

# Fundamentals of Structural Design (250700)

## General Information

School	ETSECCPB
Departments	Departament d'Enginyeria Civil i Ambiental (DECA)
Credits	6.0 ECTS
Programs	MÀSTER UNIVERSITARI EN ENGINYERIA ESTRUCTURAL I DE LA CONSTRUCCIÓ (pla 2015)
Course	2024/25

## Main teaching language at each group

- Group 10ES1 Spanish (Q1)
- Group 20EN2 English (Q2)

## Faculty

Responsible Faculty: Jesús Miguel Bairán García, Noemí Duarte Gómez  
Faculty: Itsaso Arrayago Luquin, Jesús Miguel Bairán García, Rolando Antonio Chacón Flores, Noemí Duarte Gómez, Antonio Ricardo Mari Bernat, Juan Murcia Delso, David Verges Coll

## Objectives of Education

Subject to initiate the student in the design and calculation of concrete and steel according to European standards

Initial knowledge of the process of design of concrete and steel structures according to European Standards

Introduction of structural safety concepts and tools for their calculation. Limit states . Actions and combinations. Behavior of structural materials. Structural analysis of prestressing : prestress loads and forces, calculation of prestressing losses. Structural Concrete: service and ultimate limit states. Steel structures: bolted joints , welded joints , section class concept , and service limit states last

## Total hours of student work

		Hours	Percentage
Supervised Learning	Large group	27.96 h	51.78 %
	Medium group	13.02 h	24.11 %
	Laboratory classes	13.02 h	24.11 %
	Guided Activities	0.0 h	0.00 %
Self Study		96.0 h	

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Basis of design  
Basis of design

### Prestressed concrete

Prestressed concrete  
Prestressed concrete

## **Reinforced concrete**

Reinforced concrete  
Reinforced concrete

## **Steel structures**

Steel Structures  
Steel structures

## **Block exams**

## **Teaching Methodology**

The course consists of 2,3 hours per week of classroom activity (large size group) and 0,3 hours weekly with half the students (medium size group).

The 2,3 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 0,3 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

## **Grading Rules**

*(\*) The evaluation calendar and grading rules will be approved before the start of the course.*

The mark of the course is obtained from the ratings of continuous assessment and their corresponding laboratories and/or classroom computers.

Continuous assessment consist in several activities, both individually and in group, of additive and training characteristics, carried out during the year (both in and out of the classroom).

The teachings of the laboratory grade is the average in such activities.

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises.

## **Test Rules**

Failure to perform a laboratory or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

## **Office Hours**

It will be published at the beginning of the course according the mentoring hours for each teacher

## Bibliography

### Basic

- [EHE-08 : instrucción de Hormigón Estructural : con comentarios de los miembros de la Comisión Permanente del Hormigón](#). Madrid: Ministerio de Fomento, Centro de Publicaciones, 2011.
- Comité European de Normalisation. Eurocode 2: Design of concrete structures: EN-1992. Comité European de Normalisation, 2004.
- Jimenez Montoya, P.; García Meseguer, A.; Morán, F.; Arroyo, J.C. [Hormigón armado](#). 15ª ed. basada en la EHE-2008. Barcelona: Gustavo Gili, 2009. ISBN 9788425223075.
- Marí, A.; Molins, C.; Bairán, J.M.; Oller, E. [Formigó armat i pretensat: exercicis curts de bases de càlcul i estats límits, adaptat a la instrucció EHE-08](#). 2a ed. Barcelona: Edicions UPC, 2009. ISBN 9788498803907.
- Calavera, J. Proyecto y cálculo de estructuras de hormigón: en masa, armado y pretensado, de acuerdo con la nueva instrucción EHE-08: de acuerdo con el EUROCÓDIGO EC-2. 2a ed. Madrid: Intemac, 2008. ISBN 9788488764058.
- Espanya. Comisión Permanente de Estructuras de Acero. [EAE: instrucción de acero estructural: con comentarios de los miembros de la Comisión Permanente de Estructuras de Acero](#). Madrid: Ministerio de Fomento, Secretaría General Técnica, 2011. ISBN 9788449809040.
- Simoes da Silva, L.; Simoes, R.; Gervasio, H. [Eurocode 3: design of steel structures: Part 1-1: General rules and rules for buildings](#). Brussels: ECCS- European Convention for Constructional Steelwork, 2010. ISBN 978-92-9147-098-3.