

Structural Typology

Academic Year: (2023 / 2024)

Review date: 21-04-2023

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

Coordinating teacher: SANTIUSTE ROMERO, CARLOS

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Structural mechanics
Elasticity and Strength of Materials

SKILLS AND LEARNING OUTCOMES

CB1. Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study

CB2. Students are able to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem solving within their field of study.

CB3. Students have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgements which include reflection on relevant social, scientific or ethical issues.

CB5. Students will have developed the learning skills necessary to undertake further study with a high degree of autonomy.

CG1. Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.

CG3. Ability to design a system, component or process in the field of Industrial Technologies to meet the required specifications

CG4. Knowledge and ability to apply current legislation as well as the specifications, regulations and mandatory standards in the field of Industrial Engineering.

CG5. Adequate knowledge of the concept of company, institutional and legal framework of the company. Organisation and management of companies.

CG6. Applied knowledge of company organisation.

CG8. Knowledge and ability to apply quality principles and methods.

CG9. Knowledge and ability to apply computational and experimental tools for the analysis and quantification of Industrial Engineering problems.

RA1. Knowledge and understanding: Have basic knowledge and understanding of science, mathematics and engineering within the industrial field, as well as knowledge and understanding of Mechanics, Solid and Structural Mechanics, Thermal Engineering, Fluid Mechanics, Production Systems, Electronics and Automation, Industrial Organisation and Electrical Engineering.

RA2. Engineering Analysis: To be able to identify engineering problems within the industrial field, recognise specifications, establish different resolution methods and select the most appropriate one for their solution

RA3. Engineering Design: To be able to design industrial products that comply with the required specifications, collaborating with professionals in related technologies within multidisciplinary teams.

RA4. Research and Innovation: To be able to use appropriate methods to carry out research and make innovative contributions in the field of Industrial Engineering.

RA5. Engineering Applications: To be able to apply their knowledge and understanding to solve problems and design devices or processes in the field of industrial engineering in accordance with criteria of cost, quality, safety, efficiency and respect for the environment.

RA6. Transversal Skills: To have the necessary skills for the practice of engineering in today's society.

OBJECTIVES

After passing the course the student will be able to:

know the basic types of structures,

know the mechanical behavior of each of the types studied

select the structural adjustment that is the most convenient way to a predefined mechanical functionality

DESCRIPTION OF CONTENTS: PROGRAMME

Part 1

1. INTRODUCTION TO THE STRUCTURES
2. STRUCTURAL ENGINEERING
3. STRUCTURAL MATERIALS
4. ACTIONS ON STRUCTURES
5. BASIC CONCEPTS
6. BEHAVIOR OF STRUCTURES
7. SUPPORTS AND WALLS
8. BEAMS
9. ARCS
10. VAULTS AND DOMES
11. PLATES AND SHELLS
12. LIGHT STRUCTURES
13. METAL STRUCTURES
14. OTHER STRUCTURES
15. SUPPORT STRUCTURES AND FOUNDATIONS

Part 2

16. ANALYSIS TOOLS
17. PROCEDURES ANALYSIS
18. NORMATIVE
19. INTRODUCTION TO DESIGN OF STEEL STRUCTURES
20. INTRODUCTION TO BUILDING INFORMATION MODELLING (BIM)

LEARNING ACTIVITIES AND METHODOLOGY

Presential classes and personal work, aimed at the acquisition of theoretical knowledge and practical skills related to the program.

Students are delivered the documentation used by the teacher in class (presentations, ...).

Students, in groups of 3-4, will design a simple structure. Throughout the course must bring together advances in their respective projects in classes where the teacher will discuss their proposals in guiding the development of their work.

ASSESSMENT SYSTEM

The evaluation of the student's knowledge will be held from:

a job to develop along the course, consisting on the design of a structure,

an exam consisting on a test of short questions related to the descriptive content of the course.

Both work and the test will be graded out of 10. Minimum values are not set.

% end-of-term-examination:	0
% of continuous assessment (assignments, laboratory, practicals...):	60

BASIC BIBLIOGRAPHY

- GORDON J. E. Estructuras o por qué las cosas no se caen?, Calamar Ediciones, 2010
- TORROJA MIRET, Eduardo Razón y ser de los tipos estructurales, CSIC, 2000