Universidad Zaragoza

Year : 2020/21

28727 - Works Planning and Management

Syllabus Information

Academic Year: 2020/21
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: 3
Semester: Second semester
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

The course deals with projects from the point of view of the main agents involved in a work: Promoter, Designer, Project Management, Main Contractor, Subcontractors and Suppliers, in a time frame that would go from the publication of the tender for a work, to the completion of its execution and its reception and settlement.
The course follows the process of: bidding - study - offer - tender - award - reconsideration - re-study - implementation on site - planning of work - resource allocation - certifications - cost control - delivery - settlement.
Within this process the course pays special attention to the techniques of graphic planning, studying network methods (Space-Time, Gantt, PERT, CPM, and PDM).
As a final point, the current trends in Project Management are studied.
The specific objectives are:

1. To know the responsibilities of the different agents intervening in a work as far as their participation and relationship with the management of the project of work execution is concerned.
2. To know the structure of "type" construction companies
3. To study a work for its bidding, covering the previous planning, the economic valuation and the calculation of the bidding offer.
4. Determining the classification of a contractor.
5. Calculation of a disproportionate discharge (reckless discharge).
6. Knowing the most common planning techniques: Space-Time, GANTT, PERT analysis, CPM, and PDM, exercising in the resolution of graphic problems of activities: paths, milestones, compliance probabilities, gaps and resource allocation.
7. To apply planning techniques to the works, distinguishing and determining the units of work, the most representative tasks/activities and their times according to the performances, the interrelation and functional dependence among them in order to, in all this, reach the maximum efficiency in the constructive process, finally planning the expectations of the expense and collection flows.
8. To know some computer tools available in the market to solve complex planning: Spreadsheet and MS Project, applying the theoretical knowledge to practical exercises.
9. Planning the necessary actions to carry out the so-called implementation on site.
10. To follow up the execution of the work from the point of view of progress of work executed, evaluating the measurements taken, the certifications and carrying out the comparative study between income obtained and expenditure carried out in relation to the objective set out in the tender budget and in the target budget.
11. Know the computer applications that support the planning and monitoring of costs in a complex project by carrying out comparative tendering studies / objective / real.
12. To study the possible incidents that may occur during the execution of a work and which give rise to the amendment

of a works contract and the compensation to which there would be room.

13. To know the final actions and liquidation of the work, planning them and evaluating them financially.
14. Carry out a program of inspection points within the quality control of execution of a work.
15. Know the professional standards and certifications for project management (Project Management)

1.2.Context and importance of this course in the degree

At the end of the course, the student will know the management process of a work from beginning to end, being able to plan the different work units and the resources involved in it, organize them and carry out the follow-up and control during its execution.
They will also be able to establish the implementation needs for the provisional work facilities.

1.3.Recommendations to take this course

It is highly recommended to have passed the course 28722 Procedures and Organization, since it studies the concepts of personnel and machinery cost calculation, as well as construction processes and their performance.
It is recommended to handle a spreadsheet type software and the handling of basic statistical functions in them.

2.Learning goals

2.1.Competences

Upon passing the subject, the student will be more competent in a specific way:

? E06 - Ability to apply construction procedures, construction machinery and construction planning techniques.

And in a basic and general way:

? G01 - Organizational and planning capacity

? G02 - Ability to solve problems

? G03 - Ability to make decisions

? G04 - Aptitude for oral and written communication of the native language

? G05 - Ability to analyze and synthesize

? G06 - Information management capacity

? G07 - Ability to work as a team

? G08 - Capacity for critical reasoning

? G09 - Ability to work in an interdisciplinary team

? G10 - Ability to work in an international context

? G11 - Capacity for improvisation and adaptation to face new situations

? G12 - Leadership skills ? G13 - Positive social attitude towards social and technological innovations

? G14 - Ability to reason, discuss and expose ideas

? G15 - Ability to communicate through the word and the image

? G16 - Ability to search, analyze and select information

? G17 - Capacity for autonomous learning

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

? G24 - Encourage entrepreneurship

? G25 - Knowledge of information and communication technologies

? CB1 - That students have demonstrated to possess and understand knowledge in an area of ??study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge coming from the vanguard of its field of study

? CB2 - That students know how to apply their knowledge to their work or vocation in a professional manner and possess the skills 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 gather and interpret relevant data (usually within their area of ??study) to make judgments that include a reflection on relevant issues of social, scientific or ethical nature

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

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

autonomy

2.2.Learning goals

At the end of the course, the student will be able to program and organize the construction processes, the work teams, and the technical and human resources for their implementation and maintenance, as well as for planning, programming, organisation and control works. You will have the ability to supervise deadlines and intervening agents. Ability to monitoring and control of works. Ability to prepare documentation and carry out planning and monitoring of a project.
When you pass this course you will know:

1. The structure of construction companies
2. The administrative process for contracting a work
3. The technical and economic planning of a construction site
4. Roles and responsibilities of the construction manager
5. Roles and responsibilities of the site management
6. Economic management of a construction site: certifications / costs
7. Integrated project management

2.3.Importance of learning goals

This course has a double character: theoretical and practical, offering a training with contents of application and immediate development in the labour and professional market.

When students are integrated into the world of work, they will be able to participate in any of the management activities of a work (planning, organization, execution and control), participating within the construction companies in tasks of head of production, site manager, or in architectural/engineering studios, within the supervision teams of the Faculty Management, having to relate The various agents involved in a project (property, entities, etc.) must be public, contractor companies, site management team, control laboratories, interested parties, etc.)

3.Assessment (1st and 2nd call)

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

Two forms of evaluation will be followed: continuous and final. These evaluations are not The second course may be taken if the student has not passed the course at the time of the The course will also include a series of tests that will be carried out on an ongoing basis during the course.

Continuous Evaluation

Continuous Assessment will be carried out throughout the learning period and will The main feature is that it is compulsory to participate in the activities that are course, as well as to pass the theoretical and practical tests that are to be proposed.

The following table summarizes the weights of the parts cited in the evaluation process Continue to

Classroom participation 10%.
Written tests (theoretical and practical) 40%
Individual and/or group practices 50%

The final grade will correspond to the weighted average of the grades of each test, you must have obtained a minimum mark in all the written and practical tests of 3.5 points in order to be able to weigh.
At least three (3) written tests shall be held, the dates of which shall be fixed as follows complete the subject, and at least five (5) practical tests, papers Practices that must be defended in class on an individual basis.
The grades obtained in any of the parts of continuous evaluation are not saved for the Global Final Assessment tests.

Overall Final Evaluation

Students who do not pass the course in the continuous assessment phase will have to take a final theoretical and practical assessment test on the date set as official call, in which it will be necessary to obtain a minimum score of 5 points to pass the course.

(100 % theoretical - practical test)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The teaching methodology of the course is based on teacher-student interaction, by promoting a series of activities that will teach the basic concepts that will intends to consolidate through the realization of tutored practices, also of a face-to-face. Any of the content dealt with in the activities, including visits and Master Classes, may be subject to evaluation.

- Face-to-face activities: Classes on theoretical arguments: where the theoretical concepts will be explained of the subject.
- Classes on problems and exercises: practical examples and problems in class linked to the theoretical aspects, but with a marked based on real cases and works.
- Tutored practices: students will develop examples and carry out practical cases referring to the application of the theoretical concepts studied, both in the theoretical classes and in the practical ones.
- Didactic visits: insofar as this possibility exists, visits will be made to construction sites and companies in the construction sector in which the aspects dealt with in the subject can be verified, serving as a reference for the carrying out of practical work.
- Master Classes: We will try to get the participation of prestigious professionals who will show their experiences on aspects related to the subject through this type of classes.
- Tutored autonomous activities: These activities are developed autonomously by the students under the supervision of the teachers of the subject.
- Reinforcement activities: Through the virtual teaching portal (Moodle) or unizar, the subject's teachers will develop, for cases in which conventional tutoring, coaching and mentoring activities cannot be applied support and help for students who need it, solving doubts or providing solutions to problems inherent in the arguments on the agenda.

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

4.2.Learning tasks

The course has been assigned 60 ECTS credits (150 hours) which are distributed in a The class will have 60 hours of lessons and another one to be developed individually by the students. every 90-hour student.
The four-month period in which the subject is taught is distributed over 15 school weeks so it is foreseen that the student will reach the required level of knowledge with a total commitment of 10 hours a week.
For the blocks of activities mentioned in the previous paragraph, the next lesson load to each of them:

Theoretical classes	18 hours	12%
Practical classes	7 hours	4.7%

Tutored practice 26 hours 17.3%
Evaluations 9 hours 6%
Individual non-attendance work 90 hours 60

4.3.Syllabus

TOPIC 1.- AGENTS INTERVENING IN THE CONSTRUCTION PROCESS
1.1. Types of projects
1.2. Stakeholders and interested parties
1.3. Structure of the construction company
1.4. General organisation chart of a construction company
1.5. Functions of the different departments
1.5.1. Studies
1.5.2. Treasury and administration
1.5.3. Parks and workshops
1.5.4. Occupational Risk Prevention Department
1.5.5. Quality Department
1.5.6. Environment Department
1.6. Managing a project: Planning, Organisation, Implementation and Control

TOPIC 2.- BIDDING FOR WORKS
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. Guarantees
2.1.8. Object and price of the contract
2.1.9. Processing of files
2.1.10. Sheets (PCLA,s and PPT,s)
2.2. Tendering, offer and award of contracts
2.2.1. Award procedures
2.2.2. Physical implementation budget/basic tender budget
2.2.3. Costs to be taken into account in drawing up the tender
2.2.4. Estimated planning
2.2.5. Tender for the execution of the work / financial proposal
2.2.6. Termination, awarding fee, recklessness
2.2.7. Award of contracts
2.2.8. Constitution of guarantees

TOPIC 3.- PLAN OF IMPLANTATION OF WORK.
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.

TOPIC 4.- INTRODUCTION TO PROGRAMMING AND PLANNING OF PROJECTS. COMPONENTS OF A SCHEDULE.
4.1. Introduction to the need for programming and monitoring projects
4.2. Requirements: cost, time, quality, safety
4.3. Break down a project into more representative activities/worksites
4.4. Relationship between activities and priorities

TOPIC 5.- PLANNING TECHNIQUES
5.1. Project planning
5.1.1. Task breakdown structures (TDS)
5.1.2. General planning process
5.2. General information on graphics
5.3. Space-time charts
5.4. Gantt charts

5.5. P.E.R.T. System
5.5.1. Introduction to the probabilistic analysis of a network
5.5.2. Overview of statistical parameters
5.5.3. PERT times
5.5.4. Likelihood of compliance with a project
5.6. C.P.M. System
5.6.1. Characteristics of a network
5.6.2. Construction of a network
5.6.3. Clearances
5.6.4. Roads
5.6.5. Critical path
5.7. Distribution of probabilities
5.7.1. Uncertainty in the timing of activities
5.7.2. The concept of probability of compliance with a target date.
5.7.3. The relationship between duration and resources applied (cost).
5.7.4. The SCM method. The optimal cost-duration solution.
5.8. Programming at minimum cost (SCM)
5.8.1. Duration/cost ratio
5.8.2. Cost curves
5.8.3. Duration optimisation
5.8.4. Ackoff Algorithm - Sasieni
5.9. PDM precedence system
5.9.1. Network characteristics
5.9.2. Construction of the network
5.9.3. Clearances: start, end, total and internal
5.9.4. Modifying a network to meet milestones
5.9.5. Changing a Network with a Breakdown of Activities
5.9.6. Application
5.10. Assigning resources to a project
5.10.1. Methods of solution and distribution of resources
5.10.2. Levelling and histogram of resources
5.10.3. Economic planning

6. TOPIC 6.- COMPUTERIZED PLANNING TOOLS
6.1. MS Project
6.2. Spreadsheet

7. THEME 7.- MONITORING THE EXECUTION OF THE WORK
7.1. Purchasing management
7.2. Control of executed work

7.3. Certifications

7.4. Price review. Revision formulas and indexes.
7.5. Quality control
7.5.1. Concept of quality
7.5.2. ISO 9000 standards
7.5.3. Quality management
7.5.4. Quality assurance plan
7.5.5. Inspection point programme
7.6. On-site documentation
7.6.1. Book of orders and assistances
7.6.2. Event book
7.6.3. Subcontracting book
7.6.4. Logbook
7.6.5. Parts of work
7.6.6. Warehouse stages

8. TOPIC 8.- COST CONTROL
8.1. Cost: concept and relativity of it
8.2. Difference between expenditure, cost and payment
8.3. Classification of costs
8.4. Certification planning
8.5. Cost planning

8.6. Cash flow study
8.7. Comparatives: budget / objective / actual executed

9. TOPIC 9.- COMPUTER CONTROL TOOLS
9.1. Spreadsheet: Certifications / Price Review
9.2. PRESTO: Certifications / Price comparisons budget-actual-objective
9.3. PROJECT: Monitoring the execution of work

10. TOPIC 10.- INCIDENTS DURING THE EXECUTION OF THE WORKS
10.1. Compensation in case of force majeure
10.2. Failure to comply with deadlines
10.3. Amendments to works contracts
10.4. Suspension of the work
10.5. Change in deadlines and adjustment of annuities
10.6. Assignment and subcontracting
10.7. Termination of the contract

11. TOPIC 11.- LIQUIDATION OF THE WORK
11.1. Completion of the work
11.2. Reception of the work
11.3. Final certificate of work
11.4. Settlement of the contract
11.5. Warranty period
11.6. Processing and return of guarantees

12. TOPIC 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 direction and management processes

4.4.Course planning and calendar

Planning

The distribution and allocation of the theoretical and practical load between the different chapters corresponds to one topic per school week, with the possibility of stopping at those that represent the greatest difficulty in understanding.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28727&year=2020