Universidad Zaragoza

Year : 2020/21

30021 - Strenght of Materials

Syllabus Information

Academic Year: 2020/21
Subject: 30021 - Strenght of Materials
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 436 - Bachelor's Degree in Industrial Engineering Technology
ECTS: 6.0
Year: 3
Semester: Second 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 the 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.

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:

- Lecture notes
- Additional documents uploaded in the ADD of the course

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:

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 applications 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 another 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). Here, the idea is to promote the formula of project-based learning to reinforce and fix the learning results of the rest of the activities, as well as to improve the competence of teamwork, 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.

7. 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 session to be discussed and analyzed. If assignments are submitted later, students will not be able to take the assessment test.

8. Autonomous work: students are expected to spend about 60 hours to study theory, solve problems, prepare lab sessions, and take exams.

9. 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:

0. Motivation on the objectives and contents of the course

Block I: Beam Element

1. Introduction to the Strength of Materials
2. Beam element. Definition of section stress resultants. Concept of section forces and moments
3. Axial force
4. Bending
5. Torsion

Block II: Beam Structures

1. Introduction. Structural typologies.
2. Flexibility and stiffness methods.
3. Failure criteria for beam structures (yielding & buckling).

4.4.Course planning and calendar

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.

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=30021&year=2019