Course syllabus

Konstruktion av broar och avancerade konstruktioner
Design of Bridges and Advanced Structures

VBKN15, 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-ko
Language of instruction: The course will be given in English on demand

Aim

The course gives applicable knowledge of the design of bridges and other advanced structures that are suitable for larger spans, for example, cable supported structures, stress ribbon structures and arches.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- be able to design bridges and other special types of structures that are suitable for larger spans
- have knowledge about the structural behaviour and the analysis methods and of bridges and other special structures treated in the course
- have knowledge of different bridge types and construction methods for these

Competences and skills
For a passing grade the student must

- have the ability to apply knowledge acquired in previous courses, for sizing and design of bridges and other advanced structures treated in the course

- be able to independently choose the type of construction, structural design, construction method during the phase of conceptual design
- be able to present the results of the design project in a written form and in the form of drawings/sketches
- be able to independently search for and critically evaluate information concerning technical solutions for bridges and advanced structures

Judgement and approach
For a passing grade the student must

- be able to critically evaluate different types of structures covered in the course
- be able to critically evaluate different kinds of constructive solutions reported in the literature and in the lectures
- independently be able to adapt and modify different solutions for a specific project

Contents

The course includes lectures, seminars, exercises, guest lectures by practitioning engineers and / or architects, and possible study visits. A great part of the course is devoted to two project tasks, the first consisting of the design of a road bridge. The first task is performed with planning and design calculations on a relatively detailed level. The second project involves the conceptual design of a long span structure. The second task is to be presented at end of the course.

Examination details

Grading scale: UG - (U,G) - (Fail, Pass)
Assessment: Design Projects (written report and presentation at a seminar) and individual exam. The date for the individual exam is decided during the course.

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: 0121. **Name:** Project Assignments.
Credits: 6. **Grading scale:** UG. **Assessment:** Written report and oral presentation at seminar **Contents:** All course content
Code: 0221. **Name:** Oral Exam.
Credits: 1,5. **Grading scale:** UG. **Assessment:** Oral exam **Contents:** All course content

Admission

Admission requirements:

- VBKN05 Concrete Structures
- VBKN01 Steel and Timber Structures or VBKN25 Design of Steel Structures

Assumed prior knowledge: VSMF15 Beam theory, VSMF05 Engineering Modelling: Analysis of Structures
The number of participants is limited to: No
The course overlaps following course/s: VBK041

Reading list

- Supplemental material on advanced structures is available on the course homepage.

- Hirt, M., Lebet, J.-P. : Steel Bridges: Conceptual and Structural Design of Steel and Steel-Concrete Composite Bridges. EPFL Press, 2013, ISBN: 978-1466572966. The book is available in the V-library and can be downloaded via the library's homepage.

Contact and other information

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Course homepage: https://canvas.education.lu.se