Analysis of Industrial Structures

Academic Year: (2022 / 2023) **Review date: 16-05-2022**

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

Coordinating teacher: GARCIA CASTILLO, SHIRLEY KALAMIS

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Elasticity, Strength of materials, and theory of structures.

OBJECTIVES

The competences that the student acquires are the following:
- Get and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context.
- Students will know how to apply the knowledge acquired and develop their ability to solve problems in new environments within broader (or multidisciplinary) contexts related to their area of study.
- That students possess the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.
- 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 design and calculate conventional and advanced structural solutions in industrial plants.
- Ability to use computational structural calculation systems, digitization of structures, and industrial constructions.
- Ability to recognise and characterise actions on the ground, develop the design of foundations and underground structures, within the general framework of the structural analysis.

Students who successfully pass the subject achieve the following learning outcomes:
1. Knowledge to design and analyse complex structures subjeted to a variety of loading conditions using a computer tool.
2. Ability to evaluate the behaviour of a structure and the veracity of the results obtained from a computational calculation.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Structural analysis of structures by computer: basic principles.
- Introduction.
- Generalities of the computational calculation of structures.
- Finite Element Method (FEM) / Matricial method.
- Calculation phases in a software.
- Typology of software for the structural analysis
2. Structural analysis by computer.
-Introduction.
- Calculation program: types of calculation.
- Preprocess I: Modeling of geometry, materials and sections.
- Preprocess II: Boundary conditions and loads.
- Processing and post-processing I: analysis of results.
- Processing and post-processing II: dimensioning and optimization.
- Seismic analysis with computer calculation programs.
3. Practical cases.

LEARNING ACTIVITIES AND METHODOLOGY

- Theoretical-practical classes: (0,84 créditos ECTS)
- Tutorials : (0,08 créditos ECTS)
- Individual student work: (1,4 créditos ECTS)
- Group work: (0,54 créditos ECTS)
- Partial and/or final exams: (0,14 créditos ECTS)

ASSESSMENT SYSTEM

The subject has a high practical component and it is recommended that students follow continuous assessment, which will consist of individual and/or group work.

Students who cannot follow the continuous evaluation will have the possibility of making a final evaluation of 100% of the mark.

For the extraordinary call, students will have the possibility of making a final evaluation with 100% of the mark.

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- David Sánchez Molina-Ramón González Drigo Cálculo de elementos estructurales, Iniciativa Digital Politècnica, 2011
- Díaz E. B., Ruiz M. C., Suárez B. Análisis matricial de estructuras, CIMNE, Centro Internacional de Métodos Numéricos en Ingeniería, 2008
- Federico París Teoría de la elasticidad , Universidad de Sevilla, 1998
- Sham Tickoo Exploring Bentley STAAD.Pro CONNECT Edition, CADCIM Technologies, 4th Edition

BASIC ELECTRONIC RESOURCES

- Bentley . Staad Pro: https://www.bentley.com/es/products/product-line/structural-analysis-software/staadpro