Linnæus University

Dnr: 2019/2021-3.1.2.2

Course syllabus

Faculty of Technology

Department of Building Technology

4BY375 Träkonstruktioner 2, 5 högskolepoäng
4BY375 Timber structures 2, 5 credits

Main field of study
Civil Engineering

Subject Group
Building Technology

Level of classification
Second Level

Progression
A1F

Date of Ratification
Approved by Faculty of Technology 2019-06-10
The course syllabus is valid from spring semester 2020

Prerequisites
Analysis of structures, 7.5 credits, The finite element method, 7.5 credits and Conceptual structural design, 10 credits, Energy efficient and sustainable construction, 7.5 credits, or the equivalent

Objectives

Knowledge and understanding
To pass, the student is expected to

- have a understanding for the basis of structural engineering and load combinations
- have a understanding of structural behavior of solid timber and engineered wood products
- have the ability to design advanced timber structures including, stabilization, complex glulam beams, connections and vibrations
- be able to analyze and design advanced timber structures by mean of FEM

Competence and skills
To pass, the student is expected to

- in project groups carry out a design task for timber structures using FE analysis,

- to present method and results in a technical report including theoretical framework, text and illustrative sketches and
- present conclusions and argue for procedures used to analyze.

Judgement and approach
To pass, the student is expected to

- critically review technical reports on design work and to argue for and against various assumptions,
- describe and explain different methods for analyzing timber structures and expressing limitations and
- describe ways for optimization of material use in timber structures.

Content
The course includes:

- the background for the SLS and ULS design and load combinations.
- basic understanding of wood as a structural material; grading, service class and load-duration class etc.
- design of timber structures subjected to tension, compression or bending
- design of curved beams and beams with varying depth using FEM
- buckling analysis of timber structures using FEM
- analysis and design of mechanical timber connections
- vibrations of timber structures

The course includes two assignments. These are relate to theoretical calculations, FEM analyzes and dimensioning of different design elements.

Type of Instruction
The teaching consists of lectures, exercises and project work. The lectures where the projects are introduced are compulsory elements in the course.

Examination
The course is assessed with the grades A, B, C, D, E, Fx or F.

The final grade consists 50% of submitted project reports and 50% of the written exam. The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student’s performance is assessed as fail (i.e. received the grade F).

The course is examined through individual written examination and assignments. The examination is divided into the following

- Written exam A-F 2,5
- Assignments A-F 2,5

The final grade consists 50% of submitted project reports and 50% of the written exam.

Repeat examination is offered in accordance with Local regulations for courses and examination at the first and second-cycle level at Linnaeus University.

If the university has decided that a student is entitled to special pedagogical support due to a disability, the examiner has the right to give a customised exam or to have the

student conduct the exam in an alternative way.

Course Evaluation

During the implementation of the course or in close conjunction with the course, a course evaluation is to be carried out. Results and analysis of the course evaluation are to be promptly presented as feedback to the students who have completed the course. Students who participate during the next course instance receive feedback at the start of the course. The course evaluation is to be carried out anonymously.

Other

The course material is presented on a web study site that the students reach via the Internet. Access to the Internet and computers is available in the university's computer rooms and at the university library.

Required Reading and Additional Study Material

Required reading

Bergkvist, Per (red.) (2011). Design of timber structures. Stockholm: Swedish Forest Industries Federation, Vol. 1 and 2, the literature consists of approximately 380 pages.