

Academic Year/course: 2021/22

## 29722 - Mechanics of Deformable Solids

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 29722 - Mechanics of Deformable Solids

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 434 - Bachelor's Degree in Mechanical Engineering

**ECTS:** 6.0

**Year:** 3

**Semester:** First semester

**Subject Type:** Compulsory

**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 methodology followed in this course is oriented towards the achievement of the learning objectives. It is based on the participation and the active role of the student to favour the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, practice sessions, autonomous work, and tutorials.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via web-based Moodle platform. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

#### 4.2. Learning tasks

The course includes 6 ECTS organized according to:

- Lectures: 45 hours.
- Five computer lab session: 15 hours.
- Guided assignments: 22 hours.
- Autonomous work: 63 hours
- Tutorials: Optional.

**Lectures:** the professor will explain the theoretical contents of the course and solve illustrative applied problems. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

**Practice sessions:** sessions will take place every 2 weeks (5 sessions in total) and the last 3 hours each.

**Guided assignments:** students will complete one assignments related to concepts seen in practice sessions and lectures, that will be submitted at fixed dates through Moodle.

**Autonomous work:** students are expected to spend about 63 hours to study theory, solve problems and prepare lab sessions.

**Tutorials:** the professor's tutorials hours will be posted on Moodle and on the website of the degree to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

### 4.3. Syllabus

The course will address the following topics:

#### Section I: Continuum Mechanics

1. Introduction to Linear Continuum Mechanics
2. Strain
3. Stress
4. Principal strains and stresses.
5. Constitutive equations.
6. Differential formulation of the elasticity problem
7. Limits of elastic behaviour.

#### Section II: Finite Element Method (FEM) in Continuum Mechanics

8. Introduction to FEM
9. FEM formulation in one dimension
10. FEM formulation in two-dimensional elasticity (plane strain and plane **strain stress**)
11. Formulation FEM formulation in three dimensions
12. User recommendations in MEF

### 4.4. Course planning and calendar

The course calendar is defined by the Escuela de Ingeniería y Arquitectura.

### 4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29722&Identificador=14521>