Universidad Zaragoza

Year : 2019/20

30026 - Deformable Solids Theory

Syllabus Information

Academic Year: 2019/20
Subject: 30026 - Deformable Solids Theory
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 436 - Bachelor's Degree in Industrial Engineering Technology
ECTS: 6.0
Year: 3
Semester: First semester
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

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

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

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.

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 (1.8 ECTS): 45 hours.

- Laboratory sessions (0.6 ECTS): 15 hours.

- Guided assignments (0.4 ECTS): 10 hours.

- Course project. (0.8 ECTS): 20 hours.

- Autonomous work (2.4 ECTS): 60 hours.

Notes:

Lectures: the professor will explain the theoretical contents of the course and solve illustrative applied problems. These problems and exercises can be found in the problem set provided at the beginning of the semester. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Laboratory sessions: will take place every 2 weeks (6 sessions in total) and last 2.5 hours each. Students will work together in groups actively doing tasks such as practical demonstrations, measurements, calculations, and the use of graphical and analytical methods.

Course project. 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. Finally, these projects will allow the student to improve his skills in searching relevant information in the field and take decisions with insufficient information.

Guided assignments: students will complete assignments, problems and exercises related to concepts seen in laboratory sessions and lectures. They will be submitted at the beginning of every laboratory sessions to be discussed and analyzed. If assignments are submitted later, students will not be able to take the assessment test.

Autonomous work: students are expected to spend about 75 hours to study theory, solve problems, prepare lab sessions, and take exams.

Tutorials: the professor's office hours will be posted on Moodle and the degree website 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:

Topic 0. Motivation on the objectives and contents of the course

Block I: Fundamentals of Deformable Solid Mechanics

Topic 1. Introduction to the Mechanics of Linear Elastic Solids

Topic 2. Analysis of strains

Topic 3 Concept of stresses. Principal stresses

Topic 4. Constitutive behavior. Linear elastic stress-strain relations

Topic 5. Differential formulation of the elastic problem

Topic 6. Limits of the elastic behavior

Block II: Finite Elements in Elasticity

Topic 7. Introduction to the Finite Element Method (FEM)

Topic 8. Formulation of the FEM in a model 1-D problem

Topic 9. Formulation of the FEM in plane and 3D elasticity

Topic 10. Introduction to the application of the FEM in other structural typologies

4.4.Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course, please refer to the Escuela de Ingeniería y Arquitectura de la Universidad de Zaragoza (EINA), website, https://eina.unizar.es/ .

4.5.Bibliography and recommended resources

Link:
http://biblos.unizar.es/br/br_citas.php?codigo=30026&year=2019