



Universität Stuttgart

Institute of Construction Materials (IWB)

Materials Testing Institute (MPA)

Contact person:

Jun.-Prof. Dr. Philippe Grönquist
Pfaffenwaldring 4b, 70569 Stuttgart
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ECTS points: 6

Lecture language: English

Target study programmes:

- M.Sc. Civil Engineering
- M.Sc. Real Estate Engineering and Management
- M.Sc. Computational Mechanics of Materials and Structures
- M.Sc. Integrative Technologies & Architectural Design Research

Wood represents one of mankind's most important materials. Currently, it's significance is increasing thanks benefits such as its inherent sustainable nature as a construction material. This module aims at providing basic knowledge on the physical properties of wood. A focus is laid on the relationships between wood structure and resulting mechanical and physical properties across hierarchical levels. A further focus is laid on the modelling of physical, and especially mechanical properties of wood. Knowledge will be gained about commonly used wood species used in timber construction in Europe. In addition, insight in current research in the field of wood science and technology will be provided. Participants will establish an awareness of a material-appropriate usage of wood in construction regarding its physical properties, and be able to critically reflect thereupon. This course represent a solid but facultative basis for the subsequent summer semester course "**Engineered Wood Products**".

Wood Physics

Description



(Image: P. Grönquist, IWB/MPA University of Stuttgart, 2022. Modified from M. Harrington and J.J. Harrington)



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Wood Physics

Lecture plan

Winter semester 2024/25

M.Sc. Civil Engineering

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Weekday: Thursday
Time: Lectures: 15:45–17:15 pm
Exercises: 17:15–19:00 pm
Location: PWR 05C – V 5.03
Period: 17.10.2024 – 06.02.2025
Material: Provided on ILIAS upon C@mpus registration

Date	Agenda	Lecturer
17.10.2024	Introduction & the resource wood	P. Grönquist
24.10.2024	Wood structure and anatomy I	P. Grönquist
31.10.2024	Wood structure and anatomy II	P. Grönquist
07.11.2024	Tree biomechanics	P. Grönquist
14.11.2024	No lecture (pause)	-
21.11.2024	Wood density	P. Grönquist
28.11.2024	No lecture (pause)	-
05.12.2024	Wood-water interaction I: Wood moisture	P. Grönquist
12.12.2024	Wood-water interaction II: Swelling and shrinkage	P. Grönquist
19.12.2024	Thermal and electrical properties	P. Grönquist
09.01.2025	Wood Mechanics I: Elasticity	P. Grönquist
16.01.2025	Wood Mechanics II: Strength	P. Grönquist
23.01.2025	Wood Mechanics III: Rheological behavior	P. Grönquist
30.01.2025	Wood Mechanics IV: Micromechanics	P. Grönquist
06.02.2025	Recap and exam preparation	P. Grönquist