60824 - Computer simulation in structural engineering

Información del Plan Docente

Academic Year	2017/18
Subject	60824 - Computer simulation in structural engineering
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	532 - Master's in Industrial Engineering
ECTS	6.0
Year	2
Semester	First semester
Subject Type	Optional
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. It is based on an active learning framework so the course is structured as follows:

- Acquisition of theoretical concepts by means of lectures and problem-solving tasks.

- Laboratory assignments will be solved with the help of the instructors. At the same time, a project will be developed throughout the course that applies the fundamental topics of the course.
- During office hours, students will be able to review their learning outcomes.

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

5.2.Learning tasks

The course includes the following learning tasks:

- **Lectures**. The following concepts will be analysed in depth:
  - Brief overview of the basic concepts of continuum mechanics.
  - Geometrical modeling and meshing
  - Advanced structural analysis
  - Non linear simulation
- **Laboratory sessions**
- **Projects**
- **Tutorials**

5.3.Syllabus

The course will address the following topics:

1. Overview of linear elasticity
2. Finite elements for linear elasticity
3. Introduction to non-linear structural mechanics
4. Non-linear kinematics
5. Stress measures. Equilibrium
6. Constitutive equations
7. Introduction to plasticity
8. Large strain plasticity
9. Linearised equilibrium equations
10. Boundary conditions

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 or please refer to the EINA website.

5.5.Bibliography and recommended resources

- Bonet, Javier. Nonlinear Continuum Mechanics for Finite Element Analysis / Javier Bonet, Richard D. Wood. 2nd edition Cambridge University Press, 2008 [Comentario del profesor: El curso sigue fielmente el contenido de este libro. Altamente recomendado.]
- Fish, Jacob. A first course in finite elements / Jacob Fish, Ted Belytschko Chichester (England) : John Wiley & Sons, 2009