

28718 - Geotechnics

Syllabus Information

Academic year: 2023/24

Subject: 28718 - Geotechnics

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

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0

Year: 2

Semester: First semester

Subject type: Compulsory

Module:

1. General information

The subject "Geotechnics" includes contents related to the intervention of natural materials in civil works, and therefore it is very important that the Civil Engineer knows how to assess the possible problems that may arise in relation to the natural support of such works (either soils or rocks), what analytical methodologies exist for each case and, finally, how to work with the results of such analysis and thus convert them into recommendations and/or decisions of a technical nature. The objectives pursued, therefore, are aimed at familiarizing students with the different work methodologies in this discipline, with an important emphasis on its practical aspects and applied to Civil Engineering.

The approach and objectives of the course are aligned with the Sustainable Development Goals of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>) specifically with the achievement of target 9.1 of Objective 9.

2. Learning results

The main learning results pursued with this subject are:

- To know the characteristics of the factors of the geological environment that affect the field of Civil Engineering, and to be able to give the most practical solutions.
- To understand the behavior of the different types of substrates (rocks, soils) in their interaction with the different civil works.
- To know how to assess the suitability of different types of materials for use in civil works, both in the case of rocks (for aggregates) and soils.
- Critically analyze geotechnical problems from technical, geological and safety perspectives.

3. Syllabus

INTRODUCTION

- 1.- GEOTECHNICS. THE ROLE OF GEOTECHNICAL ENGINEERING IN CIVIL ENGINEERING
- 2.- GEOTECHNICAL CLASSIFICATION OF NATURAL MATERIALS: SOILS / ROCKS

SOIL MECHANICS

- 3.- ELEMENTAL PROPERTIES OF SOILS: GRANULOMETRY, PORE INDEX, SPECIFIC GRAVITY, HUMIDITY, ATTERBERG LIMITS . SOIL CLASSIFICATION
- 4.- RESISTANCE OF NATURAL MATERIALS
- 5.- TRANSMISSION OF NATURAL STRESSES IN SOILS
- 6.- SOIL DEFORMABILITY
- 7.- GEOTECHNICAL PROBLEMS IN SOILS AND REUSE OF SOILS IN CIVIL ENGINEERING WORKS

ROCK MECHANICS

- 8.- GEOMECHANICAL CHARACTERIZATION OF MASSIFS - CONSTRUCTION IMPLICATIONS: SLOPES, TUNNELS

GEOTECHNICAL GROUND SURVEY AND INTRODUCTION TO FOUNDATIONS

- 9.- IN SITU GEOTECHNICAL SURVEYS
- 10.- INTRODUCTION TO THE MAIN TYPES OF FOUNDATIONS. SELECTION CRITERIA - GEOTECHNICAL ASPECTS OF THE SOIL IN RELATION TO THE TYPOLOGY OF THE FOUNDATIONS - THE GEOTECHNICAL REPORT: CONTENT AND GEOTECHNICAL RECOMMENDATIONS

4. Academic activities

The teaching methodology of this subject is based on a series of organized and directed classroom activities, in which the basic

concepts will be taught and consolidated through the realization of tutored practices, also of a classroom and directed nature. In addition, in the practical sessions, autonomous activities will be proposed so that the student can approach their resolution in a non-directed way. According to the above, the teaching methodology can be schematized as follows: **A) Face-to-face activities:** They will be developed at the Center, with the distribution in theory and practice groups according to the schedule of the degree and with the time dedication that is indicated.

- **Theoretical classes:** Teaching of the theoretical concepts of the subject (40 hours)
- **Tutored practical sessions:** Presentation of examples, proposal and resolution of problems in a tutored manner by the professor, in relation to the theoretical concepts taught in the theoretical classes (14 hours). Also will carry out some practices in the materials laboratory, to illustrate some practical aspects with direct experience of analytical methodologies (6 hours).

B) Non-attendance activities (work)- Proposal of problems for students to solve independently, with the support of the teacher in tutorials. These activities are an important part of the development autonomous development of students when addressing problems and seeking solutions to them, encouraging critical analysis of the theoretical information provided for its application in each specific practical case. Five activities of this type will be carried out, with a total dedication of 40 hours by the students.

5. Assessment system

The proposed assessment system is of a continuous type, for which it will be necessary to attend at least 80% of the face-to-face activities and will have the following scheme of gradable activities:

Continuous Assessment Exercises. A total of 5 continuous assessment exercises will be proposed (non face-to-face activities), which will be distributed throughout the subject once the corresponding theory topics and exercises have been completed.

These exercises will be similar to those carried out in the classroom, and for their resolution the students will have the assistance of the teacher during tutoring hours. This activity will contribute 30% to the final grade of the subject, and all exercises must be handed in.

2º.- Continuous assessment tests: There will be two mandatory written tests in the system of continuous assessment, which will be distributed throughout the subject, one in the middle and one at the end of the term. These tests will include theoretical-practical questions and problems of the corresponding topics. This activity will contribute globally with 70% to the final grade, and a minimum grade of 4 out of 10 must be obtained in each written test, otherwise the activity will be considered failed.

Prior to the first call, the teacher of the subject will notify each student whether or not they have passed the subject according to the use of the continuous assessment system, based on the sum of the scores obtained in the different activities developed throughout the subject. In case of not passing in this way, the student will have the two calls to do so, but this time in the form of a global assessment test.

As an alternative to the continuous assessment mode, when due to a personal and reasonably justifiable situation, the student cannot adapt to the pace of work required in the continuous assessment system, the student may use the global assessment system, which will be resolved by means of an evaluation test on the dates of the two official exams, in which the student will have to answer the theoretical and practical questions related to the different activities developed in the subject.