HS1021 Steel- and Timber Structures 7.5 credits

Stål- och träkonstruktion

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

The course syllabus is valid from autumn 2019.

Grading scale

A, B, C, D, E, FX, F

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

HS1008 Structural Design in Civil Engineering. The course is replaced with AF1746 and AF1747 in 2021.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The general the aim of the course is to provide detailed knowledge in analysis and design of structural members in steel and timber. After passing the course, the student should be able to:

- Determine the design resistance of steel beams with unsymmetrical cross-sections considering bending moment, axial force, shear force, and patch loading.
- Explain and analyse the influence of instability phenomena as lateral torsional buckling, flexural buckling and local buckling for steel beams with slender cross-sections.
- Determine the design resistance for bolted and welded connections in steel structures.
- Explain and analyse phenomena as vibration and lateral torsional buckling of timber beams.
- Determine the design resistance for straight and tapered glulam beams, also considering holes and notches.
- Determine the design resistance for nailed, bolted and screwed connections in timber structures.
- Using a commercial software for design of steel and timber structures.

By gathering knowledge corresponding to the listed outcomes, the student is expected to be able to conduct calculations for optimization of structures targeting reduced material consumption and thereby improved sustainability.

Course contents

The course content is divided between structures in steel and timber. In the steel part, design and assessment of the resistance of beams will be treated considering bending moment, axial force, shear force, and patch loading. Instability phenomena as local buckling, lateral buckling, and lateral torsional buckling will be treated for consideration in design. Additionally, the basics in design of welded and bolted connections will be given.

In the timber part, design of straight and tapered glulam beams will be treated. This includes vibration, lateral torsional buckling, and the effect of holes and notches on the design resistance. Design of nailed, bolted, and screwed connections will be treated.

Moreover, an introduction is given to conceptual design and creation of design drawings for steel and timber structures using a commercial BIM software.

Examination

- TENA - Examination, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- REDA - Account, 2.0 credits, grading scale: P, F
- LABA - Laboratory work, 0.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

The term TENA refers to a written examination, REDA to compulsory assignments and LABA to compulsory computer lab assignment.For final course grade, passed written examination is required (TENA: 5 credits; lowest grade E) as well as passed written assignments and computer lab assignement (RED A: 2.0 credits, LABA 0.5).

Final grade is put according to grading scale A-F.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.