

Course guide

310732 - 310732 - Site Organisation and Planning

Last modified: 21/06/2023

Unit in charge: Barcelona School of Building Construction
Teaching unit: 732 - OE - Department of Management.

Degree: BACHELOR'S DEGREE IN ARCHITECTURAL TECHNOLOGY AND BUILDING CONSTRUCTION (Syllabus 2019).
(Compulsory subject).

Academic year: 2023 **ECTS Credits:** 7.5 **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer: Llopart Egea, Amadeo

Others: Giro Sobrevias, Ricardo
Jiménez Rodríguez, Verónica
Llopart Egea, Amadeo
Anglada Gelada, Sandra

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. FE-17 Ability to schedule and organise the constructive processes, the construction teams, the technical and human means for its execution and maintenance.
2. FE-22 Knowledges of the organisation of the professional work and studies, offices and professional societies, the regulations and rules related with the functions which the Building Engineer develops and the responsibility framework associated to the activity.
3. FE-24 Ability for the development of market studies, valuations and appraisals, studies of real-state viability, valuation and expert's report of risks and damages in construction.
4. FE-27 Ability to apply the necessary advanced tools for the resolution of the parts which the technical project implies and its management.
5. FE-30 Ability of analysis of the execution projects and their transfer to the execution in constructions.
6. FE-31 Knowledge of the functions and responsibilities of the agents which intervene in the construction and their professional or managerial organisation, as well as the administrative, managerial and processing procedures.
7. FE-32 Knowledge of the professional organisation and the basic procedures in the construction field and the promotion.

Transversal:

8. 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.

TEACHING METHODOLOGY

There will be taught classes will be held twice a week, combining theory and practice (with the intention of deep in the theoretical-practical knowledge) corresponding each day to each one of the blocks of the subject.

- . Exposition method / master class: Oral exposition by the faculty of the subject contents.
- . Expositive participative class: There will be incorporated spaces for the participation and involvement of the students by means of short lenght activities at class.
- . Resolution of exercises and problems: The student must develop the appropriate or right solutions by the application of procedures of transformation of the available information and the interpretation of the results.
- . Study of cases: intensive and complete analysis of a real incident, problem or event with the purpose of know it, understand it, generate hypothesis, contrast data, reflect about it, complete the knowledge, diagnose it and occasionally test the possible alternative procedures of solution.

LEARNING OBJECTIVES OF THE SUBJECT

On the basis of the own name of the subject, "planification" is the determination of some organisation objectives within some plans, and "organisation" the necessity of creating a structure able to achieve the compliance of these.

The subject will be divided in two parts clearly differentiated which will develop at the same time.

In construction planification, there will be facilitated a group of tools and mechanisms which will allow to itemize each one of the works which comprehend the construction of a building, assign resources, or facilitate the partial solutions for obtaining the final result.

At the same time in Organisation there will be exposed everything necessary for the construction, starting with the study of the plot, discussing the elements which are essential for the choice of an organisation type and continuing with the ordinance plan of the works. The construction will be planned and scheduled, knowing the necessary stages for its execution, an implantation plan must be proposed.

STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	8.00
Self study	112,5	60.00
Hours medium group	30,0	16.00
Hours large group	30,0	16.00

Total learning time: 187.5 h

CONTENTS

Content 1: PLANIFICATION UNIT

Description:

In this content the students work:

1P.- PLANNING SYSTEMS

- 1.1.- Introduction and history.
- 1.2.- Features of the construction sector.
- 1.3.- Definition of singular projects.
- 1.4.- Basic methods of representation.
- 1.5.- Gantt diagram.
- 1.6.- Diagram of quantity-time relation.

2P.- METHODS BASED ON THE GRAPH THEORY

- 2.1.- Introduction and history.
- 2.2.- Basic concepts of the graphs theory, for the application to the project management.
- 2.3.- Division of projects in activities.
- 2.4.- Features of the activities.
- 2.5.- Relations between activities. Types and restrictions.
- 2.6.- Representation types. Node-activity, node-event.

3P.- THE CPM METHOD (PLANNING)

- 3.1.- Previous analysis.
- 3.2.- Dependence relation of the activities.
- 3.3.- Representation of the graph.
- 3.4.- Restrictions in the representation. Fictitious activities.
- 3.5.- Determinants of the method.
- 3.6.- Planning control.

4P.- THE CPM METHOD (PROGRAMMING)

- 4.1.- Temporary features of the activities.
- 4.2.- Minimum data of the events.
- 4.3.- Maximum data of the events.
- 4.4.- Calculation processes.
- 4.5.- Width of the events.
- 4.6.- Floating of the events.
- 4.7.- Programming control.

5P.- RESOURCES MANAGEMENT

- 5.1.- Representation of the GANTT diagram associated to the graph.
- 5.2.- Resources types, resources load, load curves. Histograms.
- 5.3.- Compatibility problems.
- 5.4.- Levelling and equilibrium problems.
- 5.5.- Procedures of resolution of problems.

6P.- ECONOMIC MANAGEMENT

- 6.1.- Economic planning: Resources assignment.
- 6.2.- Concepts: Costs. Incomes and payments.
- 6.3.- Certifications and mismatches. Treasury.
- 6.4.- Graphics of economic planning.
- 6.5.- Analysis of situations. Analytical resolution.
- 6.6.- Partial and gathered treasury.
- 6.7.- Other economic graphics.

7P.- P.E.R.T. METHOD

- 7.1.- PERT method: Concepts. Random times.
- 7.2.- Assignment of time. Final expected time of the programme.
- 7.3.- Time deviation of the activities. Probabilities.
- 7.4.- Analysis of the compliance.

8P.- ROY METHOD

- 8.1.- ROY system: Concepts and representation.
- 8.2.- Relations between activities.
- 8.3.- Mismatches and overlaps.
- 8.4.- Representation systems.
- 8.5.- Calculation of the time. Specific calculation for the activities with different relations.
- 8.5.- The width in the ROY system. Critical path.
- 8.7.- Comparison with other methods. Pros and cons.
- 8.8.- Conversion of systems by GANTT graphics.

9P.- FOLLOWING AND UPDATING OF PROGRAMMES

- 9.1.- Following and updating of programmes. Concepts.
- 9.2.- Deviations of programmes: Analysis of the compliance.
- 9.3.- Analysis of the deviations. Unfulfilment of the deadlines.
- 9.4.- Correcting measures: Self-correction probabilities.
- 9.5.- Application of the system. Economic control of the deviations.

10P.- UPDATING AND REDUCTION OF PROGRAMMES

- 10.1.- Updating of programmes: systems.
- 10.2.- Tendencies of the programme: progress and delays.
- 10.3.- Correction tools: phases and overlaps.
- 10.4.- Reduction of programmes: Increase of resources. Cost analysis.
- 10.5.- Optimization of programmes. "time-cost" relation curve. Optimal point.

Related activities:

There will be done the activity 1, corresponding to practices done at class, with a part of the directed activity. Also the activity 3, corresponding to a midterm exam and the activity 4, the final exam of the block.

Full-or-part-time: 46h 52m

Theory classes: 18h 45m

Self study : 28h 07m

Content 2: ORGANIZATION UNIT

Description:

In this content the students work:

- 1.0.- INTRODUCTION TO THE CONSTRUCTION ORGANIZATION.
 - 1.1.- Features of the sector and the construction product.
 - 1.2.- Integrated conception of the progress.
 - 1.3.- Main objectives: quality, cost, time. Relation between objectives.
- 2.0.- ORGANIZATIONAL DEVELOPMENT OF THE CONSTRUCTION PROCESS.
 - 2.1.- Global process stages. Definition.
 - 2.2.- Promotion. Previous studies.
 - 2.3.- Conception and design.
 - 2.4.- Qualification of project.
 - 2.5.- Resources. Definition of the agents which take part.
 - 2.6.- Scheduling and preparation of the execution. Construction execution.
 - 2.7.- Qualification for the using. Commercialization.
- 3.0.- NECESSARY DOCUMENTATION FOR THE CONSTRUCTION PROCESS.
 - 3.1.- Technical documentation.
 - 3.2.- Administration documentation.
- 4.0.- ORGANIZATION AND CONTROL OF THE CONSTRUCTION PROCESS.
 - 4.1.- Preparation of the execution.
 - 4.2.- Organization of the implementation.
 - 4.3.- Organization of the activities in construction.
 - 4.4.- Control of the activities.

- 4.5.- Determined concepts and elements of the construction organization.
- 4.6.- Factors: Labour, materials, machinery, auxiliary and prevention means.
- 4.7.- Activities cycle. Stages and phases of the process.

5.0.- THE IMPLEMENTATION OF CONSTRUCTIONS.

- 5.1.- Implementation criteria.
- 5.2.- Priorities and movements depending on the phases.
- 5.3.- The indicative planning on time; MACROGRAPHS.
- 5.4.- Analysis of the location.
- 5.5.- Preparation of the location.
- 5.6.- The construction floor plan.

6.0. ELEVATION SYSTEMS, TRANSPORTATION OF LOADS TRANSFER.

- 6.1.- Situation related with the building of other elements.
- 6.2.- The crane as central element in the construction organization.
- 6.3.- Other equipment of load transfer.
- 6.4.- Auxiliary means and systems of transfer and evacuation.
- 6.5.- Prevention of the associated risks.

7.0.- THE IMPLEMENTATION IN THE STAGE OF EARTHMOVING AND FOUNDATIONS.

- 7.1.- Organization study on floor plans. Evolution of the process.
- 7.2.- Implementation of the elements. Opening of the workplace.
- 7.3.- Facilities for the workers: Offices and construction warehouses.
- 7.4.- Facilities for the making and placing of steel frameworks, formworks and refinement of the concrete.
- 7.5.- Organization of the machinery and auxiliary means.
- 7.6.- Storage areas. Earth and rubble yard.
- 7.7.- Implementation of safety and prevention systems.

8.0.- THE IMPLEMENTATION DURING THE REINFORCED CONCRETE STRUCTURES AND PREFABRICATION STAGE.

- 8.1.- Study of phases and cycles. Specialised equipment, tools and elevation and transport systems.
- 8.2.- Workshops.
- 8.3.- The prefabrication.
- 8.4.- Control of the prefabrication of the product, stock and assembly process.
- 8.5.- Implementation of prevention and safety systems.

9.0.- THE IMPLEMENTATION DURING THE ENCLOSURES AND FINISHES STAGE.

- 9.1.- Study of the process: phases and cycles. Intervention of the teams.
- 9.2.- Implementation of the workplaces: internal organization.
- 9.3.- Interaction between locations, supplies.
- 9.4.- Manufacture teams and refinement of: materials, tools, means and load transfers. Evacuation.
- 9.5.- Industrialized systems. Prefabrication of enclosures.
- 9.6.- Implementation of the safety and prevention systems.

10.0.- THE ORGANIZATION AND CONTROL OF THE ACTIVITIES IN CONSTRUCTION.

- 10.1.- Productivity factors: time, area and resources.
- 10.2.- Control of the labour.
- 10.3.- Control of the materials.
- 10.4.- Control of the machinery, the equipment and the auxiliary means.
- 10.5.- Organization and control of the workplaces.

Related activities:

There will be done the activity 2, corresponding to practices done at class, with a part of the directed activity. Also the activity 3, corresponding to a midterm exam and the activity 4, the final exam of the block.

Full-or-part-time: 46h 53m

Theory classes: 18h 45m

Self study : 28h 08m

GRADING SYSTEM

The evaluation system will consist on midterm exams corresponding to the block Planificació i Organització, which will represent the 30% of the mark, and the final exam of both parts, which will add a 40%. The 30% remaining will consist on a continuous evaluation process, also differentiated for each one of the blocks. There will be a reappraisal, of the final test, for those pupils who have obtained a final qualification of suspense, with a minimal note of 3,5 and have taken part in all the tests evaluables of the subject.

EXAMINATION RULES.

All the continuous evaluation activities (practices) must be delivered.
The final exam will be done individually and in writing.

BIBLIOGRAPHY

Basic:

- Hillier, F. S; Lieberman G. J. Introducción a la investigación de operaciones. 9a ed. Madrid: Ed. McGraw-Hill, 2010.
- Catz, Jacques. Control de la gestión en la empresa constructora y de obras públicas. 3a ed. Barcelona: Técnicos asociados, 1978.
- Dressel, Gerhard. Medios de organización de la empresa constructora. Barcelona: Gustavo Gili, 1976. ISBN 8471461633.
- Mateos Perera, Jesús. La Programación en la construcción. 2a ed. Madrid: Bellisco, 2003. ISBN 8495279770.
- Pomares Martinez, Juan. Planificación grafica de obras : Gantt-C.P.M.-P.E.R.T.-Roy. Barcelona: Gustavo Gili, 1977. ISBN 8425206596.
- Romero López, Carlos. Técnicas de programación y control de proyectos. Madrid: Pirámide, 1997. ISBN 8436811518.

Complementary:

- Companys Pascual, R. ; Corominas Subías, A. Planificación y rentabilidad de proyectos industriales. Barcelona: Marcombo, 1988.
- Bendicho Joven, José Pascual. Manual de planificación y programación para obras públicas y construcción : camino crítico Pert-C.P.M.. Madrid: Rueda, 1983. ISBN 8472070336.
- Comas, José Antonio ... [et al.]. Organización y control de obras de edificación. Madrid: Proyectos y Producciones Editoriales Cyan, S.L., 1995. ISBN 978-84-8198-103-2.