

## 30715 - Structures 1

### Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	470 - Bachelor's Degree in Architecture Studies
ECTS	6.0
Course	2
Period	Second semester
Subject Type	Compulsory
Module	---

### 1.Basic info

#### 1.1.Recommendations to take this course

#### 1.2.Activities and key dates for the course

### 2.Initiation

#### 2.1.Learning outcomes that define the subject

#### 2.2.Introduction

### 3.Context and competences

#### 3.1.Goals

#### 3.2.Context and meaning of the subject in the degree

#### 3.3.Competences

#### 3.4.Importance of learning outcomes

### 4.Evaluation

### 5.Activities and resources

#### 5.1.General methodological presentation

The learning process that has been designed for this course has been planned to provide the students a constant and active learning. In the lecture room the theoretical aspects will be unveiled with the help of examples and exercises, which motivate the use of the different procedures seen in class. The proposed methodology aims at encouraging students for daily work.

#### 5.2.Learning activities

**Lecture** (30 hours). The teacher will expose the basic fundamental concepts needed for the development of the course

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objectives in the lecture room.

**Practical lecture.** (15 hours). The main objective of these sessions is to learn and consolidate the theoretical techniques previously seen in the lecture. These sessions are carried out in the lecture room.

**Lab.** (15 hours). The main objective of these sessions is to learn and practice the use of specific software for the solution of differential equations problems in order to consolidate the theoretical techniques previously seen in the lecture.

**A05 Homework activities.** The student has to solve a structural engineering problem using the learned techniques.

**A06: Office hours.** The students can receive a personal assistance by the teachers to review and/or discuss the topics presented in class.

**A08: Evaluation** . The evaluation process is based on a set of written tests and reports that the student has to do along the course. More details are described in point 4 of this guide.

### 5.3.Program

Part I: Theory of Elasticity

1 Introduction to Solid Mechanics: Linear Elasticity.

2 Kinematics of deformable solids.

3 Dynamics of deformable solids.

4 Symetric tensors (order 2) representation.

1 Constitutive laws. Plasticity criteria.

Part II: Mechanics of materials.

1 Tensile and compressive strength. Wires and membranes.

2 Arcs, vaults and cupulas.

3 Structures subjected to bending. Beams.

4 Beams subjected to torsion.

### 5.4.Planning and scheduling

The course schedule for both lectures and lab activities will be determined by the academic calendar. The timetable and deadlines for individual reports are announced at the beginning of the classes.

**5.5. Bibliography and recommended resources**

1 Elías Cueto, David González. Apuntes de la asignatura Estructuras I. Anillo digital docente de la Universidad de Zaragoza, 2016.

2 Federico París. Teoría de la Elasticidad. Universidad de Sevilla. 1998. ISBN: 84-88783-32-9.

3 J. A. Garrido y A. Foces. Resistencia de Materiales. Secretariado de Publicaciones e Intercambio Científico de la Universidad de Valladolid. Valladolid, 1999.

4 Aurelio Muttoni. L'art des structures. Une introduction au fonctionnement des structures en architecture . Presses Polytechniques et Universitaires Romandes. ETH Zurich, 2005. Existe una edición en italiano, editada por Mendrisio Academy Press.