

## 250127 - PROCONSELE - Construction Management and Electrotechnics

Coordinating unit:	250 - ETSECCPB - Barcelona School of Civil Engineering		
Teaching unit:	751 - DECA - Department of Civil and Environmental Engineering 709 - EE - Department of Electrical Engineering		
Academic year:	2018		
Degree:	BACHELOR'S DEGREE IN CIVIL ENGINEERING (Syllabus 2017). (Teaching unit Compulsory) BACHELOR'S DEGREE IN CIVIL ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)		
ECTS credits:	7,5	Teaching languages:	Spanish, English

### Teaching staff

Coordinator:	GONZALO RAMOS SCHNEIDER, JOSE TURMO CODERQUE
Others:	SAMUEL GALCERAN ARELLANO, GONZALO RAMOS SCHNEIDER, JUAN RULL DURAN, JOSE TURMO CODERQUE

### Opening hours

Timetable:	The schedule of care will be flexible on the students demand
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### Degree competences to which the subject contributes

#### Specific:

- 3018. 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.
- 3021. Knowledge of construction procedures, construction machinery and the techniques for organising, measuring and valuing works.
- 3045. Ability to use the appropriate construction procedures, construction machinery and planning techniques in carrying out works.

#### Generical:

- 3104. 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.
- 3110. 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 determine the ideal specifications of a new product, process or service. They will acquire the skills to prepare a basic business plan, define a new product, process or service, and plan and implement the different phases in the design process.

#### Transversal:

- 587. ENTREPRENEURSHIP AND INNOVATION - Level 3. Using knowledge and strategic skills to set up and manage

## 250127 - PROCONSELE - Construction Management and Electrotechnics

projects. Applying systemic solutions to complex problems. Devising and managing innovation in organizations.

590. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 3. Taking social, economic and environmental factors into account in the application of solutions. Undertaking projects that tie in with human development and sustainability.

593. 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.

584. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

### Teaching methodology

The course consists of 2.7 hours per week of classroom activity (large size group) and 0.7 hours weekly with half the students (medium size group).

The 2.7 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 0.7 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.

The rest of weekly hours devoted to laboratory practice (conferences or site visits).

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.

The course will be taught in Spanish and / or Catalan in two of its groups. There is a group that will be taught in English. The English group has a differentiated learning method, through self-learning techniques or student-centered learning. Students, in small groups, will fully develop the various topics of the course and present them orally to the rest of the students. Teachers will provide initial material and guidance in this process.

### Learning objectives of the subject

Students will learn about construction procedures, construction machinery, and techniques for organising, measuring, estimating and planning construction projects. 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 civil engineering project. 3. Analyse the electric power transmission and distribution system and design an electrical installation.

Organisation and planning of construction projects, including prevention, safety and health, and construction quality systems; 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

Knowledge of construction procedures, construction machinery and organization techniques, measurement, evaluation and planning of works. Basic understanding of electric power systems (power generation, transmission network, distribution and distribution), as well as types of lines and conductors, knowledge of regulations on low and high tension. After completing the course the student will acquire the ability to: 1. Perform a work organization and planning, determining the equipment used. 2. Make a plan for quality control of materials in a project / civil engineering work. 3. Analyze the system of transmission and distribution of electric energy and capacity to design an installation. Knowledge of

## 250127 - PROCONSELE - Construction Management and Electrotechnics

organization and planning of works, including prevention, health and safety and quality systems in construction. Knowledge of the most common operations in work and machinery and means used in each case (earthworks, piles, screens, concrete and bituminous mixtures). Basic knowledge of the system of transmission and distribution of electricity, as well as design criteria and calculation of facilities and consumption.

### Study load

Total learning time: 187h 30m	Hours large group:	49h 06m	26.19%
	Hours medium group:	10h	5.33%
	Hours small group:	15h 54m	8.48%
	Guided activities:	7h 30m	4.00%
	Self study:	105h	56.00%

## 250127 - PROCONSELE - Construction Management and Electrotechnics

### Content

<p>Electrical engineering</p>	<p>Learning time: 36h Theory classes: 11h Practical classes: 3h Laboratory classes: 1h Self study : 21h</p>
<p>Description: Introduction to Electric Power Systems Single-phase circuits Three-phase Circuits Transformers Facilities Practices</p>	
<p>Design and Construction Process</p>	<p>Learning time: 64h 48m Theory classes: 18h Practical classes: 7h Laboratory classes: 2h Self study : 37h 48m</p>
<p>Description: The project and the work Problems</p>	
<p>The Construction Process</p>	<p>Learning time: 79h 12m Theory classes: 20h Laboratory classes: 13h Self study : 46h 12m</p>
<p>Description: Planning Construction methods and equipment Practical exercises</p>	

## 250127 - PROCONSELE - Construction Management and Electrotechnics

### Qualification system

The subject is basically differentiated into two parts, the part devoted to the study of electrical power systems and electrical installations and the part dedicated to management of projects and construction works and procedures. The teaching load of each of the two parts is, respectively, 15 and 60 hours. The final mark of the NFA course will come from the weighted average of the results of the evaluation of the two NE and NC parts, the weights of the weighting being proportional to the tuition load of each of the parts, that is, 20% y 80%. Suspension in the evaluation of one of the parties may be offset by the note of the other. The subject is always approved or suspended globally. If suspended, in the following year the student must examine the entire subject. Qualification criteria and admission to reevaluation: Students suspended in the regular evaluation who have been submitted regularly to the evaluation tests of the suspended subject will have the option to carry out a reevaluation test in the period fixed in the academic calendar. Students who have already passed it or students qualified as not present may not be admitted to the reevaluation test of a subject. The maximum qualification for the reevaluation exam will be five (5.0). The non-attendance of a student summoned to the test of reevaluation, held in the fixed period can not give rise to another test with a later date. Extra evaluations will be carried out for those students who, because of an accredited force majeure, have not been able to perform some Of continuous assessment tests. These tests must be authorized by the corresponding head of studies, at the request of the teacher responsible for the subject, and will be carried out within the corresponding academic period. Students in the group in English have the same evaluation as the rest of the groups, through exams, coinciding in dates and contents. However, since they are going to make presentations, the exams will count a total of 75% of the final grade and the presentations (written and oral) another 25%.

### Regulations for carrying out activities

Shall not present a rating of students who do not perform two or three of the continuous assessment tests.

## 250127 - PROCONSELE - Construction Management and Electrotechnics

### Bibliography

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- Morilla, I. Guía metodológica y práctica para la realización de proyectos.. 3a ed. Madrid: Colegio de Ingenieros de Caminos, Canales y Puertos, 2001. ISBN 8438001955.
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- BOC. Llei 3/2007, de 4 de juliol, de l'obra pública. Barcelona: Generalitat de Catalunya, 2007. ISBN 9788439375289.
- Ministerio de Economía y Hacienda. Real Decreto Legislativo 3/2011, de 14 de noviembre, por el que se aprueba el texto refundido de la Ley de Contratos del Sector Público. Madrid: Boletín Oficial del Estado, 2011.
- Martínez Montes, G.; Pellicer Armiñana, E. Organización y gestión de proyectos y obras. Madrid: McGraw-Hill, 2007. ISBN 9788448156411.
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#### Complementary:

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- Weedy, B. M. Electric power systems [on line]. 5th ed. Chichester [etc.]: John Wiley & Sons, 2012 [Consultation: 19/03/2019]. Available on: <<https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=978379>>. ISBN 9781118361092.
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