Course guides
2500054 - GECCONSINF - Infrastructure Preservation

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: 4.5 Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: JOSE RODRIGO MIRO RECASENS
Others: RAMON BOTELLA NIETO, JOSE RODRIGO MIRO RECASENS

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
14422. Capacity for the construction and conservation of roads, as well as for the dimensioning, the project and the elements that make up the basic road equipment. (Specific technology module: Urban Transport and Services)
14423. Capacity for the construction and conservation of railway lines with knowledge to apply specific technical regulations and differentiating the characteristics of the mobile material. (Specific technology module: Urban Transport and Services)
14424. Knowledge of the urban management regulation framework. (Specific technology module: Urban Transport and Services)
14425. Knowledge of the influence of infrastructure in the planning of the territory and to participate in the urbanization of urban public space, such as water distribution, sanitation, waste management, transport systems, traffic, lighting, etc. (Specific technology module: Urban Transport and Services)
14426. Knowledge of the design and operation of infrastructures for modal exchange, such as ports, airports, railway stations and transport logistics centers. (Specific technology module: Urban Transport and Services)

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.
14385. Ability to carry out territorial planning studies and environmental aspects related to infrastructure, in its field.
14386. Capacity for maintenance, conservation and exploitation of infrastructure, in its field.
14389. Knowledge of the history of civil engineering and training to analyze and assess public works in particular and construction in general.
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 1.5 hours per week of classroom activity (large size group) and 1.5 hours weekly with half the students (medium size group).

The 1.5 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 1.5 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 analyze the mechanisms and agents of deterioration and the types of pavements and modes of deterioration. Auscultation, visual inspection, evaluation of the functional and structural characteristics of the pavement.

2 Capacity to analyze the conservation, surface rehabilitation and structural reinforcement of a pavement.

3 Ability to establish firm management systems and fixed vertical signs and road markings.

Knowledge of the road network in Spain, its condition and conservation needs. Knowledge of the structural and surface characteristics of a road network. Analysis of the mechanisms and agents of deterioration and the types of pavements and modes of deterioration. Knowledge of auscultation, visual inspection, evaluation of the functional and structural characteristics of the pavement. Conservation, surface rehabilitation and structural reinforcement concept. Knowledge of pavement management systems and fixed vertical signals and road markings.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>63,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>4,5</td>
<td>4.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>22,5</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>22,5</td>
<td>20.00</td>
</tr>
</tbody>
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Total learning time: 112.5 h

CONTENTS

1. Presentation

Full-or-part-time: 2h 24m
Laboratory classes: 1h
Self study: 1h 24m
2. The road network

**Description:**
The road network in Spain. State and conservation needs.

**Specific objectives:**
Acquire knowledge about: The road network in Spain. State and conservation needs.

**Full-or-part-time:** 4h 48m
Theory classes: 2h
Self study : 2h 48m

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3. Pavement condition

**Description:**
Structural characteristics. Surface characteristics: adherence, noise, roughness, optical properties.
Damage mechanisms and agents. Pavement types and modes of distress. Catalogs damage.

**Specific objectives:**
Acquiring knowledge about:
Structural characteristics. Surface characteristics: adherence, noise, roughness, optical properties.
Acquiring knowledge about:
Damage mechanisms and agents. Pavement types and modes of distress. Catalogs damage.
Acquiring knowledge about:

**Full-or-part-time:** 28h 47m
Theory classes: 12h
Self study : 16h 47m
4. Conservation techniques

**Description:**
Routine maintenance. Surface rehabilitation
Structural reinforcement. Standard 6.3-IC "Rehabilitación de firmes".
Analysis of deflections. Tramificación. Deflection characteristic. Calculating of the reinforcement thickness, Standard 6.3-IC.
Calculation of reinforcement thickness. Method IA. Method AASHO.
Design of bituminous mixtures
Practice of asphalt mixes design

**Specific objectives:**
Acquiring knowledge about:
Routine maintenance. Surface rehabilitation
Acquiring knowledge about:
Structural reinforcement. Standard 6.3-IC "Rehabilitación de firmes".
Acquiring knowledge about:
Acquiring practical knowledge about:
Analysis of deflections. Tramificación. Deflection characteristic. Calculating of the reinforcement thickness, Standard 6.3-IC.
Acquiring practical knowledge about:
Calculation of reinforcement thickness. Method IA. Method AASHO.
Acquire knowledge about: Design of bituminous mixtures
Acquiring practical knowledge about:
asphalt mixes design

**Full-or-part-time:** 48h
Theory classes: 6h
Practical classes: 14h
Self study: 28h

5. Pavement Management Systems

**Description:**
HDM
Inventory. Comprehensive maintenance contracts. Management indicators.

**Specific objectives:**
Acquiring knowledge about:
Acquire knowledge about: HDM
Acquiring knowledge about:
Inventory. Comprehensive maintenance contracts. Management indicators.

**Full-or-part-time:** 24h
Theory classes: 8h
Practical classes: 2h
Self study: 14h
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.

EXAMINATION RULES.

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

BIBLIOGRAPHY

Basic: