

Academic Year/course: 2022/23

28725 - Foundation Structures

Syllabus Information

Academic Year: 2022/23

Subject: 28725 - Foundation Structures

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

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0

Year:

Semester: Second semester

Subject Type: Compulsory

Module:

1. General information

1.1. Aims of the course

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

At the end of this subject, and in summary way the student:

It will have the right knowledge to be able to safely project all kinds of deep foundations, especially the pilings and also, to do it in accordance with the most modern regulations.

You will have the right knowledge to be able to project safely and practically all types of surface foundations.

You can design and build various types of containment structures.

You will know techniques of slope stability and land improvement.

These 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 subject of Foundation Structures, is part of the Degree in Civil Engineering taught by EUPLA, framed within the group of subjects that make up the module called Specific Training Formative Course of Civil Constructions, related to the geotechnical-structural world. It is a subject of the third course located in the sixth semester, with a teaching load of 6 ECTS credits. It is taught on a compulsory basis for students of the Degree in Civil Engineering of the training course of Civil Constructions and optional for students of the same degree with training itineraries in Hydrology and Transportation and Urban Services.

This subject implies a very important impact in the acquisition of the competences of the degree, as well as providing additional useful training in the performance of civil engineering functions related to the field of structures and geotechnical. You can not understand a civil engineer without high level structural and geotechnical knowledge, and the subject has the objective of creating the foundations, (never better said) of these essential knowledge for the performance of the engineering profession. The need of the subject within the curriculum of the present degree is more than justified and it is understood that the ideal would be that, as a student, this subject will be started with clear ideas regarding the knowledge of structures, materials and geotechnics, previous knowledge acquired in previous studies.

1.3. Recommendations to take this course

Although there are no longer "key subjects", it is advisable to have passed the previous subjects related to structures and geotechnics: Structural Theory, Structural Technology and Geotechnics, all of the 2nd year of Civil Engineering. The student, before starting this course, should be able to:

Plan a geotechnical prospecting campaign.

Master the methodological procedures aimed at the physical characterization of soils frequently used in civil engineering.

Calculate seats and tensions in different layers of the land subjected to various types of loads.

Solve both isostatic and hyperstatic structures, obtaining the different efforts that are requested.

Solve pure, compound and simple bending problems at the section level.

Predimension with steel.

Predimension with concrete.

2. Learning goals

2.1. Competences

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

Generic capacities

E07. Capacity for the construction of geotechnical works.

G01. Organization and planning.

G02. Solve problems.

G03. Take decisions.

G04. Oral and written communication.

G05. Analysis and synthesis.

G06. Information management.

G07. Teamwork.

G08. Critical thinking.

G09. Multidisciplinary teamwork.

G10. Work in an international context.

G11. Adapt to new situations.

G12. Leadership aptitude.

G13. Adapt to social and technological innovations.

G14. Reason and present their own ideas.

G15. Communicate with words and pictures.

G16. Search, analyze and select information.

G17. Self-learning.

G18. Understand advanced aspects of the study area.

G19. Apply their knowledge in solving problems and think out arguments in the study area.

G20. Search and interpret data, analyze and think about relevant topics.

G21. Transmit information and ideas to all kinds of public.

G22. Acquire learning techniques to expand their studies later.

G23. Respect fundamental rights, gender equality, accessibility for disabled people and respect the values of democracy and peace

G24. Promote entrepreneurship.

G25. Knowledge in information and communication technologies.

2.2. Learning goals

The student, to pass this subject, must demonstrate the following results ...

It will capture the physical phenomenon of the foundation of the different types of structures, both in civil works and in buildings.

You will understand the resistant diagrams attached to the different types of foundations.

You will know the two structural principles that foundations, as a deformable solid, must comply with:

a) Balance of external forces and internal efforts.

b) Compatibility of deformations of the solid with external and internal constraints.

It will be able to design and project foundations, both deep and superficial: as well as retaining walls.

You will learn slope stability techniques, land containment and land improvements.

2.3. Importance of learning goals

This subject has a marked engineering character, that is, it offers training with application content and immediate development in the labor and professional market. Through the achievement of the relevant learning results, the necessary capacity is obtained for the understanding of the structural functioning, which will be absolutely essential for the student's training, and indispensable to overcome the rest of the degree subjects related to structures and ground.

3. Assessment (1st and 2nd call)

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

The student must demonstrate that they have achieved the expected learning outcomes through the following assessment activities:

Continuous assessment

Throughout the course there will be several mandatory exercises. Its value is 30% of the total course. 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 will be completed with a theoretical-practical test whose value is 70% of the total of the course.

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

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, which will be scored from 0 to 10 and it will be necessary to obtain a minimum score of 5 points to pass the course.

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 theory sessions, practice sessions, laboratory sessions, 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.

If due to health reasons the in-person teaching-learning process is not possible, it shall be carried out telematically.

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** The theoretical concepts of the course are explained and illustrative examples are developed as a support to the theory when necessary.
- **Practice sessions:** Problems and practical cases are carried out, complementary to topics seen.
- **Laboratory sessions:** This work is tutored by a teacher, in groups of no more than 20 students.
- **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 laboratory workshops, preparation of summaries and reports.
 - Preparation of the written tests for continuous assessment and final exams.

This 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 in the following table. 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	3
Laboratory sessions	1
Other Activities	6

4.3. Syllabus

This course will address the following topics:

Topic 1	GEOTECHNICAL STUDY
Topic 2	RECOGNITION OF THE AREA
Topic 3	PROPERTIES OF THE SOILS
Topic 4	TENSIONS AND CAPACITY
Topic 5	WALLS OF CONTAINMENT
Topic 6	WALLS OF BASEMENT AND SCREENS
Topic 7	SUPERFICIAL FOUNDATIONS
Topic 8	SLABS OF FOUNDATION
Topic 9	PILES
Topic 10	PATHOLOGY OF THE FOUNDATIONS

Practice sessions

For each topic, there are corresponding exercises to be done.

4.4. Course planning and calendar

Calendar of meetings and deadlines of assignments

- Every term has 15 weeks that adjust to the agenda.
- The continuous assessment takes a calendar of activities that must be respected.
- The activities of continuous assessment will be done after finishing each topic.

Calendar of evaluation.

Name	Start	Deadline	Resolution	Grades
Practice 1	3 week	4 week	4 week	5 week
Practice 2	7 week	8 week	8 week	9 week
Practice 3	12 week	13 week	13 week	14 week
(1st call)				
(2nd call)				

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 Faculty of EUPLA website and Moodle.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28725>