

## 28727 - Works Planning and Management

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 28727 - Works Planning and Management

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

**Degree:** 423 - Bachelor's Degree in Civil Engineering

**ECTS:** 6.0

**Year:**

**Semester:** Second semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The goal of the subject is for students to learn about the process followed in the construction of works, from the point of view of the different agents involved, such as the Promoter, the Designer, the Project Management or the Contractor company, in a period of time that goes from the tendering of a work, to the delivery and reception of the work.

Thus, we will follow the path that goes from the study of the bidding specifications for the work, the elaboration and presentation of the offer, and after the awarding of the works, the implementation of the work, its initial planning and the allocation of resources for its execution.

In the following phases, the initial planning will be monitored to check possible deviations and the instruments for correction, as well as to learn how to carry out different controls, especially of the costs and quality of the work, to conclude with the completion and liquidation of the work.

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

- Goal 4: Quality Education.
- Goal 5: Gender Equality.
- Goal 9: Industry, Innovation and Infrastructure

### 2. Learning results

- Use the proper terminology used in construction.
- Know the structure of construction companies, their operation and the administrative process for the contracting of a work through the public bidding process
- Roles and responsibilities of the agents involved in the construction process.
- Capacity for technical and economic planning of a work.
- Have the capacity to be able to program and organize the construction processes, the work teams, and the technical and human means for its execution, as well as to plan, organize and control all types of works.
- Ability to prepare the documentation required in any of the work phases, both for the planning and monitoring of a project, as well as for the stages of staking out or reception of the works.
- Manage the most relevant aspects of the works, technically and economically.
- To learn about new trends in integrated project management.

### 3. Syllabus

#### UNIT 1.- AGENTS INVOLVED IN THE CONSTRUCTION PROCESS

- 1.1. Types of projects
- 1.2. Intervening agents and interested parties
- 1.3. Structure of the construction company
- 1.4. General organization chart of a construction company
- 1.5. Functions of the different departments
- 1.6. Project management: Planning, Organization, Execution and Control

#### UNIT 2.- WORKS BIDDING

- 2.1- The works contract

- 2.1.1. Public procurement legislation
- 2.1.2. Contract types
- 2.1.3. The works contract
- 2.1.4. Contracting authority
- 2.1.5. Requirements for contracting with the public sector
- 2.1.6. Classification of companies
- 2.1.7. Warranties
- 2.1.8. Object and price of the contract
- 2.1.9. Processing of files
- 2.1.10. Specifications (PCLA's and PPT's)
- 2.2- Bidding, tendering and awarding of contracts
- 2.2.1. Awarding procedures
- 2.2.2. Material execution budget / Base bidding budget
- 2.2.3. Costs to be taken into account for the preparation of the offer
- 2.2.4. Estimated planning
- 2.2.5. Bid for the execution of the work / financial proposal
- 2.2.6. Low, award fee, frivolousness, recklessness
- 2.2.7. Awarding of contracts
- 2.2.8. Constitution of guarantees

### UNIT 3.- SITE IMPLEMENTATION PLAN

- 3.1. Organization of the work:
  - 3.1.1. necessary infrastructure,
  - 3.1.2. distribution of temporary facilities,
  - 3.1.3. electricity and water supplies,
  - 3.1.4. accesses,
  - 3.1.5. permits, etc.

### UNIT 4.- INTRODUCTION TO PROJECT SCHEDULING AND PLANNING. COMPONENTS OF A PROGRAMMING.

- 4.1. Introduction to the need for project scheduling and project tracking
- 4.2. Requirements: cost, time, quality, safety.
- 4.3. Break down a project into the most representative activities/units of work
- 4.4-. Relationship between activities and priorities

### UNIT 5.- PLANNING TECHNIQUES

- 5.1. Project planning
- 5.2. General information about graphics
- 5.3. Space-time graphs
- 5.4. Gantt charts
- 5.5. P.E.R.T. System
- 5.6. C.P.M. System
- 5.7. Probability distribution
- 5.8. Minimum cost programming (MCE)
- 5.9. PDM precedence system
- 5.10. Allocation of resources to a project

### UNIT 6.- COMPUTER CONTROL TOOLS

- 6.1. MS Project
- 6.2. Spreadsheet

### UNIT 7.- WORK EXECUTION MONITORING

- 7.1. Purchasing management

- 7.2. Control of executed work
- 7.3. Certifications
- 7.4. Revision of prices. Formulas and revision indexes.
- 7.5. Quality control
- 7.6. On-site documentation

#### UNIT 8.- COST CONTROL

- 8.1. Cost: concept and relativity of cost
- 8.2. Difference between expense, cost and payment
- 8.3. Classification of costs
- 8.4. Certification planning
- 8.5. Cost planning
- 8.6. Cash flow study
- 8.7. Comparative: budget / target / actual executed

#### UNIT 9.- COMPUTER CONTROL TOOLS

- 9.1. Spreadsheet: Certifications / Price revisions
- 9.2. PRESTO: Certifications / Budget-actual-target price comparisons
- 9.3. PROJECT: Follow-up of work execution

#### UNIT 10.- INCIDENCES DURING THE EXECUTION OF THE WORKS

- 10.1. Compensation in case of force majeure
- 10.2. Failure to meet deadlines
- 10.3. Modifications to works contracts
- 10.4. Suspension of the work
- 10.5. Modification of installments and readjustment of annual installments
- 10.6. Assignment and subcontracting
- 10.7. Termination of the contract

#### UNIT 11.- LIQUIDATION OF THE WORK

- 11.1. Completion of the work
- 11.2. Reception of the work
- 11.3. Certificate of completion
- 11.4. Settlement of the contract
- 11.5. Guarantee period
- 11.6. Processing and return of guarantees

#### UNIT 12.- PROJECT DIRECTION AND MANAGEMENT

- 12.1. Project management
- 12.2. Main international standards: PMI, IPMA.
- 12.3. Standard UNE-ISO 21500 "Guidelines for the direction and management of projects"
- 12.4. Purpose and field of application
- 12.5. Terms and definitions
- 12.6. Management concepts and project management
- 12.7. Project management processes

### 4. Academic activities

**Theory lectures:** 16 hours

Sessions in which the contents of the subject will be explained

**Practice lectures:** 8 hours

Sessions on how to deal with the development of practical tasks

**Tutored practices:** 22 hours

Elaboration of the different practices: preparation of tender documentation; construction site implementation plan, identification of the most important activities of a work; construction of networks; calculation by means of the algorithm of Ackoff - Sasieni the

costs and optimal Ackoff - Sasiemi algorithm the costs and the optimal term of execution; filling in of the work books; use of computer tools of work scheduling.

**Teaching assignments.** 45 hours

Preparation of different theoretical contents of the course to be presented in class and of part of the practicals

**Personal study:** 45 hours

**Assessment tests.** 14 hours

Performance of short evaluation tests and presentation and defense of contents elaborated by the students

## 5. Assessment system

### Continuous Assessment

- **Active participation in the subject:** 10% of the grade
  - including attendance at seminars, conferences and visits to companies or construction sites **Theoretical tests:** 40% of the grade
  - linked to the preparation of topics, their presentation and defense in class: 20%
  - linked to short written tests. Expected to realize between 6 and 8: 20% **PRACTICAL TESTS:** 50% of the grade
  - of individual or group type, assigning a weight according to their complexity, evaluating separately the own presentation of their individualized defense in class. Planned to carry out 5-6 punctuations.

### Global Assessment. Official calls

- **Theoretical test:** 50% of the grade
  - written test with short questions and/or development
- **PRACTICAL TESTS:** 50% of the grade
  - individual type, based on assumptions similar to the practices carried out during the subject

In both cases, the final grade obtained corresponds to the weighted average of the grades obtained in each one of the sections/tests, having obtained in the theory or practical tests a minimum grade of 3.5 points to be able to compensate and obtain the final grade.

If the minimum grade required to pass the subject (5 points) is not reached, the grades obtained in any of the parts of the continuous assessment system will not be taken into account or saved for the exams the parts that compose the continuous assessment system will not be taken into account or saved for the Global Assessment tests