

## Course guide

# 2500027 - GECPCONSEL - Construction Methods and Electrical Engineering

Last modified: 01/10/2023

**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). (Compulsory subject).  
**Academic year:** 2023    **ECTS Credits:** 6.0    **Languages:** Spanish, English

## LECTURER

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**Coordinating lecturer:** GONZALO RAMOS SCHNEIDER  
**Others:** MARC CHEAH MAÑÉ, MAGÍ DOMINGO TARANCÓN, SAMUEL GALCERAN ARELLANO, SEYEDMILAD KOMARIZADEHASL, GONZALO RAMOS SCHNEIDER, JOAN RULL DURAN, NIKOLA TOSIC

## DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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### Specific:

14406. Ability to analyze the problem of safety and health in construction sites. (Common module to the Civil branch)  
14407. Fundamental knowledge about the electric power system: power generation, transport network, distribution and distribution, as well as types of lines and conductors. Knowledge of the regulations on low and high voltage. (Common module to the Civil branch)  
14409. Knowledge of construction procedures, construction machinery and techniques of organization, measurement and evaluation of works. (Common module to the Civil branch)  
14415. Ability to apply construction procedures, construction machinery and construction planning techniques. (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.  
14381. Understanding of the multiple technical and legal conditions that arise in the construction of a public work, and ability to use proven methods and accredited technologies, in order to achieve the highest efficiency in construction while respecting the environment and the protection of the health and safety of workers and users of public works.  
14382. Knowledge, understanding and ability to apply the necessary legislation during the exercise of the profession of Technical Engineer of Public Works.  
14383. Ability to project, inspect and direct works, in their field.  
14388. Knowledge and ability to apply business management techniques and labor legislation.  
14389. Knowledge of the history of civil engineering and training to analyze and assess public works in particular and construction in general.  
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

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The subject consists of 4 hours a week of face-to-face classes.

The electrical engineering classes of groups 10Q2A and 10Q2B will be taught in Catalan, those of procedures in Spanish.

The language indicated in the subject is Spanish because it is the majority.

In some theoretical classes the teachers explain the basic concepts and materials of the subject, present examples and do exercises. Hours are spent solving problems with greater interaction with students.

Practical exercises are carried out in order to consolidate the general and specific learning objectives.

Support material is used in the format of a detailed teaching plan through the ATENEA virtual campus: contents, programming of assessment and directed learning activities and bibliography.

The course includes workshops and presentations by speakers other than the professors of the course. These may be held in Spanish or Catalan and, exceptionally, in English.

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

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Relation and analysis of constructive procedures and construction machinery. Constituent Elements of civil works. Most common operations in different types of work and the machinery used in each case, including prevention, safety and health, the environment and construction quality systems. Electric power system: Power generation, transport network, delivery and distribution, as well as on types of lines and conductors. Regulations on low and high voltage.

- 1 Ability to carry out a study of measurements and prices in a public works project.
- 2 Ability to prepare a budget for a public works project using a computer tool.
- 3 Ability to develop the planning and organization of a public work.
4. Ability to analyze and assess public works in particular and construction in general.

Knowledge of the construction techniques applied to public works. Knowledge of the most common operations on site and the machinery used in each case (earthworks, piles, walls, concrete and bituminous mixtures). Basic knowledge of the electricity transmission and distribution system, as well as the design and calculation criteria for installations and consumption.

## STUDY LOAD

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Type	Hours	Percentage
Hours medium group	30,0	20.00
Self study	84,0	56.00
Guided activities	6,0	4.00
Hours large group	30,0	20.00

**Total learning time:** 150 h

## CONTENTS

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### Electrical engineering

**Description:**

Introduction to the electric power system  
Single-phase circuits  
Three-phase circuits  
Transformers  
Facilities  
Practices

**Full-or-part-time:** 48h

Theory classes: 11h  
Practical classes: 9h  
Self study : 28h

### Construction methods

**Description:**

Construction of structures  
Construction of underground works  
Construction of hydraulic infrastructures  
Practical cases

**Full-or-part-time:** 96h

Theory classes: 19h  
Practical classes: 21h  
Self study : 56h

## GRADING SYSTEM

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Assessment tests consist of a part with questions about concepts associated with the learning objectives of the subject in terms of knowledge or comprehension, and a set of application exercises.

Two assessments are made, the first in the Electrical Engineering part (E1), which corresponds to 33% of the mark and the second in the Procedures part (E2), which corresponds to 67% of the mark. Therefore, the grade will be  $0.33 E1 + 0.67 E2$ . In both evaluations there will be a theoretical part and practical exercises.

Criteria of qualification and of admission to the re-evaluation: The students suspended to the ordinary evaluation that have presented regularly in the proofs of evaluation of the course suspended will have option to realize a proof of re-evaluation in the period fixed in the academic calendar. Students who have already passed it or students who have qualified as not presented will not be able to take the re-assessment test for a subject. The maximum grade in the case of taking the re-assessment exam will be five (5.0). The non-attendance of a student summoned to the re-evaluation test, held in the set period may not lead to the performance of another test with a later date. Extraordinary assessments will be carried out for those students who, due to accredited force majeure, have not been able to take any of the 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 teaching period.

## BIBLIOGRAPHY

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### Basic:

- Barrero, F. Sistemas de energía eléctrica. Madrid: Thomson, 2004. ISBN 8479322835.
- Gómez Expósito, A. Análisis y operación de sistemas de energía eléctrica. Madrid: McGraw Hill Interamericana, 2002. ISBN 844813592X.
- Ras, E. Teoría de circuitos: fundamentos. 4a ed. renovada. Barcelona: Marcombo Boixareu, 1987. ISBN 8426706738.
- Ras, E. Transformadores de potencia, de medida y de protección. 7a ed. Marcombo, 1988. ISBN 8426706908.
- Rodríguez Ortiz, J.M.; Serra Gesta, J.; Oteo Mazo, C. Curso aplicado de cimentaciones. 7a ed. corr. Madrid: Colegio Oficial de Arquitectos de Madrid, 1996. ISBN 84-8557-237-8.
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- Brunn, P. (ed.). Design and construction of mounds for breakwaters and coastal protection. Amsterdam: Elsevier, 1985. ISBN 0444423915.
- Harris, F. Modern construction and ground engineering equipment and methods. 2nd ed. Essex: Longman Scientific & Technical, 1994. ISBN 0582236576.
- El-Reedy, M.A. Offshore structures: design, construction and maintenance [on line]. Waltham: Gulf Profesional, 2012 [Consultation: 01/04/2020]. Available on: <https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=953180>. ISBN 9780123854766.
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