Theory of structures and industrial constructions

Academic Year: (2022 / 2023) **Review date: 23-05-2022**

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

Coordinating teacher: SANTIUSTE ROMERO, CARLOS

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Mechanics of Structures
Elasticity
Strength of Materialss

OBJECTIVES

By the end of this content area, students will be able to:
1. a systematic understanding of the key aspects and concepts for the calculus and design of structures and industrial constructions
2. the ability to apply their knowledge and understanding to identify, formulate and solve problems of the calculus and design of structures and industrial constructions using established methods;
3. the ability to select and apply relevant analytic and modelling methods in the calculus and design of structures and industrial constructions.
4. an understanding of methodologies in design of structures and industrial constructions, and an ability to use them.
5. the ability to conduct searches of literature, and to use data bases and other sources of information;
6. the ability to combine theory and practice to solve problems of calculus and design of structures and industrial constructions;
7. an understanding of applicable techniques and methods in calculus and design of structures and industrial constructions, and of their limitations;
8. an awareness of the non-technical implications of engineering practice.
9. demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to professional ethics, responsibilities and norms of engineering practice;

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to design of steel structures
   - Current structural design code. CTE
   - Actions on structures.
   - Beams.
   - Columns.
   - Introduction to Building Information Modelling (BIM)
2. Structural elements análisis
- Curves
- Temperature
3. Matrix analysis of structures

LEARNING ACTIVITIES AND METHODOLOGY

In each week one lecture session (master class) and one practical session (in reduced groups) will be taught. The first is geared to the acquisition of theoretical knowledge, and the second to the acquisition of practical skills related to theoretical concepts. In addition to this sessions two laboratory practical sessions in reduced groups (maximum 20 students) will be impart.
In addition, students will have an SPOC-type online course with videos and exercises to follow the entire syllabus of the subject.
Students will have the possibility of individual tutorials. Additionally, there will be the possibility of one group tutoring session at 15th week of the course.

ASSESSMENT SYSTEM

Continuum evaluation: 40%
- Evaluation controls: 30%
- Laboratory report: 10%

If the mark obtained in the final exam is lower than 4.5, the final mark of the student will be computed only with the final exam.

In order to pass the course, the attendance and performance of the laboratory practices foreseen in the weekly planning are compulsory. The weighting of the laboratory practice mark in the continuous assessment corresponds to what it is established in the course, in accordance with the regulations of the university. In this subject the weighting of the laboratory practices takes the value of 25% of the continuous assessment grade.

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- MARTÍ, Pascual. Análisis de estructuras: Métodos clásicos y matriciales., Horacio Escarbajal, Editores., 2003.

- MONFORT LLEONART, J. Estructuras metálicas para edificación (adaptado al CTE). , Universidad Politécnica de Valencia. .
- NAVARRO, C.; PÉREZ CASTELLANOS, J.L. Ingeniería Estructural: Análisis. , Publicación del Departamento., .

- R. ARGÜELLES ÁLVAREZ. Estructuras de Acero, fundamentos y cálculo según CTE, AEA y EC3. , Bellisco Ediciones Técnicas y Científicas., 2013.