

28768 - Works Planning and Management

Información del Plan Docente

Academic Year	2018/19
Subject	28768 - 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	4
Semester	Second semester
Subject Type	Optional
Module	---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The current subject "Construction work management" is organized into five main groups of activities: two of them run by the teacher (lectures and problems), another carry out by the students and teacher jointly, a fourth one consisting of self-study and finally the assessment written test:

- Lectures: in which the teacher will explain the theoretical concepts of the subject topics.
- Practical sessions: The teacher will explain the practical application on the concepts developed at the theoretical lectures, resolving practical problems. This session will take place at the classroom or at the computer laboratory.
- Tutorship practical sessions: Using technical software at the computer laboratory students will resolve, individually or in groups of two of them, the practical applications of concepts detailed in above paragraphs. Depending on the

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duration of these practices it can be only initiated at class time and later on finished as a non-class activity bases.

- Assessment written test: Students will demonstrate the knowledge gained through two not mutually exclusive methods. One by continuing assessment throughout the course or, if these midterms tests are not passed successfully, a global written test on two calls.
- Personal study: Non-class activities in which students have to study the topics learnt at the class activities in order to understand and assimilate the theory taught in lectures and train the practical cases solved in the practical classes and prepare the written test.

Besides these activities there will be individual tutorials based on personalized attention by the teacher in order to help and resolve doubts and questions about the specific areas in which students have found more difficulties to be understood.

4.2.Learning tasks

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

- Lectures / Theoretical classes 18 hours (12%)
- Practical classes 7 hours (4,7%)
- Tutorship practical sessions 26 hours (17,3%)
- Assesment written test 9 hours (6%)
- Personal study 90 hours (60%)

According this distribution of hours, a total 150 hours workload is reached, corresponding to the 6 credits ECTS that the subject has assigned during the second quarter of the third course of the Civil Engineer Bachellor's degree.

These 150 hours involve 15 week of class.

Individual tutorials are scheduled in a two hours per week basis.

4.3.Syllabus

To reach the subject aims, this one is structured in 12 topics grouped into 4 educational units.

The detailed contents of these topics is as follows:

EDUCATIONAL UNIT I: PUBLIC CONSTUCTION WORKS TENDERING

TOPIC 1. GENERAL CONSIDERATIONS AT CIVIL ENGINEERING PROJECTS

1.1. Civil engineer Project: general concept and definition

1.2. Systemic concept of construction projects

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1.3. Civil engineering projects types

1.4. The Project and its environment

1.5. Phases and life cycles of a project

1.6. Agents and stakeholders

1.7. Construction company structure

1.7.1. Construction company organization chart

1.7.2. Department's roles

1.7.3. Store and warehouses

1.7.4. Safe and safety department

1.7.5. Quality department

1.8. Project management: Planning, Organization, Execution and control.

TOPIC 2. WORKS TENDERING ON THE PUBLIC SECTOR

2.1. Construction contract

2.1.1. Current legislation on public contracting

2.1.2. Contract types

2.1.3. The construction contract

2.1.4. The public contracting body

2.1.5. Conditions required to get a public contract

2.1.6. Construction Company qualification required

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2.1.7.Guarantees

2.1.8.Objet and price of a public contract

2.1.9.Processing of the contracting files

2.1.10. Biding documents (Economical and Technical)

2.2. Tendering, biding , offer document, and contracts award

2.2.1.Contract award proceeding types

2.2.2.Physical construction budget / Tendering construction budget

2.2.3.Costs to be consider on bidding

2.2.4.Initial planning estimation

2.2.5.Execution bid / Technical and economical

2.2.6.Coefficient of contract award, recklessness

2.2.7.Contract awarding

2.2.8.Forms of provide a security right (Guarantee)

2.2.9.Software tools to help for drawing up a cost assessment for a biding (PRESTO, spreadsheet Excel)

EDUCATIONAL UNIT II: PLANNING AND CONSTRUCTION WORKS ORGANIZATION

TOPIC 3. PLANNING TECHNIQUES

3.1. Project planning

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- 3.1.1. Work structure breakdown (WSB)
- 3.1.2. General planning process
- 3.2. Generalities about arrow diagrams
- 3.3. Time-space diagram
- 3.4. Gantt diagram
- 3.5. Critical path method (C.P.M) diagram
- 3.6. Program evaluation review technique (P.E.R.T) diagram
- 3.7. Precedence diagram method (PDM)

TOPIC 4. CONSTRUCTION WORKS ORGANIZATION

- 4.1. Work contract award
- 4.2. Contract completion and sign
- 4.3. The act of topographic survey
- 4.4. Contract resolution before works start
- 4.5. Pre-works
 - 4.5.1. Health and safety plan
 - 4.5.2. Communication of the opening of the work center
 - 4.5.3. The act of verification of topographic survey

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4.5.4. Implementation / deployment

4.5.5. Affected services

4.6. Construction work general organization chart

4.7. Work site manager

4.8. Assistant to work site manager

4.9. Technical and topographic office

4.10. Administrative tasks

4.11. Work site organization

4.12. Supply and material reception

4.13. Works management

4.14. Surveillance, control and works supervision

TOPIC 5. CONSTRUCTION WORKS PLANNING

5.1. Technical planning

5.1.1. Resources allocation to a project

5.1.2. Resources allocation methods

5.1.3. Resources allocation

5.1.4. Resource leveling

5.1.5. Resources histogram

5.2. Economical planning

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5.2.1. Minimum cost programming method

5.2.2. Time-cost relationship

5.2.3. Cost curve

5.2.4. Time optimization

5.2.5. Ackoff - Sasieni mathematic algorithm

TOPIC 6. PLANNING SOFTWARE TOOLS

6.1. MS Project

6.2. Excel worksheet

6.3. PRESTO

EDUCATIONAL UNIT III: CONSTRUCTION WORKS EXECUTION AND CONTROL

TOPIC 7. CONSTRUCTION WORKS EXECUTION MONITORING

7.1. Purchasing management

7.2. Executed tasks control

7.3. Payment certifications

7.4. Price review formulas and reference indices.

7.5. Quality control

7.5.1. Quality concept

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7.5.2. Standard ISO 9000

7.5.3. Quality management

7.5.4. Quality assurance plan

7.5.5. Inspection and control points programme

7.6. Documentation on work site

7.6.1. Orders and assistance log book

7.6.2. Safe & Safety log book

7.6.3. Subcontracting log book

7.6.4. Daily operations diary

7.6.5. Task report

7.6.6. Storehouse and warehouse reports

TOPIC 8. COST CONTROL

8.1. Concept of cost and relativity of it

8.2. Difference between spending, cost and payment

8.3. Classification of costs

8.4. Payment certifications planning

8.5. Costs planning

8.6. Cash flow study

8.7. Comparative study: initial bid / Price target / real execution

TOPIC 9. CONTROL SOFTWARE TOOLS

- 9.1. Spreadsheet : Payment certifications / Prices review
- 9.2. PRESTO: Payment certifications / Price comparative studies/real execution cost /target cost
- 9.3. MS Project: Work execution monitoring

TOPIC 10. INCIDENCIES DURING WORK EXECUTION

- 10.1. Indemnification in case of force majeure
- 10.2. Missed deadlines
- 10.3. Legal modifications in construction works contracts
- 10.4. Works suspension
- 10.5. Time frame modifications and readjustment of annuities
- 10.6. Contract assignment to another contractor and subcontracting
- 10.7. Contract resolution

TOPIC 11. LIQUIDATION OF THE CONSTRUCTION WORK

- 11.1. Completion of the work
- 11.2. Reception of the work
- 11.3. Final payment certification
- 11.4. Contract liquidation
- 11.5. Guarantee period
- 11.6. Processing and return of guarantees

EDUCATIONAL UNIT IV: PROJECT MANAGEMENT

 9414213. 12. **PROJECT MANAGEMENT**

- 12. 1. Project management
- 13. 2. Main international standards: PMI, IPMA.
- 14. 3. Standard UNE-ISO 21500 "Guidance on project management"
 - 12. 3.1. Aim and field of application
 - 13. 3.2. Terms and definitions
 - 14. 3.3. Project management concepts
 - 15. 3.4. Processes considered

4.4.Course planning and calendar
Planning

The theoretical and practical workload of the different topics is distributed according to the table below:

Nº	TOPIC	S	P	PT	E	TI	TOTAL
1	GENERAL CONSIDERATIONS AT CIVIL ENGINEERING PROJECTS	3				3	6
2	WORKS TENDERING ON THE PUBLIC SECTOR	3		6		12	21
EV I	Written assesment test				2		2
3	PLANNING TECHNIQUES	4	4	6		20	36

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4	CONSTRUCTION WORKS ORGANIZATION	2				1	2
5	CONSTRUCTION WORKS PLANNING	1	2	2		10	15
6	PLANNING SOFTWARE TOOLS			4		12	14
EV II	Evaluación				2		2
7	CONSTRUCTION WORKS EXECUTION MONITORING	1	1	3		9	12
8	COSTS CONTROL			2		6	8
9	CONTROL SOFTWARE TOOLS			3		12	17
10	INCIDENCIES DURING WORK EXECUTION	2				3	4
11	LIQUIDATION OF THE CONSTRUCTION WORK	1				2	3
12	PROJECT MANAGEMENT	1				2	3
EV III	Written assesment				2		2

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	test						
EV-F	Final written assesment test				3		3
	TOTAL	18	7	26	9	90	150

S.- Theoretical sesions / lectures

P.- Practical sesions /Problems

PT.- Computer lab workshop

E.- Written assesment test

TI.- Personal study

DESIGNATION OF SESSIONS ACCORDING TO THE WORKLOAD

TU	Nº	TEMA	T	P	PT	E
	0	SUBJECT INTRODUCTION AND LEARNING AIMS	S-011			

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I	1	GENERAL CONSIDERATIONS AT CIVIL ENGINEERING PROJECTS	S-112 S-122			
	2	WORKS TENDERING ON THE PUBLIC SECTOR	S-213 S-223 S-233		PT-216 PT-226 PT-236 PT-246 PT-256 PT-266	
		Written assesment test				EV-I-12 EV-I-22

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II	3	PLANNING TECHNIQUES	S-315	P-315	PT-315	
			S-325	P-325	PT-325-1	
			S-335	P-335	PT-325-2	
			S-355	P-355	PT-335	
4		CONSTRUCTION WORKS ORGANIZATION	S-412			
			S-422			
5		CONSTRUCTION WORKS PLANNING	S-511	P-512	PT-512	
				P-522	PT-522	
6		PLANNING SOFTWARE TOOLS			PT-614	
					PT-624	
					PT-634	
					PT-644	
		Written assesment test				EV-II-12 EV-II-22
III	7	CONSTRUCTION WORKS EXECUTION MONITORING	S-711	P-711	PT-713	
					PT-723	

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					PT-733	
	8	COSTS CONTROL			PT-812 PT-822	
	9	CONTROL SOFTWARE TOOLS			PT-914 PT-924 PT-934-944	
	10	INCIDENCIES DURING WORK EXECUTION	S-1012 S-1022			
	11	LIQUIDATION OF THE CONSTRUCTION WORK	S-1111			
IV	12	PROJECT MANAGEMENT	S-1211			
		Written assesment test				EV-III-12 EV-III-22
		Final written assesment test				EF-13 EF-23 EF-33
TOTAL OF SESSIONS			18	7	26	9

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(Eg. Designation meaning: PT-723.- Tutorial practice corresponding to the topic 7, sesion 2 of 3)

CALENDAR

HORA		LECTURES	PRACTICAL.	TUTORIAL SESSIONS	ASSESSMENT
					WRITTEN TEST
1	Subject introduction, contents, topics, assesment written tests	S-011			
2	General considerations on civil engineer projects	S-112			
3	Construction Company chart, management concept	S-122			
4	Construction wok contract	S-213			
5	Works tendering on the public sector	S-223			
6	Works tendering on the public sector	S-233			
7	Tendering, biding , offer document, and			PT-216	

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	contracts award				
8	Tendering, bidding , offer document, and contracts award			PT-226	
9	Recklessness offer			PT-236	
10	Construction Company qualification			PT-246	
11	Contractor offer proposal and coefficient of contract award			PT-256	
12	Getting the tendering information from the net			PT-266	
13	Diagram general aspects. Time-space diagrams	S-315			
14	Diagram general aspects. Time-space diagrams. Gantt		P-315		
15	ASSESSMENT WRITTEN TEST EU I				EV-I-12
16	ASSESSMENT WRITTEN TEST EU I				EV-I-22
17	CPM planning	S-325			

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18	CPM planning		P-325		
19	Practical exercise time-space diagram			PT-315	
20	Practical exercise of diagrams			PT-325-1	
21	PERT planning	S-335			
22	PERT planning		P-335		
23	Practical exercise of diagrams			PT-325-2	
24	Practical exercise CPM diagram			PT-335	
25	PDM planning	S-355			
26	PDM planning		P-355		
27	Practical exercise PDM diagram			PT-355-1	
28	Practical exercise PDM diagram			PT-355-2	
29	Work site organization	S-412			
30	Work site organization	S-422			
31	MS-Project			PT-614	
32	MS-Project			PT-624	

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33	Resource levelling / Minimum cost / Acoff-Sasieni algorithm	S-511			
34	Resource levelling practical exercise		P-512		
35	MS-Project			PT-634	
36	MS-Project			PT-644	
37	Acoff-Sasieni practical exercise		P-522		
38	Resource levelling practical exercise			PT-512	
39	Acoff-Sasieni practical exercise			PT-522	
40	Construction Works monitoring	S-711			
41	Payment certifications / Prices review		P-711		
42	ASSESSMENT WRITTEN TEST EU II				EV-II-12
43	ASSESSMENT WRITTEN TEST EU II				EV-II-22
44	Bidding documents			PT-713	
45	Prices review			PT-723	

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	practical exercise				
46	Contol points			PT-733	
47	Modifications of the contract / works suspension / Assigment to another constructor / Contract resolucion	S-1012			
48	Modifications of the contract / works suspension / Assigment to another constructor / Contract resolucion	S-1022			
49	Payment certifications planning			PT-812	
50	Cash flow			PT-822	
51	Reception of the work / Contract liquidation / Guarantee period	S-1111			
52	Project Management	S-1211			
53	Payment certificación using SW (Presto , Arquímedes)			PT-914	
54	Payment certificación using SW (Presto,			PT-924	

	Arquímedes)				
55	Inspection points programme, Prices review			PT-934 y 944	
56	ASSESSMENT WRITTEN TEST EU III y IV				EV-III-12
57	ASSESSMENT WRITTEN TEST EU III y IV				EV-III-22
58	FINAL ASSESSMENT WRITTEN TEST				EF-13
59	FINAL ASSESSMENT WRITTEN TEST				EF-23
60	FINAL ASSESSMENT WRITTEN TEST				EF-33

4.5. Bibliography and recommended resources