250228 - PROCONELEC - Construction Methods and Electrical Engineering

Coordinating unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2017
Degree: BACHELOR'S DEGREE IN PUBLIC WORKS ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: GONZALO RAMOS SCHNEIDER
Others: GONZALO RAMOS SCHNEIDER, FRANCISCO JOSE SUELVES JOANXICH, MANUEL VALDES LOPEZ, IGNACIO VALERO LOPEZ

Opening hours

Timetable: It will be on demand of the students

Degree competences to which the subject contributes

Specific:
3068. Fundamental knowledge of the electrical power system: energy generation and the transport and distribution network, and the types of lines and conductors. Knowledge of the low and high voltage regulations
3069. Ability to apply environmental impact study and assessment methodologies.
3070. Knowledge of construction procedures, construction machinery and the techniques for organising, measuring and valuing works.
3078. Ability to analyse health and safety issues in construction works
3084. Ability to use the appropriate construction procedures, construction machinery and planning techniques in carrying out works
3088. Knowledge and understanding of the functioning of ecosystems and environmental factors

General:
3105. Students will learn to identify, formulate and solve a range of engineering problems. They will be expected to show initiative in interpreting and solving specific civil engineering problems and to demonstrate creativity and decision-making skills. Finally, students will develop creative and systematic strategies for analysing and solving problems.
3108. Students will learn to identify and model complex systems and to identify the most suitable methods and tools for defining and solving the associated equations. They will acquire the knowledge and skills to perform qualitative analyses and approximations, estimate the uncertainty of results, formulate hypotheses and define experimental methods through which to validate them, establish compromises, identify principal components and prioritise their work. More generally, students will develop their capacity for critical thought.
3111. Students will learn to plan, design, manage and maintain systems suitable for use in civil engineering. They will develop a systematic approach to the complete life-cycle of a civil engineering infrastructure, system or service, which includes drafting and finalising project plans, identifying the basic materials and technologies required, making decisions, managing the different project activities, performing measurements, calculations and assessments, ensuring compliance with specifications, regulations and compulsory standards, evaluating the social and environmental impact of the processes and techniques used, and conducting economic analyses of human and material resources.
3114. Students will learn to identify market requirements and opportunities and to compile information from which to
Students will learn about construction procedures and machinery. They will also acquire a basic understanding of the electrical power system: the generation of energy, the transmission network, energy distribution, the different types of power lines and conductors, and the laws regulating high and low voltage.

Upon completion of the course, students will have acquired the ability to:
1. Organise and plan a construction project.
2. Draw up a quality-control plan for the materials used in a construction engineering project.
3. Analyse the electric power transmission and distribution system and design an electrical installation.

Historical development of civil engineering and construction techniques applied in public works; The most common construction operations and the resources and machinery used in each case (earthworks, piles, shear walls, concrete and bituminous mixtures); Electric power transmission and distribution system; Criteria for designing and calculating electrical installations and consumption.

**Learning objectives of the subject**

**Teaching methodology**

The course consists of 3 hours per week of classroom classroom. Lectures are given and practical exercises in order to consolidate the objectives of general and specific learning.

Detailed support material is used in the virtual campus ATHENA: content, programming and evaluation activities directed learning and literature.

**Study load**

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 31h</th>
<th>20.67%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 6h</td>
<td>4.00%</td>
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<tr>
<td></td>
<td>Hours small group: 23h</td>
<td>15.33%</td>
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<tr>
<td></td>
<td>Guided activities: 6h</td>
<td>4.00%</td>
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<tr>
<td></td>
<td>Self study: 84h</td>
<td>56.00%</td>
</tr>
</tbody>
</table>

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Detailed support material is used in the virtual campus ATHENA: content, programming and evaluation activities directed learning and literature.
## Content

### Electrical engineering

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 36h</th>
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<tbody>
<tr>
<td>Introduction to electric power system</td>
<td>Theory classes: 11h</td>
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<tr>
<td>Single-phase circuits</td>
<td>Practical classes: 3h</td>
</tr>
<tr>
<td>Three-phase circuits</td>
<td>Laboratory classes: 1h</td>
</tr>
<tr>
<td>Transformers</td>
<td>Self study: 21h</td>
</tr>
</tbody>
</table>

### The Project

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 108h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall process of construction</td>
<td>Theory classes: 32h</td>
</tr>
<tr>
<td>Description of the various actors involved in the conception, design, construction and exploitation of a work.</td>
<td>Practical classes: 10h</td>
</tr>
<tr>
<td>Functions.</td>
<td>Laboratory classes: 3h</td>
</tr>
<tr>
<td>Types of projects</td>
<td>Self study: 63h</td>
</tr>
<tr>
<td>Legislation</td>
<td></td>
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<tr>
<td>2h Memory1 cálculo</td>
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<tr>
<td>6 h Schedules of Environment and Calidad</td>
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<td>6 h Residuos</td>
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<td>6 h S and S</td>
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<td>7 h Presupuestos</td>
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<tr>
<td>2 h Tender Specifications</td>
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<tr>
<td>Practical application of knowledge</td>
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</table>
Qualification system

The course grade will be obtained from continuous assessment scores. Two scheduled exams (E1 and E2) will be developed and also practices or non-scheduled quizzes (EC1) and an assignment on BIM (EC2). The first exam (E1) is divided in two parts, one corresponding to electrical (E11) and a second one corresponding to construction procedures (E12). The final grade is the weighted sum: 20% E11 (electrical only), 20% E12, 30% E2, 10% EC1 and 20% EC2.

The second (E2) examination corresponds to construction procedures and all the knowledge imparted to the date of exam will be evaluated. Continuous assessment (EC1) also corresponds to construction procedures and shall be evaluated through quizzes or work practices.

Screening tests consist of a part with issues associated with the learning objectives of the course in terms of knowledge or understanding concepts, and a set of application exercises.

Criteria for re-evaluation qualification and eligibility: Students that failed the ordinary evaluation and have regularly attended all evaluation tests will have the opportunity of carrying out a re-evaluation test during the period specified in the academic calendar. Students who have already passed the test or were qualified as non-attending will not be admitted to the re-evaluation test. The maximum mark for the re-evaluation exam will be five over ten (5.0). The non-attendance of a student to the re-evaluation test, in the date specified will not grant access to further re-evaluation tests. Students unable to attend any of the continuous assessment tests due to certifiable force majeure will be ensured extraordinary evaluation periods.

These tests must be authorized by the corresponding Head of Studies, at the request of the professor responsible for the course, and will be carried out within the corresponding academic period.

Regulations for carrying out activities

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

Basic:


Complementary:
