Course guide
340057 - ESCI-M6O37 - Industrial Structures and Constructions

Last modified: 13/06/2024

Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering.

Degree: BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Marta Musté

Others: Joan Totusaus Margalet

Figuerola Alborna, Jordi

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. CE14. Knowledge and application of basics of material resistance.
3. CE23. Knowledge and ability to calculate and design structures and industrial constructions.

Transversal:
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

TEACHING METHODOLOGY

The directed learning hours consist, on the one hand, of theoretical classes in which the teacher gives a presentation of the concepts of the subject to be learnt. Subsequently, and through practical exercises, they try to motivate and involve the students so that they actively participate in their learning. Support material is used: publications and solved problems. Laboratory practicals are carried out in pairs and allow the development of basic instrumental skills as well as introducing students to structural design and calculation software.
After each theoretical session, tasks outside the classroom are proposed, to be worked on individually or in groups. It is also necessary to consider other hours of autonomous learning, such as those dedicated to reading oriented readings and the resolution of the proposed problems.

LEARNING OBJECTIVES OF THE SUBJECT

Knows how actions and stresses are transmitted in structures
Sizes structural and resisting elements
Knows different methods of structural analysis
Knows different types of structures
calculates structural elements subjected to static and variable actions
Knows simulation and calculation programs for structural and resistant elements and structures
Understands the technical terminology related to structural calculations.
Effectively presents technical results orally and in writing.

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours small group	15,0	10.00
Hours large group	45,0	30.00

Total learning time: 150 h

CONTENTS

PLASTICITY

Description:
Calculation of static values, plastic ball joint and classification of cross-sections in bending

Full-or-part-time: 10h
Theory classes: 10h

BENDING DIMENSIONING ACCORDING TO EC3

Description:
Permanent and variable loads, ELU and ELS and bending-shear interaction.

Full-or-part-time: 8h
Theory classes: 8h

MATRIX STRUCTURAL ANALISYS

Description:
Total, 1 and 2 states of a structure, equilibrium equations in matrix form, calculation of stresses and effect of temperature on beams.

Full-or-part-time: 8h
Theory classes: 8h

TRUSS STRUCTURES

Description:
Description, calculation of stresses by means of the Ritter and nodal method. Dimensioning of tension and compression members. Bottom chords subjected to distributed load, bars subjected to flexural and tensile stresses.

Full-or-part-time: 8h
Theory classes: 8h

BARS IN SIMPLE COMPRESSION (COLUMNS)

Description:
Description, types of extreme nodes: articulated, fixed, free; buckling according to profile axes: strong axis and weak axis.

Full-or-part-time: 4h
Theory classes: 4h

GRADING SYSTEM

THE COMPLETION OF THE INTERNSHIP AND THE PRESENTATION OF THE REPORTS IS A NECESSARY CONDITION TO PASS THE SUBJECT. ACORD CG/2024/03/08 DEL CONSELL DE GOVERN.
RATINGS:
C1 = Partial control.
It will be a test with 10 questions and two problems to be solved.
Qualification C1 = 0,25.Test + 0,25. P1 + 0,50.P2
P1- Problem 1
P2 - Problem 2

C2 = Final control
It will consist of a test with 10 questions and two problems to solve.
The evaluable content of this part will be all the material of the four-month period.
Grade C2 = 0,25.Test + 0,25.P1 + 0,50.P2
P1- Question 1
P2 - Question 2

Tests will only be repeated individually to those people who justify their absence due to a serious cause the test day. The formulary will only be able to use it with a DIN 4 sheet filled in both sides that the student can bring with him/her and in which his/her name must be written in. This application form will only be allowed to check, in the part of numeric problems, The inclusion of solved numeric problems in this formulary is absolutely prohibited. The formulary must be handed in at the end of the test. Failure to submit the formulary or the inclusion of solved problems in it, will automatically be scored in 0 (zero) in the numeric questions part. If a student wants to take the test without a formulary, he/she must inform the professor at the beginning of the test, being exempted from handing it in. In no case the formulary will be brought back.

CE = grade based on the completion of a voluntary exercise. Failure to complete this exercise will result in a qualification of 0 (zero). The statement of the exercise will be posted in the digital campus and the delivery of the exercise will also be done in the digital campus. In no case will the grade of previous courses be kept and exercises out of time will not be accepted.
P = Practicals to be carried out during the course.
The composition of the groups and the timetable for the exercises will be communicated sufficiently in advance.
The final qualification of the course, after the two previous tests, will come out of the highest value calculated with the following expressions:
Final Qualification = 0,30.C1 + 0,50.C2 + 0.05.CE + 0.15.P
Final Qualification = 0,80.C2 + 0,05.CE + 0,15.P
In case the final qualification, after taking the tests C1 and C2, is equal or higher than 2 and lower than 5, the student will have the possibility of taking a re-evaluation exam, C3, with all the material given throughout the four-month period. It will consist of a test with 10 questions and two problems to be solved.
Qualification C3 = 0,25.Test + 0,25.P1 + 0, 50.P2
P1- Problem 1
P2 - Problem 2
In this case the qualification of the student, after the re-evaluation, will be given by the following formula:
Final qualification = 0,80.C3 + 0,05.CE + 0,15.P
This final qualification will indicate whether the reevaluated student passes or fails the course. However, and as the school regulations state, in the report where the grades are handed in, a student who has passed by re-evaluation will have a maximum final qualification of 7. For those students who, in spite of being re-evaluated, do not pass the subject, in the report, the final qualification that will appear will be the higher of the two final qualifications obtained.

BIBLIOGRAPHY

Basic:
- Argüelles Álvarez, Ramón... [et al.]. Estructuras de acero. Fundamentos y cálculo según CTE, EAE y EC 3. 3a. Madrid: Bellisco, 2013. ISBN 9788492970520.