



Course guide

210310 - TFEUU - 1:1 Scale Wood Studio

Last modified: 26/05/2023

Unit in charge: Barcelona School of Architecture
Teaching unit: 735 - PA - Department of Architectural Design.
753 - TA - Department of Architectural Technology.
752 - RA - Departamento de Representación Arquitectónica.

Degree: DEGREE IN ARCHITECTURE STUDIES (Syllabus 2014). (Optional subject).

Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer: Queralt Garriga (PA)

Others: Judit Taberna (RA); Maria Pilar Giraldo (TA);

REQUIREMENTS

Have approved the design subjects of the previous courses

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

EAB1. Translation from Spanish slope
EAB7. Translation from Spanish slope
EAB8. Translation from Spanish slope
EP18. Translation from Spanish slope
EP19. Translation from Spanish slope
EP2. Translation from Spanish slope
EP4. Translation from Spanish slope
EP7. Translation from Spanish slope
EP9. Translation from Spanish slope
ET14. Translation from Spanish slope

Generical:

CG4. Translation from Spanish slope
CG7. Translation from Spanish slope
CG5. Translation from Spanish slope
CG6. Translation from Spanish slope

Transversal:

CT4. Translation from Spanish slope
CT5. Translation from Spanish slope

Basic:

CB2. Translation from Spanish slope
CB4. Translation from Spanish slope

TEACHING METHODOLOGY

The teaching methodology consists of a "learning by doing" approach. For this reason, 40% of the classes are held in situ in different parts of Catalonia, visiting architectural site works in wood in different phases of their construction process. In parallel, with a weekly frequency, in theoretical-practical telematic classes, the development of the students' designs is reviewed and guided. At the end of each month, students are asked to make a preliminary presentation of their work to an international jury of experts.

- **Practical dynamics:** the dynamics of the classes is eminently practical and disruptive, trying to experiment or try tasks and teaching processes permanently linked to the real practice of architecture. The methodology used is based on external visits to works in progress, visits to companies with on-site case presentation, the actual practice of building fragments of the projected building or complete scale models of wood on a real scale ... All this with the support for current communication tools that allow for versatile development.
- **Collaborative learning:** Students' work is in groups and shared. The course encourages collaborative learning in teams of students that, together with the multidisciplinary of teaching results in a greater awareness of students about the complexity of the issue and a deepening in conceptual, graphic and technical aspects that are difficult to achieve with individual work.
- **External consultancy:** The collaboration also extends to the presence of expert professional advisers and companies that specifically support the work of the students. This combined dynamic between academic tutors and the advice of professionals in the sector allows students to develop skills of real professional practice, constantly contrasting content and theoretical objectives and adapting them to the conditions and requirements of the project.

LEARNING OBJECTIVES OF THE SUBJECT

GENERAL OBJECTIVES:

1. Constructive sustainability. Wood construction as a central issue in the teaching of architectural projects
2. Interdisciplinarity between areas of knowledge as an academic goal
3. Experiential learning. Teaching based on real constructive practice and the experimentation of the profession
4. Connection with local industry and international experts for the promotion and exchange of the most innovative knowledge
5. Learning in a real situation. Posing real cases that need the design of technical solutions. In dialogue with the actual end user.

SPECIFIC OBJECTIVES:

CONSTRUCTIVE WOOD. The workshop is proposed as a permanent teaching unit at the ETSAB specializing in wood construction so that students learn the basics and understand the whole construction process of the material. Students are expected to become familiar with wood construction and industrialization techniques, as well as design and calculation tools. Visualize the competitive advantages of incorporating wood into the building and into our cities. Approach local businesses and industry that promote the use of lumber.

MINIMUM DWELLING. Students are asked to design, develop and build a minimal wooden housing unit that offers an efficient solution to respond quickly to current and future emergency housing challenges. This must be a modular, flexible, adaptable, efficient and spatial quality solution to address urgent endowment needs (rehousing, health emergencies, humanitarian causes, environmental disasters, etc.), or structural (decent housing deficit, support to existing infrastructure, etc.). That they advance in the sustainable conception of the construction (passive houses, energetic saving of the construction and wood km 0). That they learn the good management in all the phases of the process of transformation of the wood until his constructive application.

1_ INVOLVED WITH THE PRESENT

_From reflection on the present to technical action. Foster students 'awareness of the global challenges of the present and enable them to be part of the design of sustainable and ecological solutions.

2_ FOCUSED ON PEOPLE

_From research to form. Reflection and analysis on the programmatic object related to the minimum emergency housing, through research, as the foundation of the project.

_From form to experience. The concept of living is understood from the most humanistic and experiential point of view, while designing it with the minimum possible spatial and material resources.

3_ FOCUSED ON REAL PRACTICE

_From the classroom to the site work. 40% of the classes are outside the classroom: on visits of work in buildings under construction made entirely of wood and with the guidance of the architect-author of the work; on visits to local companies in the wood sector.

_From the project to reality. Direct knowledge of the material, characteristics, and manufacturing processes. Real-scale construction of prototypes or fragments of the project (voluntary intensive seminar). During the summer of 2022, it is planned to build some of the final prototypes by specialized companies, through specific parallel workshops.

_From project to construction. Development of the architectural project at the level of an executive project, with a professional level and requirement. The small scale of the project allows the concentration in the constructive details and all the technical aspects of the proposal. The course aims for students to know the development of the architectural executive project with wood, as well as all its implications (sustainability, processes, industrialization ..).

_From the academic year to the actual commission. Presentation of works, dialogue and periodic debate with the end-user (Barcelona City Council; individuals).

4_ LINKED WITH THE INDUSTRY

_From the university to the local industry. Knowledge, visit and learning of the leading and innovative local companies. Work with the technological challenges posed by companies in agreement with teachers.

STUDY LOAD

Type	Hours	Percentage
Self study	70,0	56.00
Hours large group	55,0	44.00

Total learning time: 125 h

CONTENTS

MINIMUM DWELLING IN WOOD_DESIGN

Description:

In teams, the spatial, comfort and construction requirements of a minimum room module for specific users are reflected on, debated and raised. The results are proposals at the basic project level, autonomous, combinable and adaptable to different locations.

The project of the workshop is the design of a minimum wooden house to be produced industrially and for temporary and urgent situations (emergency housing; homeless; vulnerable people; refugees; etc.). The unit must be able to be manufactured entirely in the factory (with the exception of the basics, on-site construction and technical connections).

The basic approach of the system (space units, panel system, structural system, etc.) as well as the manufacturing process (CLT, solid wood, framework, etc.) is the student's decision.

The housing program must respond to:

- A minimum room unit for 1 or 2 people
- Different social models
- Different temporary employment needs of users
- densification and over-construction
- Possible change of location over time
- Possible aggregation for the formation of larger units

Full-or-part-time: 15h

Guided activities: 15h

MINIMUM WOOD DWELLING_EXECUTIVE

Description:

The executive projects of the proposals are developed at technical and normative level.

The development of the project is worked on as the drafting of a real executive project. Detailed planimetry, minimum structural calculations, construction details, facility plans and calculations, adjustments to regulations and standards, as well as cost estimates are developed. Among others, topics such as:

- Structure, light foundation, structural systems, pre-dimensioning criteria, joints, transport, manufacturing ...
- Envelope, thermal and acoustic insulation, tightness, durability, sustainability (passive methods, energy saving).
- Installations, construction details
- Measurements and costs, work planning
- Representation and communication of the project (graphic and video)

Full-or-part-time: 30h

Guided activities: 30h

1: 1 PROTOTYPE CONSTRUCTION

Description:

The prototypes of those parts or parts of the module necessary for the experimentation and verification of the measures adopted are built, with the collaboration of wood industrialists and expert teachers.

This phase takes the form of a two-day full-scale semi-intensive self-construction workshop during the month of June 2022.

Full-or-part-time: 10h

Theory classes: 10h

GRADING SYSTEM

Continuous evaluation by phases, following the development of a complete executive architectural project in wood

BIBLIOGRAPHY

Basic:

- Bunyesc, Josep. Arquitectura Positiva. Primera edició. AxA Edicions, 2020. ISBN 9788409219599.
- Natterer, Julius. Construction en bois : matériau, technologie et dimensionnement. Lausanne: Presses Polytechniques et Universitaires Romandes, cop. 2004. ISBN 2880746094.
- Herzog, Thomas. Construire en bois. 3e éd. rev. Lausanne: Presses polytechniques et universitaires romandes, cop. 2005. ISBN 9782880766025.
- Construir la arquitectura: del material en bruto al edificio: un manual. Barcelona: Gustavo Gili, cop. 2010. ISBN 9788425223518.
- Pallasmaa, Juhani. Tocando el mundo [on line]. Barcelona, Madrid: Iniciativa Digital Politècnica, Asimétricas, 2019 [Consultation: 19/07/2021]. Available on: <http://hdl.handle.net/2117/328843>.
- Gabriel, Ingo. Bardages en bois : guide pratique : matériau, étude, réalisation. Lausanne: Presses polytechniques et universitaires romandes, 2012. ISBN 9782880749774.
- Kolb, Josef. Bois : systèmes constructifs en bois. Le Mont-sur-Lausanne, París: Lignum, Economie suisse du bois, CNDB, 2010. ISBN 9782880747954.

Complementary:

- Waugh Thistleton Architects. 100 Projects UK [on line]. Waugh Thistleton Architects, 2018 [Consultation: 19/07/2021]. Available on: https://www.thinkwood.com/wp-content/uploads/2018/10/CLT-100-UK-Projects_Think-Wood-Web.pdf.
- Think Wood. CLT Handbook. Mass Timber Design Manual [on line]. online, [Consultation: 22/07/2021]. Available on: <https://www.thinkwood.com/blog/new-2021-mass-timber-design-manual>.
- Estructuras de madera. Madrid: AITIM, 2013-2015. ISBN 9788487381447.
- VVAA. En madera, otra forma de construir. El material constructivo sostenible del S XXI. Madrid: Ministerio de Agricultura, Pesca y Alimentación, 2018.
- VVAA. UNE-EN 1995-1-1:2016. Eurocódigo 5. Proyecto de estructuras de madera. Madrid: Aenor, cop. 2010.
- VVAA. Documento básico SE: seguridad estructural [on line]. Madrid: Ministerio de Fomento. Dirección General de la Vivienda, la Arquitectura y el Urbanismo, 2009 [Consultation: 19/07/2021]. Available on: https://www.codigotecnico.org/images/stories/pdf/seguridadEstructural/DBSE_200904.pdf.

RESOURCES

Other resources:

The materials and documents of the subject may be written indistinctly in any languages of instruction.