



Universitat de Lleida

DEGREE CURRICULUM
**BUDGETS AND
MEASUREMENTS**

Coordination: PLANA MARTI, XAVIER

Academic year 2023-24

Subject's general information

Subject name	BUDGETS AND MEASUREMENTS			
Code	101425			
Semester	UNDEFINED / 1st Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Architectural Technology and Building Construction	3	COMPULSORY	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRAULA		TEORIA
	Number of credits	3		3
	Number of groups	1		1
Coordination	PLANA MARTI, XAVIER			
Department	INDUSTRIAL AND BUILDING ENGINEERING			
Teaching load distribution between lectures and independent student work	1 ECTS=10 h of face-to-face class + 15h of autonomous work 60 h face-to-face class (40%) 90 h autonomous work (60%)			
Important information on data processing	Consult this link for more information.			
Language	Catalan			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
COMA ARPON, JULIA	julia.coma@udl.cat	0	
PLANA MARTI, XAVIER	xavier.plana@udl.cat	6	

Subject's extra information

Subject from the 1st semester of the 3rd year of the degree.

Learning objectives

- To use an appropriate technical language, both in written and oral communication.
- To disaggregate the different parts of a budget in their basic costs.
- To determine the cost of a project.
- To correctly manage the personal time to develop the established tasks and fulfil the objectives within the given period of time.
- To decide the best social/sustainable option between different ones with different costs.
- To use correctly the computer tools to development budgets.

Competences

Cross-disciplinary competences of the degree:

- **EPS2.** Capacity to gather and interpret relevant data, within the area of study, to judge and think about relevant subjects of social, scientific and ethical nature.
- **EPS7.** Capacity to work in situations with a lack of information and/or under pressure.
- **EPS8.** Capacity of planning and organizing the personal work.
- **EPS13.** Capacity to consider the socioeconomic context as well as the sustainability criteria in engineering solutions.

Specific competences of the degree:

- **GEE31.** Capacity to calculate basic, auxiliaries, unitary and decomposed prices of the units of work; analyse and control costs during a building process; to be able to do budgets.
- **GEE32.** Skills to develop market studies, assessments and evaluations, viability studies, expert witness and economic evaluation of risks and damages in a building.
- **GEE33.** Capacity to analyse and make projects of evacuation of buildings.
- **GEE34.** Knowledge of the legal management frame and the legal urban frame.

Subject contents

1. Project Morphology

- 1.1 Project.
- 1.2 Steps of a project.

1.3 Documents of the project.

2. Economic prediction.

2.1 Objective of the budget.

2.2 Prediction of the cost.

3. Measurement units.

3.1 Definition.

3.2 Price tables.

4. Measurements.

4.1 Introduction.

4.2 Measurement units.

4.3 Classification and grouping of chapters.

4.4 Types of measurements.

5. The budget.

5.1 Definition and basic conditions.

5.2 Types of budgets.

5.3 Budget elaboration.

5.4 Detailed budget.

5.5 Cost frame.

5.6 Budget types according to cost types.

6. Materials cost.

6.1 Materials definition.

6.2 Classification of materials.

6.3 Consumption of materials.

6.4 Consumption tables and historical consumptions.

6.5 Price of materials, price of amortization and product subcontracting.

7. Labour cost.

7.1 Salaries.

7.2 Social Security cost.

7.3 Labour cost for the company.

8. Machinery cost.

8.1 Introduction.

8.2 Types of machinery.

8.3 Cost of machinery.

9. Auxiliary equipment cost.

9.1 Definition of Auxiliary Equipment.

10. Earthworks.

10.1 Earthworks.

10.2 Influence factors.

10.3 Land clearance.

10.4 Excavation of land in clearing.

10.5 Excavation of land in recess.

10.6 Embankments.

10.7 Excavation of ditches and wells.

10.8 Refilled of ditches and wells.

10.9 Compacting earth.

10.10 Earth transport.

10.11 Shoring.

10.12 Dryining.

11. Foundations and retaining walls.

11.1 Foundations.

11.2 Retaining walls.

12. Reinforced concrete structures.

12.1 Reinforced concrete structures.

12.2 Influence factors.

12.3 Measurement criteria by separate components.

12.4 Measurement criteria by quote / average section.

13. Steel structures.

13.1 Steel structures.

13.2 Influence factors.

13.3 Measurement criteria.

13.4 Supporting plates.

13.5 Beams, trusses and spatial structures.

14. Wood structures.

14.1 Wooden structures.

14.2 Measurement criteria.

14.3 Frameworks, beams, columns, roof trusses, staircases and wooden floors.

15. Masonry and stone.

15.1 Masonry.

15.2 Stone.

16. Roofs and insulation.

16.1 Roofs.

16.2 Insulation.

17. Wood and metallic closure.

17.1 Wood closure.

17.2 Metallic closure.

18. Coating and glassworks.

18.1 Coatings.

18.2 Glassworks.

19. Health and Safety.

19.1 Concept, health and safety study.

19.2 Measurement units.

19.3 Measurement criteria.

20. Budget development using specific software.

20.1 Budget development using TCQ.

20.2 Linking TCQ with REVIT.

Methodology

The subject is developed using the following methodologies:

- **Master class:** In master classes the contents are presented orally by the lecturer with no active participation of the students.
- **Project Based Learning:** The Project Based Learning methodology is used to foster the learning based on selected project from real life.
- **Problems resolution:** In this activity, the lecturer presents a complex question that the students must solve, either individually or in group.

Development plan

Week	Methodology	Content	Face-to-Face hours	Autonomous work hours

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1	Master class Problems resolution	Subject presentation Project Morphology Measurement units. Measurements. The budget. Materials cost. Labour cost. Machinery cost. Auxiliary equipment cost.	4	6
2	Problems resolution	Economic prediction.	4	6
3	Problems resolution	Earthworks.	4	6
4	Problems resolution	Foundations and retaining walls.	4	6
5	Problems resolution	Foundations and retaining walls.	4	6
6	Problems resolution Project Based Learning	Reinforced concrete structures.	4	6
7	Problems resolution	Steel structures. Wood structures.	4	6
8	Master class	Budgeting software.	4	6
9		1st Evaluation.		
10	Problems resolution	Masonry and stone. Roofs and insulation. Wood and metallic closure. Coating and glassworks. Budgeting software.	4	6
11	Problems resolution	Masonry and stone. Roofs and insulation. Wood and metallic closure. Coating and glassworks. Budgeting software.	4	6
12	Problems resolution	Health and Safety. Budgeting software.	4	6
13	Master class Problems resolution	Budgeting software.	4	6
14	Master class Problems resolution	Construction works tender. Budgeting software.	4	6
15	Master class Problems resolution	Construction works certification Budgeting software.	4	6
16/17		2nd Evaluation.		
18				
19		Recovery Activities		

Evaluation

Evaluation activities (Criteria)	%	Date
Written test (≥ 4)	30	Week 9
Written test (≥ 4)	30	Week 16
Practice 1	15	Week 10
Practice 2	15	Week 15
Exercises at class	10	Continuous
Recovery written test (≥ 4)	60	Week 19

Bibliography

Recommended bibliography

- Ruiz Fernández, J.P. Aspectos económicos del Proceso de la Edificación. Ed. Del Autor. Cuenca, 2002.
- Andrés Baroja, B.; Baringo Sabater, P. (1998) Presupuestos de obra. Análisis y metodología. Barcelona: Departamento de Organización de Empresas. UPC. Depósito legal: B-40.147
- Andrés Baroja, B.; Baringo Sabater, P. (1997) Rendimientos de la mano de obra en la edificación. Barcelona: Departamento de Organización de Empresas. UPC.
- Andrés Baroja, B.; Baringo Sabater, P.; Vilajosana Béjat, J. (2002) Aplicación y control de presupuestos en obra. Introducción a las valoraciones inmobiliarias. Barcelona: Departamento de Organización de Empresas. UPC. Depósito legal: B-48.377.
- Ramirez de Arellano Agudo, A et al Recomendaciones sobre criterios de mediciones en construcción. Ed. Asociación Española de Profesores de Mediciones, Presupuestos y Valoraciones. Madrid, 1994.
- Garcia Muñoz, G. (2001) Precio, tiempo y arquitectura. Madrid: Mairena/Celeste.
- Ramirez de Arellano Agudo, A. (2000) Presupuestación de obras. Sevilla: Universidad de Sevilla.
- Sanchez Rodriguez, M. (1983) Control de costos en la construcción. Barcelona: C.E.A.C.
- Quadre de Preus referència d'edificació, d'enginyeria civil, d'urbanització, rehabilitació, seguretat i salut i assaigs de control de qualitat elements simples, elements compostos, partides d'obra i conjunts d'epartides d'obra (2008). Barcelona: ITEC (Institut de Tecnologia de la Construcció de Catalunya).