

## 66426 - Advanced structural design

### Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	536 - Master's in Mechanical Engineering
ECTS	4.5
Course	1
Period	Second semester
Subject Type	Optional
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 course has been planned for providing the continuum and active learning of students. In order to get that objective, the following learning means will be used:

1. Participatory theory classes, taught by the professor for the entire group. Basic concepts of the course are exposed, together with illustrative examples challenging the students to participate thinking about the applications of theoretical concepts.
2. Problem classes. Taught by the professor for the reduced groups. The objective is the strengthening of the theory classes' contents by means of a selected collection of problems, covering all the relevant aspects.
3. Individual work consisting of problems and practical cases. After the problem classes, the student should resolve several proposed problems and practical cases, with a degree of difficulty similar to the problems

## 66426 - Advanced structural design

previously solved in class.

4. Computer practices. Organized for students to learn the usage of basic tools for design and calculation of structures. The student should be able to interpret the results and to discuss about their validity.

5. Tutorials for helping the student with the doubts encountered during learning.

### 5.2.Learning activities

#### Course contents

#### Block I: Design and analysis of structures

1. Structural typologies and models of analysis

2. Structural modelling by means of FEM

3. Analysis techniques in FEM

4. Static and dynamic structural analysis

5. Structural stability analysis

#### Block II: Building acoustics

6. Fundamental acoustic and vibration concepts

7. Measuring techniques and instrumentation

## 66426 - Advanced structural design

8. Noise transmission and propagation

9. Sound absorption

10. Sound isolation

11. Legal framework

The course will be developed based on the following methodologies:

1. Theory classes (T1). They represent the educational core. The course contents are developed together with applied examples. Magisterial class technique is used.

2. Problem classes (T2). They complement theory classes, allowing the students the application of theoretical concepts for solving practical engineering problems. They can be used too for developing some abilities, such as the usage of standards, manuals, etc.

3. Computer practices (T3). They are intended for students to learn the usage of basic tools for design and calculation of reinforced concrete structures. The student should be able to interpret the obtained results and to be able to apply the acquired knowledge dor calculating the proposed structure.

4. Individual work (T6). It is intended for project based learning, in order to strengthen the theoretical and practical learning acquired in the rest of activities.

5. Course work (T6). It is intended for project based learning, in order to strengthen the rest of activities and to promote the skills for teamwork.

6. Tutorials. They help the student to integrate the different contents and to consolidate the learning.

### **5.3.Program**

#### **Course contents**

#### **Block I: Design and analysis of structures**

##### **1. Structural typologies and models of analysis**

##### **2. Structural modelling by means of FEM**

##### **3. Analysis techniques in FEM**

##### **4. Static and dynamic structural analysis**

##### **5. Structural stability analysis**

#### **Block II: Building acoustics**

##### **6. Fundamental acoustic and vibration concepts**

##### **7. Measuring techniques and instrumentation**

##### **8. Noise transmission and propagation**

##### **9. Sound absorption**

## 66426 - Advanced structural design

10. Sound isolation

11. Legal framework

### 5.4.Planning and scheduling

The magisterial and problem classes and the practical sessions are delivered in accordance with the academic calendar and timetable established by the School, which are published before the start of the courses.

The individual work should be delivered within the period set by the professor, announced in advance.

The course work should be delivered within the period set by the professor, announced in advance, and always before the official exam established by the School.

Every professor shall announce the tutorial timetable.

### 5.5.Bibliography and recommended resources

Usually, the bibliography for the academic year is updated at the School Library ([biblioteca.unizar.es](http://biblioteca.unizar.es))