28727 - Works Planning and Management

Información del Plan Docente

Academic Year	2016/17
Academic center	175 - Escuela Universitaria Politécnica de La Almunia
Degree	423 - Bachelor's Degree in Civil Engineering
ECTS	6.0
Course	
Period	Second semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

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 forth one consisting of self-study and finally the assessment written test:

- Lectures: in which the teacher will explain the theorical concepts of the subject topics.
- Practical sessions: The teacher will explain the practical application on the concepts developed at the theorical 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

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.

5.2.Learning activities

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

- Lectures / Theoretical classes 19 hours
- Practical classes 10 hours
- Tutorship practical sessions 22 hours
- Assesment written test 9 hours
- Personal study 90 hours

According this hours distribution 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.

5.3.Program

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

1.3. Civil engineering projects types

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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 warehauses

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

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

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. Crital path method (C.P.M) diagram

3.6. Program evaluation review technique (P.E.R.T) diagram

3.7. Roy potential tecnique diagram

3.8. Precedence diagram method (PDM)

TOPIC 4. CONSTRUCTION WORKS ORGANIZATION

4.1. Work contract award

4.2. Contract completation 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

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.Woks management

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. Resourses allocation

5.1.4. Resourse leveling

5.1.5. Resources histogram

5.2. Economical planning

5.2.1. Minimum cost programming method

5.2.2. Time-cost relationship

5.2.3. Cost curve

5.2.4. Time optimization

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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

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 warehause 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 assigment 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

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TOPIC 12. PROJECT MANAGEMENT

12.1.Project management

12.2.Main international satndards: PMI, IPMA.

12.3.Standard UNE-ISO 21500 "Guidance on project mangement"

12.3.1. Aim and field of application

12.3.2. Terms and definitions

12.3.3. Project management concepts

12.3.4. Processes considered

5.4.Planning and scheduling

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

Nº	TOPIC	S	P	PT	E	TI	TOTAL
1	GENERAL CONSIDERATIONS AT CIVIL ENGINEERING PROJECTS	3				3	5
2	WORKS TENDERING ON THE PUBLIC SECTOR	3	1	6		10	17

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EV I	Written assesment test				2		2
3	PLANNING TECHNIQUES	5	5	6		20	36
4	CONSTRUCTION WORKS ORGANIZATION	1				1	2
5	CONSTRUCTION WORKS PLANNING	1	2	2		10	15
6	PLANNING SOFTWARE TOOLS			2		12	16
EV II	Evaluación				2		2
7	CONSTRUCTION WORKS EXECUTION MONITORING	1	1	3		9	15
8	COSTS CONTROL			2		6	9
9	CONTROL SOFTWARE TOOLS	1		4		12	16
10	INCIDENCIES DURING WORK EXECUTION	1				3	4
11	LIQUIDATION OF THE CONSTRUCTION WORK	1				2	3

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12	PROJECT MANAGEMENT	1				2	3
EV III-IV	Written assesment test				2		2
-	Final written assesment test				3		3
	TOTAL	**18**	**8**	**25**	**9**	**90**	**150**

S.- Theorical 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			
I	1	GENERAL CONSIDERATIONS AT CIVIL ENGINEERING PROJECTS	S-112			
			S-122			

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	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 S-325 S-335 S-345 S-355	P-315 P-325 P-335 P-345 P-355	PT-315 PT-325-1 PT-325-2 PT-335 PT-345 PT-355	
	4	CONSTRUCTION WORKS ORGANIZATION	S-411			
	5	CONSTRUCTION WORKS PLANNING	S-511	P-512 P-522	PT-512 PT-522	
	6	PLANNING SOFTWARE TOOLS			PT-614-624 PT-634-644	
		Written assesment test				EV-II-12 EV-II-22

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III	7	CONSTRUCTION WORKS EXECUTION MONITORING	S-711	P-711	PT-713 PT-723 PT-733	
	8	COSTS CONTROL			PT-812 PT-822	
	9	CONTROL SOFTWARE TOOLS	S-911		PT-914 PT-924 PT-934 PT-944	
	10	INCIDENCIES DURING WORK EXECUTION	S-1011			
	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	8	25	9

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(Eg. Designation meaning: PT-723.- Tutorial practice corresponding to the topic 7, sesión 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			

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7	Tendering, biding , offer document, and contracts award			PT-216	
8	Tendering, biding , 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	ASSESMENT WRITTEN TEST EU I				EV-I-12

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16	ASSESMENT WRITTEN TEST EU I				EV-I-22
17	CPM planning	S-325			
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	Roy planning	S-345			
24	Roy planning		P-345		
25	Roy planning			PT-325-2	
26	Practical exercise CPM diagram			PT-335	
27	PDM planning	S-355			
28	PDM planning		P-355		

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29	Practical exercise Roy diagram			PT-345	
30	Practical exercise PDM diagram			PT-355	
31	Work site organization	S-411			
32	Resource levelling / Minimum cost / Acoff-Sasieni algorithm	S-511			
33	MS-Project			PT-614 y PT-624	
34	MS-Project			PT-634 y PT-644	
35	Resourse levelling practical exercise		P-512		
36	Acoff-Sasieni practical exercise		P-522		
37	Resourse levelling practical exercise			PT-512	
38	Acoff-Sasieni practical exercise			PT-522	
39	Construction Works monitoring	S-711			

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40	Payment certifications / Prices review		P-711		
41	ASSESMENT WRITTEN TEST EU II				EV-II-12
42	ASSESMENT WRITTEN TEST EU II				EV-II-22
43	Payment (refered to the works start) certification			PT-713	
44	Prices review practical exercise			PT-723	
45	Control software tools	S-911			
47	Modifications of the contract / works supension / Assigment to another constractor / Contract resolucion	S-1011			
48	Payment certifications planning			PT-812	
49	Cash flow			PT-822	
50	Reception of the work / Contract liquidation /	S-1111			

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	Guarantee period				
51	Project Management	S-1211			
52	Payment certificación using SW (Presto , Arquímedes)			PT-914	
53	Payment certificación using SW (Presto, Arquímedes)			PT-924	
54	Inspection points programme, Prices review			PT-934	
55	Real construction project analys			PT-944	
56	ASSESMENT WRITTEN TEST EU III y IV				EV-III-12
57	ASSESMENT WRITTEN TEST EU III y IV				EV-III-22
58	FINAL ASSESMENT WRITTEN TEST				EF-13
59	FINAL ASSESMENT WRITTEN TEST				EF-23

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60	FINAL ASSESMENT WRITTEN TEST				EF-33

5.5.Bibliography and recomended resources

Basic Bibliography

- Organización y gestión de proyectos y obras de los autores Germán Martínez Montes y Eugenio Pellicer Almiñana (Editorial Mc Graw Hill).
- Procedimientos generales de construcción y organización de obras de Antonio Lara Galera (Editorial Cuadernos ES ICCP Madrid).
- Planificación Técnica (CICCP; Carlos Tutor Larrosa)

Normativa de consulta

- Real decreto legislativo Texto refundido de la Ley de contratos del sector público TRLCSP 3/2011 (BOE núm 276 ; 16nov2011).
- Reglamento general de la Ley de contratos de las Administraciones Públicas (RD 1098/2001 ; B.O.E. 257 de 26-oct-01)

Complementary Bibliography

- Presto . Tercera Edición. (Mc Graw Hill; R. de Benito Arango y A.J. Sánches Granda)
- Planificación gráfica de obras (Editorial Gustavo Gili ; Juan Pomares Martínez)
- Organización y control de obras (Universidad de Cantabria; Carlos Fresno; Aja Setién)

Normativa de consulta

- Ley 32/2006 de subcontratación del sector de la construcción