Universidad Zaragoza

Academic Year/course: 2023/24

30153 - Reinforced and Prestressed Concrete

Syllabus Information

Academic year: 2023/24
Subject: 30153 - Reinforced and Prestressed Concrete
Faculty / School: 179 - Centro Universitario de la Defensa - Zaragoza
Degree: 563 - Bachelor's Degree in Industrial Organisational Engineering
ECTS: 6.0
Year: 4
Semester: First semester
Subject type: Optional
Module:

1. General information

- Concrete composition and its influence on its performance and durability.

- Behaviour of reinforced concrete.

- Design, calculation and testing of reinforced concrete structures according to Spanish regulations, with constructive solutions of sustainable architecture.

- Optimal and efficient execution of reinforced concrete structures.

- Ability to analyse and assess the social and environmental impact of solutions acting with professional responsibility and social commitment.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 agenda (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning results of the subject provides training and competencies to contribute to some extent to their achievement: SDG 7 (Objective 4.7., 7.3), SDG 9 (Objectives 9.1 and 9.4) and SDG 11 (Objectives 11.6).

2. Learning results

1. Qualitatively define the mechanisms of resistance response that occur in elements of reinforced concrete.

2. Design and execute reinforced concrete structures according to Spanish regulations.

3. Describe in a basic way the behaviour of prestressed concrete structures.

4. Describe in general terms the characteristics of other types of specialty concretes and their applications

5. Correctly apply structural theoretical models to the analysis of real problems.

6. Use with rigor and agility the different models and methodologies of structural analysis to apply them to their future professional practice.

3. Syllabus

1 Main structural response mechanisms of concrete structures. Active section, slabs and active form. Design parameters

2 Construction process of concrete structures.

3 Concrete dosage and properties Constituents

4 Mass concrete and reinforced concrete. Behaviour.

5 Calculation bases. Deformation domains.

6 Limit states and checks. Calculation of beams and columns: normal and tangential stresses

7 Armor. Layout, overlaps and anchors

8 Surface foundations.

9 Basis of Prestressed Concrete Performance.

4. Academic activities

- Participative theory classes. Presentation of the concepts with real examples related to their environment.
- Problem-based learning: Different designs will be developed explaining the calculation process and reasoning the decision making.
- Cooperative problem solving and inverted classroom: the classroom will be divided into groups that will solve a problem with the support of the teacher. Each group will go out to explain the resolution of one of the parts.
- Computer practices. Project-based learning: The student will be taught CYPE structures. Calculate and optimize a previously designed warehouse
- Oral presentations: Two presentations, one explaining an existing structure and one of the practices in English.
- Tutoring and personal work

5. Assessment system

FIRST CALL:

Continuous assessment:

1. Two written tests on theoretical and practical aspects, based on problem solving. (50%)

2. Oral presentation explaining the transmission mechanisms, load distribution and the building process of an existing structure. (10%)

3. Paired design of a reinforced concrete building (10%)

4. Practice in pairs. Calculation of the structure of the building designed with the CYPE program in accordance with CTE. (25%)

5. Presentation of the practices in English and brief report of the work. (5%)

Global test:

Students who do not pass the subject by continuous evaluation or who want to improve their grade, will have the right to take a global test, with the best of the grades obtained prevailing.

This global test will have a 100% weight in the final grade . It will consist of the calculation of a column, a beam and a footing of a portal frame of a reinforced concrete structure.

SECOND CALL:

Global test:

Students who do not pass the subject in the first exam may sit for a global exam as the one defined for the first call.

ASSESSMENT CRITERIA

In order to pass the subject, the student must obtain a final grade of 5 or higher.

The value of each section and the form of correction will be indicated in each test.

In the continuous evaluation, the minimum grade for each of the tests and assignments must be 3.5.

Assessment instruments:	RA 1	RA 2	RA 3	RA 4	RA 5	RA 6
Written tests		x		x	x	x

Presentation structure	x		x	x		
Design of the warehouse	x	x				
Practices and defence presentation	x	x	x	x	x	x

RA: Learning Result