

ITEC: Intensive Timber Engineering Course



The course of **60 hours in total** will take place at the Rothoblaas headquarters in English and consists of **2 parts: Summer Session and Winter Session (two intensive sessions of 5 days each)**.

The programme offers the possibility to gain in-depth knowledge on the design of timber structures in only **2 intensive weeks**.

This is a unique opportunity to gain knowledge allowing you to increase your job opportunities in a rapidly expanding field in such a short time.

During the course, the theoretical part will always be complemented by a practical part, including design exercises and laboratory tests, with the assistance of experts who will guide each participant through the learning process.



2 WEEKS



**BOOST YOUR
KNOWLEDGE**



**EXPAND YOUR JOB
OPPORTUNITIES**

VIEW THE PROGRAMME



SUMMER EDITION

18th - 22nd July 2022

DAY 1

08:30 - 08:45 **Registration of the participants**
08:45 - 09:30

Welcome and explanation of the course

Eng. Matteo Andreottola, Rothoblaas

09:30 - 10:00

General Introduction

Sustainability, role of forests, forest-based circular bio-economy, potential for timber constructions

Prof. eng. Ghasan Doudak, University of Ottawa

10:00 - 10:15 ☕ **Coffee break**

10:15 - 11:15

Wood Material

Characteristics, anatomy, physical and mechanical properties of the wooden material

Prof. eng. Ghasan Doudak, University of Ottawa

11:15 - 12:15

Wood products

Description, types and grading of wood structural materials

Prof. eng. Ghasan Doudak, University of Ottawa

12:15 - 13:15 🍴 **Lunch**

13:15 - 14:15

Structural forms, limits and challenges

Different timber structural types: balloon vs platform framing, heavy vs light-frames, domes, trusses, curved beams, and portal frames

Prof. eng. Ghasan Doudak, University of Ottawa

14:15 - 15:15

Building codes & Design Standards

Description of the main national codes for timber structures: Eurocode, Canadian and American design standards

Prof. Eng. Ghasan Doudak, University of Ottawa

15:15 - 15:30 ☕ **Coffee break**

15:30 - 17:30

Design principles for timber structures

Safety concepts, load cases and resistance, structural conception and bracing systems

Dr. Eng. Daniele Casagrande, CNR IBE

19:00 - 22:30 🍴 **Network dinner in Amalia Pernter**

DAY 2

08:30 - 10:30

Design of simple structural members

Design of beams and columns for basic loading (compression, tension, shear, bending)

Dr. Eng. Daniele Casagrande, CNR IBE

10:30 - 10:45 ☕ **Coffee break**

10:45 - 11:15

Serviceability limit states and vibrations

Description, types and grading of wood structural materials

Dr. Eng. Daniele Casagrande, CNR IBE

11:15 - 12:15

Exercise: Design of beams and columns

Eng. Alessio Maffeo, Rothoblaas

12:15 - 13:15 🍴 **Lunch**

13:15 - 14:45

Design of timber connections (MODULE 1)

Design of connections with dowel type fasteners, design principles, minimum distances, issues to avoid in the design methods

Prof. Eng. Ghasan Doudak, University of Ottawa

14:45 - 15:15 ☕ **Coffee break**

15:15 - 17:30

Design of timber connections (MODULE 2)

Design of connections with dowel type fasteners, design principles, minimum distances, issues to avoid in the design methods

Dr. Eng. Daniele Casagrande, CNR IBE

Free evening

DAY 3

08:30 - 09:30

Design of timber connections (MODULE 3)

Design of connections with dowel type fasteners, design principles, minimum distances, issues to avoid in the design methods

Prof. Eng. Ghasan Doudak, University of Ottawa

09:30 - 10:30

Design of timber connections (MODULE 4)

Design of connections with dowel type fasteners, design principles, minimum distances, issues to avoid in the design methods

Eng. Matteo Andreottola, Rothoblaas

10:30 - 10:45 ☕ **Coffee break**

10:45 - 12:45

Stability of members and structures

Beam and column buckling, verification and design solutions

Prof. Eng. Ghasan Doudak, University of Ottawa

12:45 - 13:45 🍴 **Lunch**

13:45 - 15:15

Tapered beams, trusses, frames and bracings

Calculation methods, design issues and solutions, structural concepts, and deflection

Dr. Eng. Daniele Casagrande

15:15 - 16:30

Visit and engineering explanation of the Rothoblaas new automatic warehouse with the timber structure

The Rothoblaas new automatic warehouse is one of the only in the world with a timber structure. Discover this amazing structure with the people who designed it

Eng. Matteo Andreottola, Rothoblaas

🍴 **Walk and dinner on the mountain in ISI HÜTTE**

DAY 4

08:30 - 10:30

Exercise: Connection, stability, and bracings

Eng. Matteo Andreottola, Rothoblaas

10:30 - 10:45 ☕ **Coffee break**

10:45 - 12:15

Composite floors

Types of composite floors, stiffness, connections, different uses and solutions, calculation methods and construction details

Prof. Eng. Ghasan Doudak, University of Ottawa

12:15 - 13:15 🍴 **Lunch**

13:15 - 14:15

Structural reinforcements of timber elements

Reinforcements for compression and tension perpendicular to the grain, rolling shear, curved beams, tapered beams and penetrations

Dr. Eng. Daniele Casagrande

14:15 - 15:15

Durability of timber structures (PART 1)

Design of adequate connection to the ground. Details to guarantee durability of timber structures. Corrosion resistance, waterproofing and airtightness

Dr. Eng. Paolo Grossi, Rothoblaas

15:15 - 17:00

Study time and Q&A session

Study time with the chance to ask questions and ask support to the engineers following the exercises

Eng. Matteo Andreottola, Rothoblaas;

Eng Alessio Maffeo, Rothoblaas

19:00 - 23:00 🍷 **Gala dinner in local winery**

DAY 5

09:00 - 10:30

Case study of mass timber structures

Study of a mass timber structure, design challenges, installation methods, innovative solutions

10:30 - 10:45 ☕ **Coffee break**

10:45 - 12:15

Fire design of timber structures (PART 1)

Final design exercise where the attendees carry out design of a timber structure and discuss the design choices with the rest of the group and instructors

Eng. Roberto Modena, Rubner Holzbau

12:15 - 13:15 🍴 **Lunch**

13:15 - 15:00

Final workshop

Design of a timber structure with large spans with different possible structures and the support of the engineers following the exercises

Eng. Matteo Andreottola, Rothoblaas;

Eng Alessio Maffeo, Rothoblaas

15:00 - 15:15 ☕ **Coffee break**

15:15 - 17:15

Discussion and presentations by attendees

Final design exercise where the attendees carry out design of a timber structure and discuss the design choices with the rest of the group and instructors

Dr. Eng. Daniele Casagrande, CNR IBE +

Prof. Eng. Ghasan Doudak, University of Ottawa

🍷 **Italian aperitivo in Rothoblaas**

WINTER EDITION

12th - 16th December 2022

DAY 1

08:30 - 08:45

Registration of the participants

08:45 - 09:00

Welcome and explanation of the course

Eng. Matteo Andreottola, Rothoblaas

09:00 - 10:00

General Introduction

General description, design for gravity and lateral load, stiffness, and design of connection systems.

Dr. Eng. Daniele Casagrande

10:00 - 10:15  **Coffee break**

10:15 - 11:15

Design of light timber frame structures (MODULE 2)

General description, design for gravity and lateral load, stiffness, and design of connection systems

Dr. Eng. Daniele Casagrande

11:15 - 12:45

Design of light timber frame structures (MODULE 3)

General description, design for gravity and lateral load, stiffness, and design of connection systems

Prof. Eng. Ghasan Doudak, University of Ottawa

12:45 - 13:45  **Lunch**

13:45 - 15:15

Design of light timber frame structures (MODULE 4)

General description, design for gravity and lateral load, stiffness, and design of connection systems

Prof. Eng. Ghasan Doudak, University of Ottawa

15:15 - 15:30  **Coffee break**

15:30 - 16:30

Design of CLT structures (MODULE 1)

General description, production and installation, CLT as a structural material, design for gravity and lateral loads, stiffness, and design for connection systems

Dr. Eng. Daniele Casagrande

19:00 - 23:00  **Network dinner**

DAY 2

08:30 - 10:30

Design of CLT structures (MODULE 2)

General description, production and installation, CLT as a structural material, design for gravity and lateral loads, stiffness, and design for connection systems

Dr. Eng. Daniele Casagrande

10:30 - 10:45  **Coffee break**

10:45 - 11:45

Design of CLT structures (MODULE 3)

General description, production and installation, CLT as a structural material, design for gravity and lateral loads, stiffness, and design for connection systems

Prof. Eng. Ghasan Doudak, University of Ottawa

11:45 - 12:45

Exercise: structural design of a timber building (PART 1)

The participants are divided in groups and design together a complex timber structure of a building

Eng. Matteo Andreottola, Rothoblaas

12:45 - 13:45  **Lunch**

13:45 - 14:45

Exercise: structural design of a timber building (PART 2)

The participants are divided in groups and design together a complex timber structure of a building

Eng. Matteo Andreottola, Rothoblaas

14:45 - 15:00  **Coffee break**

15:00 - 16:25

Visit and engineering explanation of the Rothoblaas new automatic warehouse with the timber structure

The Rothoblaas new automatic warehouse is one of the only in the world with a timber structure. Discover this amazing structure with the people who designed it

Free evening

DAY 3

08:30 - 10:30

Durability of timber structures (PART 2)

Details to ensure durability of timber structures. Corrosion resistance in aggressive environment, design of flat roofs, and avoiding condensation risk

Dr. Eng. Paolo Grossi, Rothoblaas

10:30 - 10:45  **Coffee break**

10:45 - 12:45

Case study of timber bridges and large-span structures (PART 2)

Design challenges, installation methods, and innovative solutions

Dr. Eng. Paolo Grossi, Rothoblaas

12:45 - 13:45  **Lunch**

13:45 - 14:45

Introduction to extreme loading

Calculation methods of a structure subjected to seismic loads, connection types, ductility and energy dissipation of energy, and design of shear walls and diaphragms.

Dr. Eng. Daniele Casagrande

14:45 - 16:45

Seismic design (MODULE 1)

Calculation methods of a structure subjected to seismic loads, connection types, ductility and energy dissipation of energy, and design of shear walls and diaphragms

Dr. Eng. Daniele Casagrande

 **Italian aperitivo and free evening**

DAY 4

08:30 - 10:30

Seismic design (MODULE 2)

Calculation methods of a structure subjected to seismic loads, connection types, ductility and energy dissipation of energy, and design of shear walls and diaphragms

Prof. Eng. Ghasan Doudak, University of Ottawa

10:30 - 10:45  **Coffee break**

10:45 - 11:45

Modelling (MODULE 1)

Modelling of structures using finite elements, calculation of horizontal forces on the different shear walls and on connections

Dr. Eng. Daniele Casagrande

11:45 - 12:45

Modelling (MODULE 2)

Modelling of structures using finite elements, calculation of horizontal forces on the different shear walls and on connections

Dr. Eng. Daniele Casagrande

12:45 - 13:45  **Lunch**

13:45 - 16:45

Fire design (LEVEL 2)

Calculation methods for structural elements and connections protected and not protected, fire design of CLT

Prof. Dr. Andrea Frangi, ETH Zurich

 **Gala dinner**

DAY 5

09:00 - 11:00

Exercise: seismic, modelling and fire

Eng. Matteo Andreottola, Rothoblaas

11:00 - 11:15  **Coffee break**

11:15 - 12:15

Structural design for Blast and Tornados

Prof. Eng. Ghasan Doudak, University of Ottawa

12:15 - 13:15  **Lunch**

13:15 - 15:15

Final workshop

Final design exercise where attendees carry out design of a mass timber structure for fire, seismic actions and extreme loadings and discuss the design choices with the rest of the group and instructors

Eng. Matteo Andreottola, Rothoblaas

15:15 - 15:30  **Coffee break**

15:30 - 17:30

Discussion and presentations by attendees

Final design exercise where attendees carry out design of a mass timber structure for fire, seismic actions and extreme loadings and discuss the design choices with the rest of the group and instructors

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Rothoschool is the educational branch of Rothoblaas organizing courses on the most current topics of **timber structural design, waterproofing and airtightness and fall protection**. The enduring expertise and experience of the selected speakers guarantees to acquire professional knowledge.

Rothoschool is also **professional network and know-how exchange at national and international level**. From coffee breaks to collateral activities set up for our guests, Rothoblaas makes sure that the time spent is of best quality and will be remembered with a smile.



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