Course guide
2500037 - GECCALCEST - Structural Design

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.
Degree: BACHELOR’S DEGREE IN CIVIL ENGINEERING (Syllabus 2020). (Optional subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: Spanish

LECTURER
Coordinating lecturer: LUIS MIGUEL CERVERA RUIZ
Others: LUIS MIGUEL CERVERA RUIZ, JOSE MANUEL GONZALEZ LOPEZ

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
14410. Knowledge of the typology and calculation bases of prefabricated elements and their application in manufacturing processes. (Specific technology module: Civil Construction)
14411. Knowledge about the project, calculation, construction and maintenance of building works in terms of structure, finishes, facilities and own equipment. (Specific technology module: Civil Construction)

Generical:
14380. Scientific-technical training for the exercise of the profession of Technical Engineer of Public Works and knowledge of the functions of advice, analysis, design, calculation, project, construction, maintenance, conservation and exploitation.
14383. Ability to project, inspect and direct works, in their field.
14391. Conceive, project, manage and maintain systems in the field of construction engineering. Cover the entire life cycle of an infrastructure or system or service in the field of construction engineering. (Additional school competition).

TEACHING METHODOLOGY

The course consists of 4 hours per week of classes during the 15 weeks of the semester. The approximate distribution of the 60 contact hours is as follows:
36 hours of lectures devoted to the exposition of the concepts and materials of the course.
12 hours of practical sessions devoted to the presentation of examples and exercises and problems.
4 hours laboratory and directed activities devoted to practical exercises to consolidate the objectives of general and specific learning of the subject.
8 hours devoted to assessment.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.
LEARNING OBJECTIVES OF THE SUBJECT


1. Capacity for the project, calculation, construction and maintenance of building works in terms of structure and foundation structures, finishes, facilities and own equipment.
2. Ability to identify different types of prefabricated elements and their calculation bases and capacity for their application in manufacturing processes.


STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

**Structural reliability and structural basis of design**

Description:
Structural reliability and structural design bases. Problems
Structural reliability and structural design bases. Laboratory

**Full-or-part-time:** 28h 47m

Theory classes: 6h
Practical classes: 2h
Laboratory classes: 4h
Self study : 16h 47m
Funicular Structures

Description:
Cables. Arcos.
Funicular Structures. Problems

Full-or-part-time: 9h 36m
Theory classes: 2h
Practical classes: 2h
Self study : 5h 36m

Second-order analysis

Description:
Slender columns. Isolated concrete column. Isolated concrete column and steel
Analysis of second order. Problems

Full-or-part-time: 9h 36m
Theory classes: 2h
Practical classes: 2h
Self study : 5h 36m

Plastic Analysis

Description:
Plastic calculation. Problems

Full-or-part-time: 19h 12m
Theory classes: 4h
Practical classes: 2h
Laboratory classes: 2h
Self study : 11h 12m

Plates

Description:
Plates. Problems

Full-or-part-time: 24h
Theory classes: 6h
Practical classes: 4h
Self study : 14h
Shells

Description:
Sheets. Problems

Full-or-part-time: 19h 12m
Theory classes: 4h
Practical classes: 2h
Laboratory classes: 2h
Self study : 11h 12m

Dynamic Analysis

Description:
Introduction to matrix analysis.
Dynamic Analysis. Problems
Dynamic Analysis. Laboratory

Full-or-part-time: 33h 36m
Theory classes: 8h
Practical classes: 2h
Laboratory classes: 4h
Self study : 19h 36m

GRADING SYSTEM

The final grade is the weighted average of the one obtained in the periodic evaluation exercises (AV), the exercises carried out in the practical classes and directed activities (AD) and in the final work of the subject (AT).

The periodic evaluation (A) is obtained as: \( AV = 0.4 \times A1 + 0.6 \times A2 \), being A1 and A2 the two periodic evaluations.

The final grade for the subject will be:

Subject grade = 0.3*(AV grade) + 0.3*(AD grade) + 0.6*(AT grade)

if each of the AV, AD and AT grades has obtained a grade equal to or greater than 4.0. Otherwise, the mark of the subject will be:

Mark of the subject = \( 1.2 / \left[ (0.3/\text{Note AV}) + (0.3/\text{Note AD}) + (0.6/\text{Note AT}) \right] \)

To pass, the mark of the course must be equal to or greater than 5.0.

Criteria for qualification and admission to re-evaluation: Students suspended in the ordinary evaluation who have regularly taken the evaluation tests of the failed subject will have the option to take a re-evaluation test in the period established in the academic calendar. The students who have already passed it or the students qualified as not presented will not be able to present themselves to the re-evaluation test of a subject. The maximum grade in the case of taking the reevaluation exam will be five (5.0). The non-attendance of a student summoned to the re-evaluation test, held within the established period, may not give rise to another test with a later date Extraordinary evaluations will be carried out for those students who, due to proven force majeure, have not been able to carry out any of continuous assessment tests. These tests must be authorized by the corresponding head of studies, at the request of the professor responsible for the subject, and will be carried out within the corresponding academic period.
EXAMINATION RULES.

Failure to perform a laboratory or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

BIBLIOGRAPHY

Basic:

Complementary: