

## Foundation Analysis

Academic Year: ( 2022 / 2023 )

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Department assigned to the subject:

Coordinating teacher: PERNAS SANCHEZ, JESUS

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

## 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

Assess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context.

Apply acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

Be able to know the aspects and techniques of analytical and computational calculation methods to project, calculate and design structures and plants in the field of Industrial Construction.

Ability to simplify complex structural problems that allow their analysis and solution.

Ability to design and calculate conventional and advanced structural solutions in industrial plants.

Ability to apply local, regional, national and/or international rules and regulations in the field of Industrial Construction.

Ability to recognize and characterize the actions on the ground, develop the design of foundations and buried/underground structures, within the general framework of structural design.

Advanced knowledge and systematic understanding of the key concepts and aspects for the calculation and design of buried structures.

Ability to choose and apply relevant analytical and modeling methods in the calculation and advanced design of buried structures.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction.

- Generalities and terminology.
- Surface foundations.
- Piloted foundations.
- Stability of foundations.

2. Analytical and computational calculation methods for foundations.

- Static equipment, process structures and pipe trays.
- Design criteria and calculation procedures.
- Implementation, validation and analysis of results.

National and international regulations on foundations.

- Spanish standards.

- Eurocode and/or international standards.

4. Calculation, dimensioning and stability of walls.

5. 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

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

The evaluation will be carried out by means of individual and group work deliveries and partial exams.

## BASIC BIBLIOGRAPHY

- ACI Committee 318 ACI CODE-318-19: Building Code Requirements for Structural Concrete and Commentary, AMERICAN CONCRETE INSTITUTE, 2019

- American Association of State Highway and Transportation Officials (AASHTO) AASHTO LRFD Bridge Design Specifications, AASHTO, 2020

- CANADIAN GEOTECHNICAL SOCIETY Canadian Foundation Engineering Manual, CANADIAN GEOTECHNICAL SOCIETY, 2006

- Edited By Manjriker Gunaratne The Foundation Engineering Handbook, CRC Press, 2014

- Hsai-Yang Fang Foundation Engineering Handbook, Springer.

- Lambe, T.W. and Whitman, R.V. Soil Mechanics, John Wiley & Sons, New York., 1969

- Tharwat M. Baban Shallow Foundations Discussions and Problem Solving, Wiley, 2016