

30026 - Deformable Solids Theory

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS	6.0
Course	3
Period	First 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 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 be used, namely:

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* Powerpoints and had-outs of the course

* Additional documents uploaded in the ADD of the course

5.2.Learning activities

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.Program

Content:

0. Motivation on the objectives and contents of the course

Block I: Fundamentals of Deformable Solid Mechanics

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1. Introduction to the Mechanics of Linear Elastic Solids
2. Analysis of strains
3. Concept of stresses. Principal stresses
4. Constitutive behavior. Linear elastic stress-strain relations
5. Differential formulation of the elastic problem
6. Limits of the elastic behavior

Block II: Finite Elements in Elasticity

1. Introduction to the Finite Element Method (FEM)
2. Formulation of the FEM in a model 1-D problem
3. Formulation of the FEM in plane elasticity
4. Formulation of the FEM in 3D elasticity
5. Introduction to the application of the FEM in other structural typologies

5.4.Planning and scheduling

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