3. Materials and equipment for prestressed concrete
- Topic 4. Loss of prestressed force.
- Topic 5. Basic parameters in the project of prestressed beams
- Topic 6. Dimensioning of prestressed beams
- Topic 7. Prefabrication in civil engineering
- Topic 8. Prefabrication in building
- Topic 9. Light prefabrication
- Topic 10. Transport and assembly

### 4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates ( <http://www.eupla.unizar.es/asuntos-academicos/examenes>) and other details regarding this course will be provided on the first day of class or please refer to the Faculty of EUPLA website and Moodle.

### 4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28724>