



Course syllabus

Stålbyggnadsteknik Design of Steel Structures

VBKN25, 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: V4-hb, V4-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 steel 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 steel as a structural material as well as the behaviour of connections.
- be able to use relevant mechanical theories for practical applications for steel.

Competences and skills

For a passing grade the student must

- be able to design steel 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:

- steel structures, general
- composite structures (concrete, steel)
- instability phenomena: lateral buckling of beams, local buckling
- fatigue
- global plastic analysis
- bracing of structures
- design of details
- connections for steel structures (welded and bolted connections)
- learning from failures
- frames and arches

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

Examination details

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

Assessment: Oral 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: 0122. **Name:** Design of Steel Structures.

Credits: 5. **Grading scale:** TH. **Assessment:** Oral examination **Contents:** all course content **Further information:** Time slots for oral exam during exam week will be booked individually.

Code: 0222. **Name:** Project Tasks.

Credits: 2,5. **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:

- VBK013 Structural Engineering, Basic Course or VBKF15 Structural Engineering

Assumed prior knowledge: 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

- Eurocodes (mainly EC3, but also EC4, 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.
- Additional literature (e.g. about fatigue, composite structures etc.) is accessible in digital format via the course homepage.
- Al-Emrani M., Åkesson B.: Stålbyggnad. Chalmers. Available for download from course homepage (at course start).

Contact and other information

Course coordinator: Sebastian Thöns, sebastian.thons@kstr.lth.se

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

Further information: Course homepage on Canvas. Registered students receive access to course homepage.