250347 - PROJECON - Projects and Economics

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 GEOLOGICAL ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 4.5
Teaching languages: Catalan, Spanish

Degree competences to which the subject contributes

Specific:
4027. Capacity for integral planning and management of works, measurements, setting out, control and monitoring
4029. Knowledge of project methodology, management and organisation
4053. Adequate knowledge of the concept of companies and their institutional and legal framework. Company organisation and management
4063. Ability to analyse health and safety issues in designs, plants and installations

Generic:
3103. 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.
3109. 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
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 1.7 hours per week of classroom activity (large size group) and 0.7 hours weekly with half the students (medium size group).

The 1.7 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.

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

Students will acquire an understanding of the methodologies and elements involved in a geological engineering project, aspects of economics and business, health and safety analysis in construction and its application to geological engineering projects and construction.

Upon completion of the course, students will be able to: 1. Conduct an alternatives assessment prior to choosing a specific design solution;
2. Create a formal design of a geological engineering infrastructure;
3. Conduct integral management analyses of engineering projects.

Planning and organisation of works, including prevention, health and safety, and quality systems; Required documentation in an engineering project; Environmental impact; Economic analysis; Alternatives assessments; Formal design and integral management; Different project types for specific infrastructure (urban development, roads, hydraulic installations, services, housing, etc.); Economics and business: Business organisation and management; Human resources management; Cost and investment analysis; Analysis of financial status and interpretation of results; Costs that influence the decision-making process

The subject is structured in two lines of work. One is the elaboration of a engineering project in all his phases and facets. The other is an introduction to the economic and business analysis, specially the subjects related with the construction sector and about the economic effects of the projects of civil work.

In projects, the generic aims turn in turn to the following subjects:

Knowledge of the methodology to do projects of engineering. Capacity of analysis of the problematic of the security and health to the works of building. Capacity to apply methodologies of studies and evaluations of environmental impact.
1. Realize an alternatives study, previous to adopt the solution to project. 2. Do a formal design of an infrastructure in civil engineering. 3. Do an analysis of integral management of a project.

Knowledge of the documents that integrate a project in engineering. Knowledge about environmental impact, economic studies, alternatives studies. Knowledge of formal design and integral management of project. Knowledge of different typologies of projects: urbanism, road, hydraulic work, services, buildings, etc.). Capacity of planning, organization and direction of the execution of works. Incorporation of technical for the integrated management of projects, including the maintenance, tolls, etc. So that it take into account all the useful life of the infrastructure.

In economy, the objective turn around the following subjects:

Introductory knowledge of economy including the analysis of the productive activity, market economy, productive economy, production and income, Knowledge of monetary and financial economy. Knowledge of regional economy and role of infrastructures. Knowledge of economy of environment and his management.

Knowledge of the concept of company, institutional and juridical frame of the company. Organization and management of company. Analysis and interpretation of the business accounts. Knowledge of the resources of the company, the funding, investments...


To scale more concrete will treat between other, subjects like to realize an economic study of feasibility for the investment in the building of an infrastructure, analyze the economic operation of an undertaken constructor, elaborate an analysis cost-profit that determine the effects on the social welfare to carry out a determinate infrastructure, value the impact on environment of infrastructures or consider the consequences and obligations that comports the funding deprived of infra

<table>
<thead>
<tr>
<th>Study load</th>
<th>Total learning time: 112h 30m</th>
<th>Hours large group: 38h</th>
<th>33.78%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 5h</td>
<td>4.44%</td>
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<td></td>
<td>Hours small group: 2h</td>
<td>1.78%</td>
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<td></td>
<td>Guided activities: 4h 30m</td>
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<td></td>
<td>Self study: 63h</td>
<td>56.00%</td>
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## Content

### Engineering Projects

<table>
<thead>
<tr>
<th>Description:</th>
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<tbody>
<tr>
<td>Project Description Meaning</td>
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<tr>
<td>Memory description and annexed drawings, Specifications and Budget</td>
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<tr>
<td>Study alternatives to the Project Description</td>
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<tr>
<td>Description Project Management: Administration, Engineering and Construction. Integrated Project (GIP)</td>
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<td>Management Awards</td>
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<tr>
<td>Description of Roads Projects</td>
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<td>Description estates and buildings</td>
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<td>Description Maritima water projects work projects</td>
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<td>Overview Services Projects Maintenance Projects</td>
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<td>Description Safety and Health Project and Construction Phase</td>
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<td>Description (Environmental Impact Study) and PVA (Environmental Monitoring Plan)</td>
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<td>Description Images of significant projects</td>
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<td>SWOT Analysis Project Description</td>
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### Learning time:

52h 48m
- Theory classes: 17h
- Practical classes: 3h
- Laboratory classes: 2h
- Self study: 30h 48m
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<tr>
<th><strong>Economy</strong></th>
<th><strong>Learning time:</strong> 55h 12m</th>
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<tbody>
<tr>
<td>Theory classes: 21h</td>
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<tr>
<td>Practical classes: 2h</td>
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<tr>
<td>Self study : 32h 12m</td>
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## Description:
Concept of economy. Basic principles that govern the economic thought. Basis of economic analysis.
Basic microeconomic concepts. Supply and demand, types of goods. Concept of elasticity and its effects.
Consumer surplus, cost and Theory.
Concept of business, and the various types. Type of society, and limited liability l\'à\'limitada, concept of social capital. The construction sector as a productive activity, peculiarities of the sector. Features of construction companies.
Analyze a feasibility plan for investment in infrastructure. Concept of investment. Phases of the project. Factors that determine the profitability of an investment from the economic and financial standpoint. Define the criteria that define the financial viability of a project as the NPV and IRR.
Introduce cost-benefit analysis. Using these methods to evaluate the utility and set priorities in defining the policies infrastructure. Calculation externalities. Applying the instrument of a feasibility plan to analyze the effects on the overall welfare of society.
It will exercicis evaluation throughout the course timetable.
Group work that must be presented in class.

## Specific objectives:
Know the basis of economic reasoning.
These are basic concepts that are used in many fields related to civil engineering and transportation, which are important to understand how business.
Understanding the basics of how companies and focus on the construction sector, which is the preferred field of action of Civil Engineers.
Students learn to interpret, a business or a work situation, through the elements that gives accounting.
That students learn to interpret the feasibility of a proposed investment in infrastructure.
Introduce students to the basics on how to finance infrastructure and the possibilities that the public and private funding.
That students learn to interpret the viability and social welfare in terms of a proposed investment in infrastructure.
Evaluate the role of infrastructure on the country's economic base, and its effects on the welfare and development.
Analyze a specific case, to draw conclusions if presented it in public.
The mark of the course is obtained from the ratings of continuous assessment.

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 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.

One of these activities is a work that must defend themselves in public, behave and work together elements of projects and part of economy.

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.

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


Sebastian Truyols, José Manuel Saiz. Economía aplicada a la construcción.. Biblioteca Técnica Universitaria, 2005.
