

Academic Year: ( 2021 / 2022 )

Review date: 09-07-2021

Department assigned to the subject: Continuum Mechanics and Structural Analysis Department

Coordinating teacher: VAZ-ROMERO SANTERO, ALVARO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 2

#### REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Professionals with technical engineering, higher engineering, degree or master's degrees corresponding to the branches of industrial and/or civil engineering, whose training in Solid Mechanics and Theory of Structures ensures the proper use of the master's degree offered. Specifically, among the recommended degrees are:

Industrial Engineering Branch: Technical Industrial Engineering (specialization in Mechanical Engineering), Industrial Engineering, Degree in Industrial Technologies, Degree in Mechanical Engineering

Civil Engineering Branch: Technical Engineering of Public Works, Civil Engineering, Degree in Civil Engineering, Degree in Public Works

Exceptionally, graduates of other technical degrees may also be admitted, provided that it is guaranteed that the students have a sufficient accredited base in the subjects of Solid Mechanics and Theory of Structures, which will allow them to adapt well to the content of the proposed degree, or that they have studied the Master's Degree in Industrial Engineering or Civil Engineering. In this case, the basic and specific training obtained will be analyzed in each particular case.

#### OBJECTIVES

Knowledge to create innovative and original solutions and ideas in the field, including novel researching areas.  
Capacity to solve problems in new and unknown areas in the context of multidisciplinary problems in industrial plants.  
Knowledge about the analytical and computational techniques used to design and build structures and industrial plants.  
Capacity to simplify, analyse and solve complex structural problems.  
Capacity to design and elaborate conventional and advance structural solutions in industrial plants.  
Capacity to apply local, national and international technical standards to the requirements in industrial plants.  
Capacity to identify and characterize actions on the ground, calculating foundations and underground systems in the structural design  
Advance knowledge of general and particular issues in designing and calculating underground systems in industrial plants  
Capacity of choosing and applying different analytical methods and modelization techniques to calculate and design advance underground systems

#### DESCRIPTION OF CONTENTS: PROGRAMME

1. Underground systems.
  - Introduction.
  - Definitions and applications.
  - General rules for designing
  - Technical standards
2. Underground networks
  - Introduction
  - Building materials.
  - Function, location, installation and limitations.
  - Designing criteria and dimensioning

#### 3. Caskets

- Introduction
- Building materials
- Types
- Designing criteria

#### 4. Pavements

- Introduction
- Building materials.
- Types.
- Designing criteria.

#### 5. Culverts

- Introduction
- Functionality
- Dimensioning and calculation

#### 6. Practical cases.

### LEARNING ACTIVITIES AND METHODOLOGY

Both theoretical and practical sessions will be held. The first is geared to the acquisition of theoretical background, and the second is aim to obtain practical skills related to theoretical concepts. Students will complete face-to-face sessions with personal homework and team work.

Additionally, there will be practical lab sessions.

### ASSESSMENT SYSTEM

Participate and/or attendance to sessions, individual homework and/or team work assignments, continuous assessment tests.

<b>% end-of-term-examination:</b>	0
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	100

### BASIC BIBLIOGRAPHY

- null AASHTO 7th ED - Loads on walls and abutments due to earth, NA, 2010
- null ACI 318 Building code Requirements for Structural Concrete and Commentary, na, na
- null BS 8007:1987 Code of practice for design of concrete structures for retaining aqueous liquids, NA, 2008