Course guides
2500028 - GECPROBPUB - Public Works Project

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: 2020 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: ÁLVARO GAROLA CRESPO
Others: VALENTIN ACEÑA RAMOS, ÁLVARO GAROLA CRESPO, CARLES LABRAÑA DE MIGUEL, JOSE PABLO RODRIGUEZ-MARIN SASTRE, GEMA VELEZ SABATER

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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.
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

Knowledge about the methodology for carrying out an engineering project. Capacity to analyse safety and health problems in construction projects, and also to apply environmental impact analysis and assessment methodologies.

1 Ability to carry out the organization and planning of a work.
2 Ability to carry out a quality control plan for materials in a Civil Engineering project / work.

Knowledge of the documents that make up an engineering project. Knowledge of project elements such as environmental impact, economic studies, alternative studies. Knowledge of formal design and comprehensive project management. Knowledge of the different types of projects depending on the type of infrastructure (urbanization, road, hydraulic work, services, building, etc.). Legal Framework and regulations applicable to the drafting of a project. Technical conditionings. Collection of information and completion of previous studies. Economic approach. Profitability analysis. Approach and selection of alternatives. Multicriteria analysis. Works contract. The consulting and assistance contract. Project management. Legislation on public procurement. Quality and safety in the execution of the work. Integrated project management.

Knowledge of the methodology for doing an engineering project. Ability to analyze safety and health issues at construction sites. Ability to apply methodologies of studies and environmental impact assessments.

1 Ability to organize and plan a work.
2 Ability to carry out a quality control plan for materials in a civil engineering project / work.
3 Ability to analyze the system of transmission and distribution of electricity and ability to design an installation.
4. Ability to carry out an integrated project management.
5. Ability to financially analyze a project and calculate its viability
6. Ability to analyze project alternatives and evaluate them.

Knowledge of the documents that make up an engineering project. Knowledge of project elements such as environmental impact, economic studies, studies of alternatives. Knowledge of formal design and comprehensive project management. Knowledge of the different types of projects depending on the type of infrastructure (urbanization, road, hydraulic work, services, building, etc.). Legal framework and regulations applicable to the drafting of a project. Technical conditions. Collection of information and carrying out previous studies. Comprehensive project management (project management, BIM, Canvas ...). Economic approach. Economic and Financial Plan. Profitability analysis. Approach and selection of alternatives. Multicriteria Analysis. Works Contract. The Consulting and Assistance Contract. Project management. Legislation on public procurement. Quality and safety in the execution of th

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<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>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
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</tbody>
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Total learning time: 150 h
## Meaning of the Project

**Description:**
Project as a unit of work in the life of an engineer. Classification of projects. We who intervene in the different phases of a project. Property Conditioning. The Terms and Conditions. Collection of information and carrying out previous studies.

**Specific objectives:**
Understand the concept of project Have a comprehensive vision of the project

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

## Project Documents

**Description:**
Description of the report and the different annexes. Application regulations. Analysis of plans, scales, formats, level of detail. Description of the specifications and their content. Regulations to apply. Preparation of measurement statements and preparation of the project budget. Learn to conceive a Report and to select annexes. Distinguish between the essentials.

**Specific objectives:**
Have an overview of the project Know the documentation to consider Assess the importance of each document

**Full-or-part-time:** 9h 36m  
Theory classes: 4h  
Self study: 5h 36m

## Projects management

**Description:**
The different roles of the actors in a project, from the promoter, to the editor and the executor, to control. Objectives and general concepts in project management. Life cycle of a project. Control and monitoring of deadlines, Costs, Quality, Risks Define the roles of people in the project. The project manager. Teamwork. Customer relationship. Define the different project management techniques (project management, BIM, Canvas ...)
Case studies of project management. Use of various techniques.

**Specific objectives:**
Understand the project as a comprehensive concept that needs to be managed. Discuss the importance of the technician as a project manager Explain the basics of project management techniques  
Have students see cases where project management techniques have been applied. Discuss the applicability of these techniques

**Full-or-part-time:** 24h  
Theory classes: 4h  
Practical classes: 6h  
Self study: 14h
## Particularities of the different types of Projects

**Description:**
Roads. Demand analyzes. The importance of the route. The various solutions that can be proposed. Urbanization. Urbanizations and the equipment and services they require (transport, parking, sanitation, supply, ....) Need to achieve economic profitability that justifies investments. Polygons. Hydraulics and Maritime. Pipelines, irrigation, supplies, sanitation. Fundamental annexes for these types of projects. Different types of maritime work: protection, mooring, facilities, access, ... Services and Maintenance. Services in the world of engineering. Its design and sizing

**Specific objectives:**
Understand the differential characteristics of each type of project

**Full-or-part-time:** 9h 36m
Theory classes: 4h
Self study : 5h 36m

## Safety and Environment

**Description:**

**Specific objectives:**
Understand the particularities of these two types of study that are of relevant importance.

**Full-or-part-time:** 9h 36m
Practical classes: 4h
Self study : 5h 36m

## Introduction to business. Management and business

**Description:**

**Specific objectives:**
Reminder of business bases. Accounting. Introduce basic elements of business strategy
Apply business analysis techniques

**Full-or-part-time:** 9h 36m
Theory classes: 2h
Practical classes: 2h
Self study : 5h 36m
Project financing

Description:
Feasibility analysis of projects. Financial models to analyze the viability of projects. Financial instruments for decision making.

Specific objectives:
Strengthen project feasibility analysis techniques Develop an Economic and Financial Plan based on a real case

Full-or-part-time: 9h 36m
Practical classes: 4h
Self study : 5h 36m

Concept of Risk

Description:

Specific objectives:
Understand the concept of risk in a project and its consequences Learn to assess risk and ways to mitigate it

Full-or-part-time: 9h 36m
Theory classes: 4h
Self study : 5h 36m

Project evaluation

Description:

Specific objectives:
Understand the meaning of project evaluation. Explain the different project evaluation techniques. Get acquainted with the Cost-Benefit analysis. Learn to develop a Cost-Benefit analysis based on a real case.

Full-or-part-time: 19h 12m
Theory classes: 2h
Practical classes: 6h
Self study : 11h 12m

Study of alternatives

Description:

Specific objectives:
Apply evaluation methods to the study of project alternatives. Become familiar with multicriteria techniques.

Full-or-part-time: 9h 36m
Practical classes: 4h
Self study : 5h 36m
Sources of project funding

**Description:**

**Specific objectives:**
Know the sources of funding for infrastructure projects and their consequences on the viability of the project

**Full-or-part-time:** 9h 36m
Theory classes: 4h
Self study: 5h 36m

Financing of new activities. Innovation management

**Description:**
Financing of new activities. Funding rounds. Venture Capital.

**Specific objectives:**
Familiarize yourself with new forms of financing emerging activities

**Full-or-part-time:** 9h 36m
Theory classes: 4h
Self study: 5h 36m

Business cases

**Description:**
Presentation of group work prepared by students. The works will be based on conversations with companies that propose an activity to be developed

**Specific objectives:**
Encourage collaborative work. Dealing with problems related to real projects and problems.

**Full-or-part-time:** 9h 36m
Practical classes: 4h
Self study: 5h 36m

**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.**

If any of the laboratory or continuous assessment activities are not performed in the scheduled period, it will be considered a zero score.
BIBLIOGRAPHY

Basic: