

## 30021 - Resistance of Materials

### Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS	6.0
Year	3
Semester	Second semester
Subject Type	Compulsory
Module	---

### 1.General information

#### 1.1.Introduction

#### 1.2.Recommendations to take this course

#### 1.3.Context and importance of this course in the degree

#### 1.4.Activities and key dates

### 2.Learning goals

#### 2.1.Learning goals

#### 2.2.Importance of learning goals

### 3.Aims of the course and competences

#### 3.1.Aims of the course

#### 3.2.Competences

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

#### 4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

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

#### 5.1.Methodological overview

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

Continuous evaluation with reviewable intermediate milestones and an individual or team project

Besides the bibliographical resources available and mentioned in this introductory guide, several additional resources will

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be used, namely:

- \* Powerpoints and hand-outs of the course
- \* Additional documents uploaded in the ADD of the course

### 5.2.Learning tasks

**The course program offers the student the next activities designed to help him in achieving the planned results and competences...**

The course will be developed along the semester as a collection of the following activities:

1. Theory lectures (T1). In them, the main scientific body of the course will be exposed and several examples of application will be presented.
2. Exercise lectures (T2). These lectures are designed to complement the T1 activities, allowing the student to fix and apply the concepts introduced as well as to face and resolve simple but realistic problems in the field engineering practice.
3. Lab practices (T3). These practices are designed to get the student closer to the experimental reality, to recognize and use some of the usual equipment in real practice to measure stress-strain variables and, finally, to test the validity and accuracy of the assumptions and results explained in T1 and T2.
4. Simulation practices (T4). The aim of these practices is to present the student other essential tool in engineering practice, as it is numerical computing and physical simulation in deformable solid mechanics. The main practical objectives are to become familiar with update software for mechanical simulation and to learn how criticize the results obtained in the computer, detecting errors and assessing the validity and accuracy of the obtained results.
5. Course project (T5). In here, the idea is to promote the formula of project-based learning to reinforce and fix the learning results of the rest of activities, as well as to improve the competence of team work, together with T3 and T4. Finally, these projects will allow the student to improve his skills in searching relevant information in the field and take decisions with insufficient information.
6. Mentoring. Individual contacts between teacher and student help in fixing particular aspects and solve doubts derived from the different teaching activities.

### 5.3.Syllabus

0. Motivation on the objectives and contents of the course

Block I: Beam Element

1. Introduction to the Strength of Materials
2. Beam element. Definition of section stress resultants. Concept of section forces and moments

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3. Axial force
4. Bending
5. Torsion

### Block II: Beam Structures

1. Introduction. Structural typologies.
2. Flexibility and stiffness methods.
3. Failure criteria for beam structures (yielding & buckling).

## **5.4.Course planning and calendar**

### **Schedule of on-site lectures and presentation of projects**

The T1 and T2 lectures as well as T3 and T4 practices will be developed according to the schedule established by the School of Engineering and Architecture, which are published prior to the beginning of the course.

The course project will have to be delivered prior to the official date of the course exam established by the School of Engineering and Architecture.

Each teacher will inform about the schedule of mentoring sessions.

## **5.5.Bibliography and recommended resources**