

Academic Year/course: 2022/23

28745 - Extension of Structures

Syllabus Information

Academic Year: 2022/23

Subject: 28745 - Extension of Structures

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject Type: Compulsory

Module:

1. General information

1.1. Aims of the course

The course and its expected results respond to the following approaches and objectives:

At the end of the course, the student will know the structural behavior of different types of bridges and will be able to define calculation models for a bridge, which can be solved with structural calculation software. You will also know how to solve other elements of the bridge such as the pillars.

Another transport infrastructure of great importance in the training of Civil Engineers is tunnels. In this course it is intended that the student knows the basic aspects of tunnel design and construction.

It is also intended that the student know how to design mixed structural sections (concrete - steel), know the Finite Element Method and know when it is necessary to carry out a dynamic analysis of structures.

The approaches and objectives are in line with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>) in such a way that the acquisition of the course learning outcomes provides training and competence to contribute to their achievement to some degree:

(9) Industry, Innovation and Infrastructure.

1.2. Context and importance of this course in the degree

The course of Extension of Structures is a fourth-year subject located in the first semester and is compulsory, with a teaching load of 6 ECTS credits.

The course applies prior knowledge to the design and construction of bridges and tunnels. We cannot understand a civil engineer without a foundation in these basic subjects of the profession.

The need for the course within the degree program is more than justified.

1.3. Recommendations to take this course

The student must have previous knowledge of Structures and Geotechnics.

2. Learning goals

2.1. Competences

Upon passing the course, the student will be more qualified to ...

Generic capacities

G01. Organization and planning.

G02. Solve problems.

G03. Take decisions.

G04. Oral and written communication.

Each of the parts has a value equal to 50% of the subject and will be evaluated as follows:

Throughout each part there will be several mandatory exercises. Its value is 30% of the part. The teacher will propose the practical exercises, which the students must do during the determined time. Students will deliver the practice on the date scheduled for their evaluation. Once delivered, the practice will be resolved in class.

The continuous assessment of each part will be completed with a theoretical-practical test whose value is 70% of the total of the part.

Students whose average mark is equal to or greater than 5.0 points will pass each part in continuous assessment.

It will be necessary to pass each part independently.

It will also be necessary to have attended 80% of the face-to-face activities.

Final assessment

Students who do not pass the course in continuous assessment will have to take a theoretical-practical final test in each of the parts, which will be scored from 0 to 10 and it will be necessary to obtain a minimum score of 5 points to pass each of the parts.

The final score will be the average of the scores of the two parts passed.

Those students who have previously passed one of the parts, will have the option to examine only the part not passed.

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. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, tutorials, and autonomous work and study.

A strong interaction between the teacher/student is promoted. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

The approach, methodology and assessment of this guide are intended to be the same for any teaching scenarios. They will be adapted to the social - health situation at any particular time, as well as to the instructions given by the authorities concerned.

4.2. Learning tasks

This course is organized as follows:

- **Lectures:** Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the course are displayed, highlighting the fundamentals, structuring them in topics and or sections, interrelating them.
- **Practice sessions:** The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.
- **Tutorials:** Carried out giving individual, personalized attention with a teacher from the department. These tutorials may be on-site or online.
- **Autonomous work and study**
 - Study and understanding of the theory taught in the lectures.
 - Understanding and assimilation of the problems and practical cases solved in the practice sessions.
 - Preparation of seminars, solutions to proposed problems, etc.
 - Preparation of the written tests for continuous assessment and final exams.

The course has 6 ECTS credits, which represents 150 hours of student work in the course during the trimester, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen below. These figures are obtained from the course file in the Accreditation Report of the degree, taking into account the level of experimentation considered for this course is moderate.

Activity / Weekly hours

Lectures / 4

Other Activities / 6

4.3. Syllabus

This course will address the following topics:

- Topic 1. Bridges

- Topic 2. Composite construction in steel and concrete
- Topic 3. Tunnels
- Topic 4. Finite Element Methods
- Topic 5. Dynamic analysis of structures

4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates (<http://www.eupla.unizar.es/asuntos-academicos/examenes>) and other details regarding this course will be provided on the first day of class or please refer to the Faculty of EUPLA website and Moodle.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28745>