Course guides
2500038 - GECCTPONTS - Construction of Bridges and Other Structures

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: 2021  ECTS Credits: 6.0  Languages: Spanish

LECTURER

Coordinating lecturer: GONZALO RAMOS SCHNEIDER
Others: JUAN RAMON CASAS RIUS, ALBERTO DE LA FUENTE ANTEQUERA, GONZALO RAMOS SCHNEIDER, IGNACIO SEGURA PEREZ, JOSE TURMO CODERQUE

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
14406. Ability to analyze the problem of safety and health in construction sites. (Common module to the Civil branch)
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)
14415. Ability to apply construction procedures, construction machinery and construction planning techniques. (Specific technology module: Civil Construction)

General:
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.
14386. Capacity for maintenance, conservation and exploitation of infrastructure, in its field.
14390. Identify, formulate and solve engineering problems. Pose and solve construction engineering problems with initiative, decision-making skills and creativity. Develop a systematic and creative method of analysis and problem solving. (Additional school competition)
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 2 hours per week of classroom activity (large size group) and 2 hours weekly with half the students (medium size group).

The 2 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 2 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.
LEARNING OBJECTIVES OF THE SUBJECT


1 Ability to identify the different types of bridges and understand their construction procedures for their various elements both in situ and prefabricated.
2 Capacity for the construction of foundation elements and other works directly related to the land, singular concrete constructions and singular metallic constructions.
3 Ability to define demolition techniques and understand the relations between construction and environment.


STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<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>
<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>
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</tbody>
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Total learning time: 150 h
CONTENTS

Bridges

Description:
- Presentation, terminology and current situation of Bridge Construction
- Actions to consider on road bridges. Actions to consider on railway bridges.
- Loads to consider in Bridges
- Beam decks, frame bridges, arches, cable supported bridges. Types of support devices and their characteristics.
- Static Schemes. Support Devices
- Isostatic and continuous decks, frames
- Beams. Frames
- Structural system. Examples
- Arch bridges. Cable-stayed and Suspended
- Precast beam decks, slab decks, box girders, composite and steel decks
- Beams, slabs and box girders
- Types of pier according to the deck. High piers. Types of abutments. Design.
- Piers and Abutments. Typologies. Behavior
- Construction methods of piers and abutments
- Piers and Abutments. Construction
- Construction of precast bridge decks. Mounting by crane, beam launcher, lifting, ...
- Construction by crane. Beams
- Construction on lasework over the entire length and construction span by span, on lasework or with self-launching falswork.
- Postensioning
- Construction on falswork. Postensioning
- Construction procedure and auxiliary means for the construction of decks and cantilevered arches
- Construction procedures and auxiliary means
- Construction procedures and auxiliary means
- Criteria for choosing static diagrams and cross sections
- Criteria for choosing construction procedures
- Criteria for choosing bearings
- Evaluation

Full-or-part-time: 100h 48m
- Theory classes: 25h
- Practical classes: 17h
- Self study: 58h 48m

Construction of Other Structures

Description:
- Construction Procedures for Dams, Buildings, Unique Elements
- Construction procedures, auxiliary means and applications.
- Construction with Special Concrete. Sprayed. Fibers, Self-compacting
- Construction of Other Structures. Dams

Full-or-part-time: 43h 12m
- Theory classes: 8h
- Practical classes: 8h
- Laboratory classes: 2h
- Self study: 25h 12m
GRADING SYSTEM

The mark of the course is obtained from the ratings of continuous assessment and their corresponding laboratories and/or classroom computers.

Continuous assessment consist in several activities, both individually and in group, of additive and training characteristics, carried out during the year (both in and out of the classroom).

The teachings of the laboratory grade is the average in such activities.

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises.

BIBLIOGRAPHY

Basic:

Complementary: