



Course syllabus

Träbyggnadsteknik Design of Timber Structures

VBKN30, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED V

Date of Decision: 2023-03-21

General Information

Elective for: V5-hb, V5-ko

Language of instruction: The course will be given in English on demand

Aim

The course shall give understanding and knowledge about the behaviour of advanced timber structures, tools for modelling and design and the ability to weigh pros and cons for different structural systems.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- understand the behaviour of timber as a structural material as well as the behaviour of connections
- be able to select the most suitable timber-based material for different structures and explain the pros and cons
- be able to use relevant mechanical theories for practical applications for timber

Competences and skills

For a passing grade the student must

- be able to design timber structures and connections
- be able to find design solutions based on given conditions regarding end user demands
- be able to present the assumptions being used in the design as well as present the results in writing and construction drawings

- be able to use available design models in a constructive way and if necessary find and develop new models

Judgement and approach

For a passing grade the student must

- be able to assess different systems using a critical approach. Evaluate pros and cons for different design models and solutions regarding structural framework and the overall design of the structure
- be able to critically assess existing structures using gained knowledge and available information

Contents

The course includes the following parts:

- timber structures: multi-storey buildings and structures with long span
- instability of members (lateral torsional buckling of beams)
- straight and curved members
- holes and notches in beams
- cross laminated timber
- bracing of structures
- design of details
- connections for timber structures: dowel-type joints and glued joints
- learning from failures
- frames, arches and cable structures

The ability to independently approach, solve and present one's work is trained by project tasks (e.g. bridges, multistorey buildings, large span structures).

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Written exam and assignments.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0118. **Name:** Design of Timber Structures.

Credits: 6. **Grading scale:** TH. **Assessment:** Written examination **Contents:** all course content

Code: 0218. **Name:** Project Tasks.

Credits: 1,5. **Grading scale:** UG. **Assessment:** Assignments. For written assignments, not only the correctness of calculations and results is assessed, but also the quality of the presentation, i.e. structure and descriptive texts of the report.

Admission

Admission requirements:

- VBKF15 Structural Engineering

Assumed prior knowledge: VBKN25 Design of Steel Structures (Steel connections), VBKF01 Structural Engineering - Building Systems, VSMF05 Engineering Modelling: Analysis of Structures.

The number of participants is limited to: No

The course overlaps following course/s: VBKN01

Reading list

- Swedish Wood: Design of Timber Structures , volume 1, 2, 3. 2015. Those three books are provided free of charge when the course starts. The students do not have to buy them in advance.
- Eurocode 5 - timber structures and EC0, EC1. Can be accessed via www.sis.se.
- Isaksson, T, Mårtensson A: Byggkonstruktion. Regel- och formelsamling. Studentlitteratur, 2010, ISBN: 978-91-44-07032-2. English Translation of the most important parts is provided on the course homepage. Alternatively, other equation books for structural engineering/structural mechanics could be used.
- Additional literature in digital format (e.g. glulam handbook part 1-4) in Swedish/English will be provided through the course homepage.
- KLTrä-handboken. Svenskt Trä. CLT-handbook will be handed out free of charge at course start to all students, the students do not have to buy the book in advance. Also available in digital format.

Contact and other information

Course coordinator: Eva Frühwald Hansson, eva.fruhwald@kstr.lth.se

Course homepage: <http://www.kstr.lth.se>

Further information: Course homepage on Canvas. Registered students receive access to course homepage. Short information about the course can be found on www.kstr.lth.se/utbildning.