4-DAY COURSE

Digital Timber Construction

New ways of designing and building with wood

TARGET AUDIENCE

Construction professionals – such as architects, engineers, contractors, project managers, timber manufacturers, and carpenters – wanting to learn innovative computational workflows for designing and building timber structures.

The course will be given in English.

REQUIREMENTS

A basic knowledge of Computer-Aided Design (CAD), ideally on Rhinoceros 6 or 7, is required.

For those not having this skill, it is possible to train themselves in the Rhino/Grasshopper environment through online resources, made available two weeks before the start of the course.

ORGANIZATION

Laboratory for Timber Constructions (IBOIS), Swiss Federal Institute of Technology Lausanne (EPFL)

OVERVIEW

The construction industry must make a drastic change in its model to meet current environmental requirements and the challenge of climate change. Bio-based materials, mainly via wood construction, are part of the answer. Applications are broad : new buildings to meet new needs, densification of city centers via elevations to avoid urban sprawl, and renovation to maintain and upgrade the existing built environment.

Design and construction methods with wood have considerably evolved in the recent years. What are the new norms and standards ? What are the advantages to build with timber engineered products ? How to leverage technology and digital tools to create innovative and sustainable timber projects ?

OBJECTIVES

- Understand the current trends and challenges for the timber construction industry
- Learn advanced CAD methods for the design of standard and bespoke timber structures
- Experiment with laser scanning and point clouds to create structures out of round wood
- Be able to use innovative computational tools to boost your efficiency and creativity from design to construction
- Learn how to integrate fabrication, assembly, and structural engineering constraints in mass timber construction projects

Friday June 23, Saturday June 24, Friday June 30, Saturday July 1, 2023

From 8.30 am to 5.30 pm

EPFL, Lausanne, Switzerland

Certificate of achievement with 1 ECTS credit

CHF 1'900.-
10% special discount :
- for contributing members of EPFL Alumni
- if more than one participant from the same company

On-line registration
Registration deadline : May 8, 2023
Number of participants is limited

LEARN MORE

PROGRAM

PRIOR TO THE COURSE : 3D MODELING AND VISUAL SCRIPTING

- Access to a pedagogical web platform to get familiar with the Rhino/Grasshopper environment. This online upgrade (a few hours of training to be done individually) is mandatory for participants who don't have basic knowledge of Rhinoceros 6 or 7. It is optional for others.

DAY 1 : DESIGNING AND BUILDING WITH WOOD IN THE DIGITAL ERA

- State of the art of timber construction : historical review and new perspectives
- Introduction to IBOIS research : digital tools for new design and construction methods
- Technical tour: Commented visit of the Saint-Loup chapel and the Vidy theater

DAY 2 : RECIPROCAL GRIDSHELLS WITH ROUNDWOOD – FROM COMPUTATIONAL DESIGN TO DIGITAL FABRICATION

- Designing structures from non-standard timber elements using point clouds and meshes
- 3D modeling complex timber joints and simulating fabrication toolpath
- Applied case-study : Designing a timber structure from a library of scanned tree trunks

DAY 3 : PANELIZED TIMBER STRUCTURES – A COLLABORATIVE WORKFLOW FOR ARCHITECTS AND ENGINEERS

- Integrating fabrication and assembly considerations into the design of timber plate structures
- Integrating structural engineering considerations into the design of timber plate structures
- Applied exercise : Designing a timber plate structures while integrating construction constraints

DAY 4 : COURSE CONCLUSION – DEMONSTRATIONS AND PRESENTATIONS

- Workflow demonstration from parametric design to digital fabrication with a 5-axis CNC
- Workflow demonstration from parametric design to automated assembly with an industrial robotic arm
- Presentation of the outcomes of the workshop by the participants, discussion with the speakers

PROGRAM DIRECTOR

- **Prof. Dr. Yves Weinand**, *Director of the laboratory for timber constructions, IBOIS, EPFL ; Principal Investigator at the NCCR Digital Fabrication*

PROGRAM COORDINATOR

- **Dr. Nicolas Rogeau**, *Postdoctoral researcher and lecturer, IBOIS, EPFL ; Expert in computational design and robotic assembly*

INSTRUCTORS

- **Prof. Dr. Yves Weinand**, *Director of IBOIS, EPFL ; Principal Investigator at the NCCR Digital Fabrication*
- **Prof. Dr. Aryan Rezaei Rad**, *Assistant Professor of Structural Engineering in the Department of Civil & Mineral Engineering at the University of Toronto ; Expert in timber engineering and computational simulations*
- **Dr. Petras Vestartas**, *Postdoctoral researcher and lecturer, IBOIS, EPFL ; Expert in computational design and digital fabrication*
- **Dr. Nicolas Rogeau**, *Postdoctoral researcher and lecturer, IBOIS, EPFL ; Expert in computational design and robotic assembly*

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