

28744 - Projects

Syllabus Information

Academic Year: 2021/22

Subject: 28744 - Projects

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject Type: Compulsory

Module:

1. General information

1.1. Aims of the course

The subject *Projects* brings the student closer to the knowledge that enables him to write the documentation required by any construction project for a civil work. The legal aspects of the Public Sector Contracts Law that determines the form and content of the entire project for the execution of the work, as well as the obligations and requirements of the engineering service companies that bid, are identified and studied in the course. and the designers who develop the projects.

All this theoretical knowledge will be needed in a practical way by writing the different documents that make up a project: memory, plans, technical specifications, budget and other legal documents (ESS, waste management and others).

As it is specifically addressed in other subjects of the degree, the Health and Safety Study and the possible Environmental Impact Study are not included.

See also the writing of Technical Reports, this being one of the facets most developed by engineering professionals, showing the different types and nuances that differentiate them.

The specific objectives of the subject are:

- Know the general aspects that characterize any project of a civil work
- Know the legislation that regulates the contracts of the type "services" of project development: its framework in the contractual types, tender, award and execution; as well as the responsibilities of the designer and the correction of errors.
- Learn to differentiate the different types of engineering studies: Preliminary studies, preliminary projects, layout projects, basic projects, execution projects.
- Enhance an objective evaluation of different solutions proposed by alternatives by applying different mathematical methods.
- Learn the technical knowledge on the standardization of the documents that make up a project.
- Acquire the necessary skills for writing the memory of a project and some of its annexes.
- Acquire the necessary skills for drawing the plans of a project according to their different typology.
- Acquire the necessary skills for the writing of the specifications of particular technical requirements of a project.
- Acquire the necessary skills for writing a project budget.
- Writing technical reports and expert reports

These approaches and objectives are aligned with the following Sustainable Development Goals (SDG) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning outcomes of the subject provides training and competence to contribute to some

extent to its achievement:

Objective 4: Quality education

Objective 5: Gender equality

1.2. Context and importance of this course in the degree

The subject *Projects* aims to be a meeting point for the technical knowledge acquired in the different subjects that have been taken throughout the degree. It is about knowing the regulatory way of turning the study and solution of an engineering problem into a document that, encompassing all the technical and economic details, allows its subsequent realization by a different technician than the one who wrote it.

The practical nature on which much of the development of the subject is based will allow to value the teamwork of the students acquired throughout the degree, an essential quality for their subsequent inclusion in multidisciplinary teams and different technical specialization than in the reality of the civil engineering work world are formed for the development of project writing.

1.3. Recommendations to take this course

It is highly recommended:

- Have passed the subjects of "Graphic expression", "Topography", "Procedures and organization" and "Health and safety".
- Having completed the subject "Planning and management of work"
- Handle with ease the software of AutoCAD.
- Know the work budgeting software (Presto / Archimedes)
- Know the software Project planning (MS Project or similar)
- Handle fluent Word Processor software and Spreadsheet.

2. Learning goals

2.1. Competences

Upon passing the subject, the student will be more competent to:

General competences

G01 - Organizational and planning capacity

G02 - Ability to solve problems

G03 - Ability to make decisions

G04 - Aptitude for oral and written communication in the native language

G05 - Analysis and synthesis capacity

G06 - Information management capacity

G07 - Ability to work in a team

G08 - Capacity for critical reasoning

G09 - Ability to work in an interdisciplinary team

G10 - Ability to work in an international context

G11 - Improvisation and adaptation capacity to face new situations

G12 - Leadership aptitude

G13 - Positive social attitude towards social and technological innovations

G14 - Capacity for reasoning, discussion and presentation of ideas

G15 - Ability to communicate through words and images

G16 - Ability to search, analyze and select information

G17 - Ability for autonomous learning

G23 - Know and understand respect for fundamental rights, equal opportunities between women and men, universal accessibility for people with disabilities, and respect for the values of the culture of peace and democratic values

G24 - Promote entrepreneurship

G25 - Knowledge of information and communication technologies

CB1 - That the students have demonstrated to possess and understand knowledge in a study area that starts from the general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study

CB2 - That students know how to apply their knowledge to their work or vocation in a professional way and possess the competences that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study

CB3 - That students have the ability to collect and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific or ethical issues

CB4 - That students can transmit information, ideas, problems and solutions to both a specialized and non-specialized audience

CB5 - That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy

Specific competences

C09 - Ability to analyze the problems of safety and health in construction works

C11 - Ability to apply environmental impact assessment and study methodologies.

C12 - Knowledge of construction procedures, construction machinery and techniques for organizing, measuring and evaluating Works

2.2. Learning goals

The student upon passing the subject:

You will know the general aspects of engineering projects

You will know the generalities of the public sector contracts law

You will know the particularities of service contracts in the public sector and their application to the public bidding process for projects

You will know the differentiation between the different types of studies that are carried out in civil engineering

You can objectify the decision in a choice of alternatives

You will know the theoretical knowledge regarding the documentation required for a project

You will learn the formal aspects for preparing civil engineering plans, differentiating according to their typology

You will know the structure and content that the document "Specification of particular technical prescriptions" of a project must have

You will learn to define work units within a project

You will obtain skill in the breakdown of the work units, calculating prices and returns of the necessary labor, machinery and materials in order to obtain their valuation

You will gain experience in taking measurements

You will know the particularities to make the price tables

You will learn to get the budget broken down by chapter and the general of a project

You will become familiar with the content that a memory must have and its annexes

Draft the attached Work Plan, Contractor Classification and Price Review

You will know the different types of technical reports, practicing in their writing

2.3. Importance of learning goals

The projects constitute the basic and main element of work of the engineers in most of the positions that they can occupy in the development of their professional competences. This basis is necessary regardless of whether the position is held in the various public administrations, construction companies or engineering companies, and even performing tasks of judicial expertise.

Although the learning objectives of the subject are focused on the elaboration of projects, their achievement provides very useful knowledge to face multiple tasks that are carried out around them, such as their management in the preparation of budget items, actual execution on site, quality control, supply of materials, planning, technical assistance, etc., all activities in which future graduates will participate, in one way or another, in complete safety.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

You can choose two forms of evaluation:

Continuous assessment:

It will be developed throughout the academic year and will consist of two different parts, one with a more theoretical component and the other more practical. In order to compensate between these parts in the final grade, a minimum grade of 3.5 points must be obtained in each one. The evaluative parts in continuous evaluation, as well as their weights are:

- Written assessment tests. 35% of the final grade
- Practical works: 65% of the final grade
- **Written assessment tests:** there will be two individual written tests with a primarily theoretical focus in the middle and end of the course.
- **Practical works:** The following works will be evaluated, each one consisting of a part of development and another of individual defense. The percentage, expressed as percentages of the final grade in the practical work section is:

Writing of the Memory and annexes 10 + 10 %

Preparation of Plans 10 + 10 %

Writing or analysis of a PPT's 10 + 10 %

Budget and attached price justification 10+10 %

Technical report 10 + 10 %

There will be practical work that will be developed individually, and others in groups. The designation of groups, the specific content of the work to be carried out, as well as the conditions for carrying out and Delivery dates will be communicated through Moodle as the development of the The subject. Each work will be scored for both its content and its defense.

The delivery of the works outside the established date will suppose a penalty in the qualification of the score obtained from:

- 25% if delivered within 24 hours of the established date
- 50% if delivered within 48 hours of the established date
- 75% if delivered within 72 hours of the established date
- Deliveries will not be accepted after 96 hours to the established date

In the same way, the works that are not delivered in the formats established in each practice, they will also be penalized with 10% on the initial grade obtained.

In the event of not passing the subject by the continuous assessment system, it will be accessed directly a final global evaluation, without any of the marks previously obtained in continuous evaluation being moved or saved for another type of evaluation

Final global evaluation:

It will be developed throughout the academic year and will consist of two different parts, one with a more theoretical component and the other more practical. In order to compensate between these parts in the final grade, a minimum grade of 3.5 points must be obtained in each one. The evaluative parts as well as their weights are:

- Written assessment tests. 35% of the final grade
- Practical works: 65% of the final grade
- **Written tests:** there will be an individual written test with a primarily theoretical focus on the date of the official call.
- **Practical work:** In this call, the work must be carried out individually, the specific content of the work and the conditions of execution being the same as those proposed in continuous evaluation.

The delivery date will be 7 calendar days before the day of the official call. The defense of the works will be carried out as a priority on the same day of the official announcement of the subject. If due to the high number of students enrolled this could not be the case, the defense dates will be agreed with the affected students, which should be dates close to that of the official call.

Failure to deliver the work on the established date will suppose the rating of NOT PRESENTED in the call.

The works will have the following percentages with respect to the note in this section:

Writing of the Memory and annexes 10 + 10 %

Preparation of Plans 10 + 10 %

Writing or analysis of a PPT's 10 + 10 %

Budget and attached price justification 10+10 %

Technical report 10 + 10 %

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The subject "Projects" is structured in blocks of activities in which, along with the expository part of the teacher, the active participation of students will be encouraged so that through the development of the practical parts in a tutored way to achieve the objectives of the course.

Theoretical classes: In which the teacher will explain the theoretical concepts of the contents of the subject

Tutored practices: The theoretical concepts explained will be taken to practical application. They will take place

in the EUPLA technical computer room and will be carried out (preferably) using specific software. They will be carried out in groups of between two to four components. Due to the duration of these practices, they will begin and be structured in the technical classroom and will later be completed by the students outside of class hours, within their non-contact work.

Assessments: Students will demonstrate the knowledge acquired through the assessment systems established in section 3.1

Individual or team non-presential work: The knowledge acquired in class must be consolidated with the individual work of the student.

Magnas Classes: as far as possible it is intended to have the collaboration of professionals of proven solvency who will be able to develop the content of any part of the subject. The contents of these Classes may be subject to evaluation within the evaluation process established in section 3.1

"If classroom teaching were not possible due to health reasons, it would be carried out on-line."

4.2. Learning tasks

The subject has been assigned a total of 60 ECTS credits (150 hours). These credits are distributed in a teaching load to be developed in class of 60 hours and another to be developed by teams (in the works) and individually of 90 hours.

The semester in which the subject is taught is distributed over 15 school weeks, so the student is expected to reach the required level of knowledge with a total dedication of 10 hours a week.

To the activity groups mentioned at the previous section the following workload has been assigned:

| | | |
|-----------------------------|----------|---------|
| • Lectures | 11 hours | (7,3%) |
| • Laboratory sessions | 38 hours | (25,4%) |
| • Exams | 11 hours | (7,3%) |
| • Autonomous work and study | 90 hours | (60,0%) |

4.3. Syllabus

This course will address the following topics:

- TOPIC 1. GENERAL ASPECTS OF A CIVIL ENGINEERING PROJECT**
 - 1.1. The civil Works as an instrument of society
 - 1.2. Civil Works requirements
 - 1.3. Civil Works' concept and its implementation: different types of project design and studies referred at the Road & Railway Laws
 - 1.4. Project: concept and definition
 - 1.5. Civil works life cycle and its influence on its concept and design
 - 1.6. Basic elements to be considered into a civil Works project design
 - 1.7. Terrain forced expropriation law
- TOPIC 2. PROJECT DESIGN CONTRACT CONCERNING TO PUBLIC WORKS**
 - 2.1. Legislation concerning the public sector contracting
 - 2.2. Process/sequence of the tender and award of public contracts
 - 2.3. A project design as a type of public contract
 - 2.4. The requirement to fulfill in order to contract a project design
 - 2.5. Preparatory actions previous to a work contract
 - 2.6. Award of project design contracts
 - 2.7. Specific contracting law articles concerning services contracts
- TOPIC 3. PREVIOUS STUDIES: FEASIBILITY STUDIES**
 - 3.1. Introduction
 - 3.2. Feasibility studies aims
 - 3.3. General methodology
 - 3.3.1. General conditions, content and format

- 3.3.2. Input data and project environment knowledge
- 3.3.3. Technical study - Alternatives
- 3.3.4. Economic study
- 3.3.5. Environmental study
- 3.3.6. Other items to consider

- 3.4. Tools supporting decision making
- 3.5. Multicriteria decision models. General features
- 3.6. Method of "Weighted averages approach"
- 3.7. PRESS method
- 3.8. Other multicriteria methods

TOPIC 4. PROJECT DESIGN STANDARD DOCUMENTS

- 4.1. Introduction
- 4.2. Basic concept on standarization
- 4.3. Process to develop an European standard (UNE)
- 4.4. Purpose and background of the "Professional collegiate authorisation"
- 4.5. Origin and rationale of the standards series 157000
- 4.6. The AEN / CTN 157 committee "Proyectos"
- 4.7. UNE 157001
 - 4.7.1. Rationale, purpose and scope
 - 4.7.2. General requirements
 - 4.7.3. Project design basic documents content
- 4.8. The family of UNE 157001 standards
- 4.9. Conclusions

TOPIC 5. DRAWINGS

- 5.1. Introduction
- 5.2. Designing
- 5.3. Formal expression
 - 5.3.1. Outline
 - 5.3.2. Standard formats
 - 5.3.3. Drawing data box
- 5.4. Delineation
 - 5.4.1. Dimension data
 - 5.4.2. Labeling
 - 5.4.3. Scales
- 5.5. General content
- 5.6. Specific content depending on drawing topics
 - 5.6.1. Situation
 - 5.6.2. Work overview / general definition
 - 5.6.3. Setting out top view
 - 5.6.4. General top view
 - 5.6.5. Longitudinal diagram
 - 5.6.6. Standard section
 - 5.6.7. Cross sections
 - 5.6.8. Structures
 - 5.6.9. Replacement of affected services
 - 5.6.10. Expropriations

TOPIC 6. SPECIFICATIONS

- 6.1. Introduction
- 6.2. Specification porpous
- 6.3. Specification structure
- 6.4. Specification scope
- 6.5. Normative
- 6.6. Description of the works

- 6.7. Materials
- 6.8. Facilities and equipment
- 6.9. Execution of the works
- 6.10. Quality assurance
- 6.11. Measurement and evaluation
- 6.12. Other specifications
- 6.13. Particular site Works conditions

TOPIC 7. MEASUREMENTS, VALUATIONS AND WORKS ESTIMATES

- 7.1. Introduction
- 7.2. Works units
 - 7.2.1. Definition and its writing
 - 7.2.2. Definitions examples
- 7.3. Measurements
 - 7.3.1. Auxiliary measurements
 - 7.3.2. Measurements of the work units
 - 7.3.3. Measurement examples
 - 7.3.4. Linking with the work schedule
 - 7.3.5. Ratios measurement
- 7.4. Price calculation
 - 7.4.1. Stages
 - 7.4.2. Type of costs
 - 7.4.3. Workforce
 - 7.4.4. Materials
 - 7.4.5. Machinery
 - 7.4.6. Indirect costs
 - 7.4.7. Auxiliary prices
 - 7.4.8. Unit prices
 - 7.4.9. Lump sum payment units
- 7.5. Prices lists
 - 7.5.1. Unit prices list
 - 7.5.2. Broken down prices list
 - 7.5.3. Price ratios
- 7.6. Works estimates
 - 7.6.1. Partial and chapters estimates
 - 7.6.2. Quality assurance and health and safety estimates
 - 7.6.3. Woks estimates global sum
 - 7.6.4. Works estimates for public employer understanding

TOPIC 8. QUALITY PLAN OF A PROJECT

- 8.1. Quality concept
- 8.2. ISO 9000
- 8.3. Quality assurance plan of a work
- 8.4. Quality assurance plan of a project
- 8.5. Final thoughts

TOPIC 9. THE PROJECT REPORT AND ITS ANNEXES

- 9.1. Projects documents and their interrelationships
- 9.2. The project document No. 1
 - 9.2.1. Normative
 - 9.2.2. Content and overall structure
 - 9.2.3. Relationship with previous studies
- 9.3. Project report
 - 9.3.1. Structuring proposal
 - 9.3.2. Contenido
 - 9.3.3. Variantes

- 9.4. Project report annexes
 - 9.4.1. Annexes structuring
 - 9.4.2. Basic information annex
 - 9.4.3. Solutions study annex
 - 9.4.4. Technical and constructive annexes
 - 9.4.5. Economical and Time of phases completion annexes
 - 9.4.6. Supplementary annexes
 - 9.4.7. Inappropriate annexes
 - 9.4.8. Relevant annexes

- 9.5. Final thoughts

TOPIC 10. TECHNICAL REPORTS

- 10.1 Previous considerations
- 10.2 Types of reports
- 10.3 Regulations
- 10.4 Contents

4.4. Course planning and calendar

| WEEK | TOPICS |
|---------|------------------|
| 1 | presentation y 1 |
| 2 | 2 y 3 |
| 3 | 4 |
| 4 y 5 | 5 |
| 6 y 7 | 6 |
| 8 | 7 |
| 9 | 8 |
| 10 y 11 | 9 |
| 13 | 10 |
| 14 y 15 | last works |

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28744>