



Universitat de Lleida

DEGREE CURRICULUM  
**STRUCTURAL MATERIALS**

Coordination: PUIGDOMENECH FRANQUESA, LUIS

Academic year 2020-21

## Subject's general information

<b>Subject name</b>	STRUCTURAL MATERIALS			
<b>Code</b>	102578			
<b>Semester</b>	2nd Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Bachelor's Degree in Agricultural and Food Engineering	3	COMPULSORY	Attendance-based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRALAB	PRAULA	TEORIA
	<b>Number of credits</b>	1	2	3
	<b>Number of groups</b>	1	1	1
<b>Coordination</b>	PUIGDOMENECH FRANQUESA, LUIS			
<b>Department</b>	AGRICULTURAL AND FOREST ENGINEERING			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Català: 100%			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
PUIGDOMENECH FRANQUESA, LUIS	lluis.puigdomenech@udl.cat	6	

## Subject's extra information

### Subject/matter in the whole degree plan

"Materials Estructurals" is a middle level subject of construction matters, between Strength of Materials and Structural Analysis/ Buildings and is taught in the 3rd year of Enginyeria Rural i Ambiental mention.

**Compulsary previous subjects:** - Construcció (102521)

## Learning objectives

## Competences

The non-unique solution of problems with different structural materials, the subject promotes the development of the general competence:

**CG8.** Ability to solve problems with creativity, initiative, methodology and critical reasoning.

The specific competence in the present subject is highlighted in bold:

**CEMCR2.** Bases and technology of rural buildings. **Soil Mechanics. Materials.** Strength of materials. **Structural design.** Agricultural buildings. Rural infrastructure and roads.

## Subject contents

### Part 1

**Unit 1.** Norms. Denomination and mechanical properties of steel, concrete, timber and soil. Most relevant ULS and SLS of each material

**Unit 2.** Durability. Standard measures

**Unit 3.** Quality control. Sampling, evaluation and acceptance methods

**Unit 4.** Building processes

### Part 2

**Unit 5.** Verifications on materials. Plasticity. Cracking. Anisotropy. Combined materials

**Unit 6.** Verifications on structures. Buckling. Deformation. Reology

**Unit 7:** Unions. Tipology considering structural material.

## Methodology

First part is descriptive. Material denominations, quality control and durability measures are mentioned in order to giving tools for building management.

The second part, the design is the goal. A generalist approximation of different problems is given, so considering the particular characteristics of each structural material, we evaluate technical verifications of the standards.

Development plan

## Evaluation

Evaluation consists in two examens, one per content part defined in Contents. Each part must be passed separately with, at least, 5,0/10 points

## Bibliography

### A) Steel

Código Técnico de la Edificación, Documento Básico, Seguridad Estructural, Acero (CTE-DB- SE-A) [www.codigotecnico.org](http://www.codigotecnico.org). Ed. Mº Fomento, 166 pp.

Comisión Permanente de Estructuras de Acero, 2011. Instrucción de acero estructural EAE. Ed. Mº Fomento, 655 pp.

Arnedo A., 2009. Naves industriales con acero. Ed. APTA, 434 pp.

Eurocodi 3, UNE-EN 1993-1-1

### B) Timber

Código Técnico de la Edificación, Documento Básico, Seguridad Estructural, Madera (CTE-DB- SE-M) [www.codigotecnico.org](http://www.codigotecnico.org). Ed. Mº Fomento, 126 pp.

Comité técnico AEN/CTN 140, 2010. Proyecto de estructuras de madera, Eurocódigo 5. Ed. AENOR

Argüelles R., Arriaga F., Martínez J.J., 2000. Estructuras de madera : diseño y cálculo. Ed. AITIM., 730 pp.

Eurocodi 5, UNE-EN 1995-1-1

### C) Concrete

Comisión Permanente del Hormigón, 2008. Instrucción de Hormigón Estructural EHE 08. Ed. Mº Fomento, 704 pp.

Código Técnico de la Edificación, Documento Básico, Seguridad Estructural, Cimientos (CTE- DB-SE-C) [www.codigotecnico.org](http://www.codigotecnico.org). Ed. Mº Fomento, 160 p.

Jiménez Montoya P *et al.* 2009. *Hormigón armado*. 15ª ed. Barcelona: Gustavo Gili, 629 pp. Calavera J., 2008. Proyecto y cálculo de estructuras de hormigón. Ed. Intemac, 2 tomos.

Eurocodi 2, UNE 1992-1-1

### D) Soil

Código Técnico de la Edificación, Documento Básico, Seguridad Estructural, Cimientos (CTE- DB-SE-C) [www.codigotecnico.org](http://www.codigotecnico.org). Ed. Mº Fomento, 160 p.

Guía de Cimentaciones en Obras de Carretera. (GCOC) Mº Fomento. 303 p.D) Sol