



Universitat de Lleida

# DEGREE CURRICULUM **REFURBISHING 1**

Academic year 2014-15

## Subject's general information

<b>Subject name</b>	Refurbishing 1
<b>Code</b>	101428
<b>Semester</b>	1st term
<b>Typology</b>	Optional
<b>ECTS credits</b>	6
<b>Theoretical credits</b>	1.5
<b>Practical credits</b>	4.5
<b>Office and hour of attention</b>	CREA building, 1.04. Appointment by e-mail.
<b>Department</b>	Computer and Industrial Engineering
<b>Teaching load distribution between lectures and independent student work</b>	60 h of lectures (40%) 90 h of independent student work (60%)
<b>Modality</b>	Presencial
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.
<b>Language</b>	English
<b>Degree</b>	Degree in Technical Architecture
<b>Distribution of credits</b>	Lidia Rincón Villarreal 6 credits
<b>Office and hour of attention</b>	CREA building, 1.04. Appointment by e-mail.
<b>E-mail addresses</b>	lrincon@diei.udl.cat

Lidia Rincón Villarreal

## Subject's extra information

Best practice course (75%) containing 25% theory, in which the study is based on the realization of a practical work along the course evolution, with classroom presentations in class.

The theoretical examinations are of mandatory attendance. The practical work is significant for understanding the practical application, although the evaluation proportion is lower.

Therefore, the theory must be understood, known and applied to develop with guarantees the whole course and the practical results.

It is highly recommended to have approved and achieved favorable results in subjects Materials 1 and 2 and Systems and Types of Construction.

It is considered highly recommended to course the list of subjects of specialization, namely Rehabilitation 1, 2 and 3.

## Learning objectives

- To develop a renovation project of an existing building considering all the aspects that comprise refurbishment and precisely defined performed interventions.
- To know, know how to interpret, develop and apply the general rule that orders the field of refurbishment and restoration monumental in terms of local, national and international (sectorial regulations Heritage & Rehabilitation).
- To develop an implementation of proposals for energy refurbishment about the project specialization.
- To be able to discern about most suitable energy renovation measures in relation to the development of a constructive refurbishment process.
- To critically evaluate the thermal performance, acoustic and lighting in existing buildings, based on the recognition of materials, building systems and elements that comprise it.
- To develop a rehabilitation project of an existing building using the necessary tools, CAD drawing programs, budgets and measurements programs, data processing programs, writing papers and presentations.
- To develop presentations and subsequent evolutionary advancement of the practice of course, valued in the whole evolution.
- To learn to develop themselves in public presentation to the rest of the group and teachers in the development of the previous point.

## Competences

University of Lleida strategic competences

- UdL2 Command of a foreign language.

Degree-specific competences

- GEE12. Manufactured or traditional constructive systems and materials knowledge, its varieties and physics and mechanical characteristics that define them.
- GEE13. Capacity to adapt the materials of construction to the typology and use of buildings; manage the

reception and the quality control of the materials, its use in the building works, the execution control of the units of work and the performance of tests and final proofs.

- GEE15. Aptitude to identify the elements and constructive systems, define their function and compatibility, and his use in the building process. Pose and solve constructive details.
- GEE17. Capacity to give advice on the causes and evidences of the building injuries, to be able to offer solutions to avoid or amend their pathologies, and analyse the life cycle of the elements and constructive systems.
- GEE18. Aptitude to take part in the rehabilitation, restoration and conservation of the built heritage.
- GEE21. Capacity to apply technical rules to the building process, and produce documents of technical specification of the procedures and constructive methods of buildings.
- GEE23. Aptitude for the pre-dimensioning, design, calculation and test of structures and to manage its execution.
- GEE24. Capacity to constructively develop the facilities of the building, control and schedule its execution and verify the service reception test, as well as his maintenance.
- GEE25. Capacity to schedule and manage the building process, the work teams, and the technical and human means for maintenance and execution.
- GEE29. Aptitude to analyse, design and execute solutions that allow the universal access to buildings and surroundings.

#### Cross-disciplinary competences

- EPS3. Capacity to convey information, ideas, problems and solutions to both a specialized and no specialized public.
- EPS7. Capacity to work in situations with a lack of information and/or under pressure.
- EPS8. Capacity of planning and organizing the personal work.
- EPS9. Capacity for unidisciplinary and multidisciplinary teamwork.
- EPS13. Capacity to consider the socioeconomic context as well as the sustainability criteria in engineering solutions.

## Subject contents

### PART 1:

- Project theme "Interventions on Seu Vella bastions".
- Introduction to Seu Vella monument and its constructive genesis.
- Visit to Seu Vella: interventions and monument.
- Criteria and types of programs on the use of the building. Construction typologies of bastions. Interventions to existing bastions.
- Workshop: project references and proposed building program.

### PART 2:

- Bioclimatic architecture in building renovation: fundamental concepts, program distribution based on bioclimatic criteria.
- Workshop: site climate, solar radiation.
- Workshop: program distribution based on bioclimatic criteria.

### PART 3:

- Renovation criteria: Rehabimed city and Rehabimed building.
- Interventions on historical walls.
- Workshop: criteria for intervention.

## PART 4:

- Renovation measures to improve energy efficiency in buildings.
- Workshop: the building envelope, insulation, thermal mass.
- Energy certification for project decisions, theory and workshop.
- Social housing renovation against energy poverty, theory and workshop.

## Methodology

The course is divided into lectures and workshops. The lectures aim to introduce various concepts and scientific and technological knowledge that will enable the student to achieve the objectives and specific competencies to the subject. Independent work and teamwork will be essential for students to develop these skills and apply them to practical cases. During the course of the semester, students will carry out a renovation project where they apply the skills taught during the lectures. The project will be supervised by teachers throughout the semester.

Types of classes:

- Lectures: Presentation and discussion of case examples of reference.
- Workshop: Regular supervision sessions of the various phases of the work. Public meetings scheduled for exhibition and critical work.

## Development plan

Date	Class	Contents
Sep 16th	Lecture	Subject introduction and project theme presentation
Sep 17th	Lecture	Introduction to the hill monument and its constructive genesis. Interventions and monument.
Sep 23th	Visit	Visit to Seu Vella, Lleida
Sep 24th	Lecture	Criteria and types of programs on the use of the building. Construction typologies of bastions.
Sep 30th	Workshop	Project references
Oct 1st	Workshop	Building program proposal
Oct 7th	Lecture	Bioclimatic architecture 1
Oct 8th	Workshop	Site climate, solar radiation
Oct 14th	Lecture	Bioclimatic architecture 2
Oct 15th	Workshop	Distribution program based on bioclimatic criteria
Oct 21th -22th	EVALUATION	Project presentation 1
Oct 28th	Lecture	Rehabimed city
Oct 29th	Lecture	Rehabimed building
Nov 4th	Lecture	Historical wall interventions
Nov 5th	Workshop	Criteria for intervention
Nov 10th - 14th	EVALUATION	Written test 1
Nov 18th	Lecture	Renovation measures to improve energy efficiency in buildings
Nov 19th	Workshop	The building envelope, insulation, thermal mass
Nov 25th	Lecture	Energy Certification
Nov 26th	Workshop	Energy certification for project decisions
Dec 2nd -3rd	EVALUATION	Project presentation 2

Dec 9th	Lecture	Social housing renovation against energy poverty
Dec 10th	Workshop	Social housing renovation
Dec 16th - 17th	Workshop	Project workshop
Jan 7th	EVALUATION	Project final presentation
Jan 12th -16th	EVALUATION	Written test 2
Feb 2nd -6th	EVALUATION	Recovery activities

## Evaluation

Continuous evaluation of the project by means of public presentations and the theory concepts by means written test.

Project presentation 1:	5 %
Project presentation 2:	10 %
Final project presentation:	60 %
Theory written test 1:	12.5 %
Theory written test 2:	12.5 %

## Bibliography

### 1- Basic References-

- Paricio Ansuategui, Ignacio. Els elements.A: Paricio Ansuategui, Ignacio. 'La construcció de l'arquitectura'. 3ª ed. rev.Barcelona: Institut de Tecnologia de la Construcció de Catalunya, 1995-1996, vol. 2.
- Paricio Ansuategui, Ignacio. Les tècniques. A: Paricio Ansuategui, Ignacio.'La construcció de l'arquitectura'. 3ª ed. rev. Barcelona: Institut deTecnologia de la Construcció de Catalunya, 1995-1996, vol. 1.
- Schmitt, Heinrich; Heene, Andreas. 'Tratadode Construcción'. Gustavo Gili, 1998. ISBN 8425217296. manuals de diagnosi
- Col·legi d'aparelladors iarquitectes tècnics de barcelona manual 1-2-3-4-5-6-7-8
- Publicacions de l'itec (institutde tecnologia de l'edificació de catalunya), amb format pdf de descàrrega gratuïta a l'adreçawww.itec.cat
- Curso de patología,conservación y restauración de edificios" (coam) madrid toms 1-2-3 i 4
- Master de restauración yrehabilitación del patrimonio" universidad de alcalà toms 1-2-3-4-5.
- Arquitectura bioclimática en un entorno sostenible. F.Javier Neila González. Ed. Munilla-Iería.
- Un Vitruvio Ecológico. Principios y práctica del proyecoarquitectónico sostenible. Ed. Gustavo Gili, 2007.
- The solar house. Passive heating and cooling. Daniel D.Chiras. Ed. Chelsea Green Publlising Company, 2002.
- Rafael Serra Florensa. Les energies a l'arquitectura.Edicions UPC. ETSAB. 1991.
- [Granados Menéndez, Helena](#). Rehabilitación energética de edificios. Madrid :Tornapunta, 2010.
- [Coscollano Rodríguez, José](#). Ahorro energético en la construcción yrehabilitación de edificios. Madrid : International Thomson, cop. 2002.
- Economidou, Marina. Europe's buildings under themicroscope. A country-by-country review of the energy performance of buildings.October 2011 by Buildings Performance Institute Europe (BPIE). Buildings Performancelnstitute Europe (BPIE) <http://www.bpie.eu/>
- WWF España. Potencial de ahorro energético y de reducciónde emisiones de CO2 del parque residencial existente en España en 2020. INFORMEDiciembre 2010.

**2- Terminology & understanding-**

- -'Diccionari visual de la construcció'[Recurselectrònic ]. 3a ed. Barcelona: Generalitat de Catalunya. Departament de Política Territorial i Obres Públiques, 2001. ISBN 84-393-5046-5.

Available at: <http://www10.gencat.net/ptop/AppJava/cat/documentacio/llengua/terminologia/diccvisual.jsp>

- 'Diccionari visual de la construcció'. 6a ed. Barcelona:Generalitat de Catalunya, Departament de Política Territorial i ObresPúbliques, 2004. ISBN 8439365098.
- - Fullana Llompart, Miquel. 'Diccionari de l'art dels oficis i de laconstrucció'. 6a ed. augmentada. Palma de Mallorca: Moll, 1995. ISBN84-273-0743-8.
- Paniagua Soto, José Ramón. 'Vocabulario basico de arquitectura'.Madrid: Cátedra, 1978.
- Arte de proyectar en arquitectura / ErnstNeufert / Ed. GG.

**3- Website regulations and aplicable legislation-**

- CTE (Código Técnico de la Edificación).

Available at: <http://www.codigotecnico.org>

- CTE: Catàleg de solucions constructivesaplicables.

Available at: [http://www.codigotecnico.org/fileadmin/Ficheros\\_CTE/Documentos/CTEFeb08/CAT-EC-v05.0\\_MAYO08.pdf](http://www.codigotecnico.org/fileadmin/Ficheros_CTE/Documentos/CTEFeb08/CAT-EC-v05.0_MAYO08.pdf)

- Normas Tecnológicas de la Edificación NTE /Ed. Ministerio de Obras Públicas, Transportes y Medio Ambiente.

**4- Specialized publications-**

- Revista TECTÒNICA.  
Available at: <http://www.tectonica.es>
- Revista DETAIL.  
Available at: <http://www.detail.de>

**5- Related institutions -.**

- Institut de Tecnologia de la Construcció deCatalunya  
Available at: <http://www.itec.cat>
- Instituto de Ciencias de la Construcción Eduardo Torroja.  
Available at: <http://www.ietcc.csic.es>
- Arxiu Docent de la UPC (Universitat Politècnica de Catalunya).  
Available at: <http://www.upcommons.upc.edu/>
- Arxiu Digital de la UPM (Universitat Politècnica de Madrid).  
Available at:<http://oa.upm.es/pfc.html>