

## 66424 - Deformation and Fracture of Engineering Materials

### Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	536 - Master's in Mechanical Engineering
ECTS	6.0
Year	1
Semester	First 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 methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as:

- A01: Lectures (30h): Lectures describing the main contents of the course.
- A02: Problems and cases (15h).
- A03: Laboratory sessions and visits to research laboratories (15h)

## 66424 - Deformation and Fracture of Engineering Materials

- A04: Assignment (20 h): Students will do an assignment related to the mechanical properties of materials and their characterization.
- A05: Tutorials (5h): Time to discuss with students the questions they have regarding the course contents or their assignment.
- A06: Study of the course contents (59 h).
- A07: Assessment (6 h): an exam, the laboratory reports and the presentation of the assignment.

### 5.2.Learning tasks

The course includes the following learning tasks:

1. To study the mechanical properties of the different materials and of the constitutive equations that explain their behavior.
2. To do mechanical essays on different types of materials and visit to different laboratories where these essays are carried out.
3. To simulate different mechanical behaviours using FEM software.
4. To apply fracture mechanics to different materials.

### 5.3.Syllabus

The course will address the following topics:

#### Part 1. Deformation of materials for engineering

- Behavior of materials for mechanical design.
- Mechanical experiments and norms.
- Elastic behavior.
- Permanent deformation.

#### Part 2. Fracture of materials for engineering

- Fracture and Fatigue.
- Fracture experiments.

#### Part 3. Computing techniques

- Computing programs of materials mechanical behaviours.

### 5.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class.

### 5.5.Bibliography and recommended resources

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| <b>BB</b> | Hertzberg, Richard W.. Deformation and fracture mechanics of engineering materials / Richard W. Hertzberg . - 4th ed. New York [etc.] : John Wiley & Sons, cop. 1996 |
| <b>BB</b> | Hosford, William F.. Mechanical behavior of materials / William F. Hosford . - 1st pub. Cambridge [etc.]: Cambridge  |

## 66424 - Deformation and Fracture of Engineering Materials

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[Maidenhead]: McGraw-Hill, 1972