To learn about energy standards and how to design advanced energy efficient building envelopes. Passive house principles and fundamentals on thermal, moisture issues, and air tightness will be covered.

**Activities as a craftsman**
- apprenticeship as a joiner
- lumberjack
- journeyman joiner
- master carpenter

**Academic education**
- technical school for furniture design
- study of architecture
- doctor of technical sciences

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**Program – Workshop 1**

1. **Introduction** 1:00 – 1:05 Anton Kraler
2. **Sustainable Wood Construction Practices in Austria** 1:05 – 1:30 Anton Kraler
4. **Passive House Principles** 2:00 – 3:00 Anton Kraler
   - Break 3:00 – 3:30
5. **Detailing for Durability** 3:30 – 4:30 Paul Fisette
6. **Discussion Forum** 4:30 – 5:00 Moderator Alexander C. Schreyer

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**Sustainable Wood Construction Practices in Austria**

Asst.-Prof. DI Dr. techn. Anton Kraler

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**Europe - Austria**

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**Innsbruck - View from north**

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Traditional log buildings

Examples of modern wood architecture

Timber construction systems
Detail: wall in timber frame construction

Timber construction systems
Timber frame construction

Timber frame construction

Timber frame construction
Timber construction systems

Timber frame construction

Single-family house

Detail: wall with solid wood or cross-laminated timber (CLT)

Timber construction systems

Timber construction systems

Detail: ceiling board with solid wood or cross-laminated timber

Solid wood construction

Timber construction systems

Timber construction systems
Requirements for timber construction systems

Hybrid: solid wood and timber frame construction
Detail – Party Wall, Ceiling and Exterior Wall

Comparison of low energy house – passive house
Typical U-Values in W/(m²K) in Austria

Typical thermal insulation for timber construction
Wooden softboard

Typical thermal insulation for timber construction
Cellulose

Typical thermal insulation for timber construction
Mineral wool
**Typical thermal insulation for timber construction**

Sheep's wool

10 in - 14 in for U - Value 15kW/m²K

**Special thermal insulation for timber construction**

Vacuum-insulation panel (VIP)

2 in for U - Value 15kW/m²K

**Important factors for timber construction systems**

- Sound insulation
- Air tightness
- Quality assurance

**Quality assurance**

- Blower Door and Thermography measurements

**Quality assurance**

- Ultrasound testing equipment
- Drill resistance measuring device
- Hardwood core drill

**University of Innsbruck / Timber Engineering Unit**

Thank you for your attention