

Academic Year/course: 2021/22

## 28948 - Engineering of green areas

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 28948 - Engineering of green areas

**Faculty / School:** 201 - Escuela Politécnica Superior

**Degree:** 583 - Degree in Rural and Agri-Food Engineering

**ECTS:** 6.0

**Year:** 3 and 4

**Semester:** Second semester

**Subject Type:** Optional

**Module:**

### 1. General information

### 2. Learning goals

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

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

#### 4.1. Methodological overview

The learning process designed for this course is based on the following methodologies:

- Theoretical sessions,
- Problem/project-based learning, and
- Computer lab sessions.

#### 4.2. Learning tasks

The course includes the following learning tasks:

- Lectures (3 ECTS):
  - The teacher explains the theoretical content of each session. One of the objectives of this activity will be the promoting of the participation of the students and cooperative learning.
  - Problem-solving sessions. The teacher will resolve specific problems.
- Practice sessions (3 ECTS):
  - Problem-based learning. Students, working individually or in groups, gain knowledge and skills by working to respond to problems and questions.
  - Computer lab sessions. Students use specific structural calculation software.
  - Project-based learning. Students gain knowledge and skills by working with examples of real projects.

#### 4.3. Syllabus

The course will address the following topics:

MODULE 1. Basis for the calculation of structures

1. Structural typologies in fruit and vegetable and gardening buildings.
2. Building elements.
3. Actions on the building.
4. Load theory.

#### MODULE 2. Metallic structures

5. Properties of steel.
6. Characteristics of metallic structures: Gabled portico.
7. Calculating traction elements.
8. Calculating flexion elements.
9. Calculating compression elements.

#### MODULE 3. Reinforced and prefabricated concrete structures

10. Properties of prefabricated concrete.
11. Characteristics of reinforced concrete.
12. Calculating flexion elements.
13. Calculating compression elements.
14. Justification and definition of structural elements from prefabricated concrete.
15. Construction details.

#### MODULE 4. Foundations

16. Geotechnical parameters.
17. Types of foundations.
18. Calculating isolated footings.

#### MODULE 5. Irrigation pools

1. Constituent elements.
2. Sizing criteria

#### Practical program

1. Calculating the actions on the building.
2. Determining load combinations for calculating the structures.
3. Calculating the isolated elements of a metallic structure: Pillars, beams and roof purlins.
4. Calculating a gabled portico made from prefabricated concrete using specific software.
5. Using commercial technical information on prefabricated concrete elements.
6. Calculating superficial foundations using isolated footings

#### 4.4. Course planning and calendar

Week	Lectures (h)	Practice sessions (h)	Autonomous work (h)	Total (h)
1	2	2	6	10
2	2	2	6	10
3	2	2	6	10
4	2	2	6	10
5	2	2	6	10
6	2	2	6	10
7	2	2	6	10
8	2	2	6	10
9	2	2	6	10
10	2	2	6	10
11	2	2	6	10
12	2	2	6	10

<b>13</b>	2	2	6	10
<b>14</b>	2	2	6	10
<b>15</b>	2	2	6	10
<b>Total hours</b>	30	30	90	150

#### 4.5. Bibliography and recommended resources

- BB** España. Ministerio de Fomento. EHE-08 : Instrucción de hormigón estructural : Con comentarios de los miembros de la Comisión Permanente del Hormigón / Ministerio de Fomento. 3ª ed. Madrid : Ministerio de Fomento, Secretaría General Técnica, 2009
- BB** España. Ministerio de la Vivienda. Código técnico de la edificación. Edición septiembre 2009 Madrid : La Ley, 2009
- BB** Estructuras de acero. [1] Cálculo / autores, Ramón Argüelles Álvarez ... [et al.] . 2ª ed. amp y act. Madrid : Bellisco, 2005
- BB** Estructuras de acero. [2], Uniones y sistemas estructurales / autores, Ramón Argüelles Álvarez ... [et al.]. 2ª ed. amp y act. Madrid : Bellisco, 2007
- BB** Jimenez Montoya, Pedro. Hormigón armado / Pedro Jiménez Montoya, Álvaro García Meseguer, Francisco Morán Cabré . 14ª ed., [reimp.] Madrid : Gustavo Gili, 2000 (reimp. 2007)
- BC** Calavera Ruiz, José. Cálculo de estructuras de cimentación / J. Calavera . 4a. ed. [Madrid] : INTEMAC (Instituto Técnico de Materiales y Construcciones), D.L. 2000
- BC** Calavera Ruiz, José. Una introducción a la prefabricación de edificios y naves industriales / J. Calavera Ruiz, J. Fernández Gómez . [Madrid : INTEMAC] , D.L.2001

The updated recommended bibliography can be consulted in:  
<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28948>