

Course guide 290118 - ESTFUS - Wooden Structures

Unit in charge:
Vallès School of Architecture

Teaching unit:
753 - TA - Department of Architectural Technology.

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

Academic year:
2024

ECTS Credits:
3.0

LECTURER

Coordinating lecture:
Gimferrer Vilaplana, Xavier

Others:
Gimferrer Vilaplana, Xavier

PRIOR SKILLS

Understand the structural behavior of Hyperstatic Structures. Use some structural calculation software like WinEva or Robot.

TEACHING METHODOLOGY

The course progresses following a guiding thread, the development of a wooden structure project that the student carries out from the initial sketch to the main calculations and constructive details.

It is structured in weekly sessions where theory is interspersed with practical application on the structure in question.

Both manual calculations and computer tools are used for the development of the practices.

LEARNING OBJECTIVES OF THE SUBJECT

Wood, despite being an excellent structural material, has a particular behavior and is different from other structural materials. In order to be able to carry out a correct analysis and development of a wooden structure, a deep knowledge of the specificities of wood as a structural material is required, as well as of the design of joints, locking systems, structural design laws, fire behavior, etc ...

A key aspect in the stability and general behavior of wooden structures is the behavior of the joining mechanisms in such a way that this behavior is one of the most influential in its design, as it depends directly on the mechanical and deformation behavior, and therefore must be controlled in order to be able to properly design a wooden structure.

At present, wood is a very good material for making new construction structures, but it is also a material widely used in previous years, so when intervening in existing buildings there are often wooden structures present, and in order to be able to intervene, apart from knowing their structural behavior, it is also necessary to know their main injuries, the level of risk they involve, as well as being able to repair them.

In the course, we will learn the specific behavior of wood as a structural material paying attention to all those specific aspects of the material in order to successfully deal with the design and calculation of a wooden structure by performing all the necessary checks.



CONTENTS

Wooden Structures

Description:

- 1 Material Anatomy. Physical characteristics.
- 2 Mechanical characteristics of the material.
- 3 Pre-Sizing, ELS Checks, Kdef Factors.
- 4 Introduction to software of a wooden structure.
- 5 Calculation Method: E.L.U.
- 6 Practical structural verification of a wooden structure.
- 7 Introduction Links. Case Studies pegs.
- 8 Structural Types. General stability. Work systems.
- 9 Case study.
- 10 Structural behavior under fire situation.
- 11 Injuries and consolidation of wooden structures.
- 12 Presentation of work.

Specific objectives:

Understand the structural behavior of the wood material. Identify the appropriate structural typologies to carry out with a wooden structure. Design and size a wooden structure, based on its efforts and structural behavior. Design the joints of a wooden structure according to the expected structural behavior. Recognize the lesions and corrective measures of wooden structures.

Full-or-part-time: 33h Theory classes: 24h 45m Practical classes: 8h 15m

GRADING SYSTEM

The final grade will be the sum of the different evaluation tests:

- Weekly practices done in class time (30%)
- First part of the course work "pre-sizing and software entry" (30%)
- Second part of the course work, "sizing and constructive details" (40%).

It is mandatory, to be evaluated, to have a minimum of 60% of the weekly practices delivered and submit both parts of the work. Otherwise, it will be considered as not presented.

BIBLIOGRAPHY

Basic:

Jiménez Peris, Francisco Javier. La Madera : propiedades básicas. Madrid: Grupo Estudios Técnicos, DL 1999. ISBN 9788492228393.
 Rodríguez Nevado, Miguel Ánge. Diseño estructural en madera : una aproximación en imágenes al estado del arte a finales del siglo

XX. Madrid: AITIM, cop. 1999. ISBN 9788487381164.

- Gotz, Karl-Heinz. Construire en bois : choisir, concevoir, réaliserr. 2ème éd. Lausanne: Presses polytechniques et universitaires romandes, cop. 1987. ISBN 9782880742584.

- Argüelles Álvarez, Ramón.. Estructuras de madera. Madrid: AITIM, 2013-2015. ISBN 9788487381447.