LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Vägbyggnadsteknik
Pavement Design and Construction

VVBN10, 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

Compulsory for: IBYV2
Elective for: V4-at, V4-bf, V4-tv
Language of instruction: The course will be given in Swedish

Aim

The aim of the course is to provide students with the knowledge and skills required for optimal analytical design and construction of a road.

The most important part of the course are four areas; analytical pavement design, properties of bound and unbound pavement materials, production process of pavements.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- Describe how to ensure the standard and bearing capacity of a road by using statistical acceptance inspection during its construction properties of pavement construction materials.
- Characterise the properties of asphalt and unbound road construction materials
- Understand the importance of water on material properties and service life of the pavements
- Area of application, possibilities and problems of using recycled material in road construction

Competences and skills

For a passing grade the student must

- Design a pavement with an incremental design model
- Analyse and understand the theories behind material models
- Implement material models in pavement design
- Choose suitable methods with which to derive input data for dimensioning on the basis of established dimensioning principles
- Draw up a simple production plan comprising calculations, tenders and material utilization based on construction specifications

Judgement and approach
For a passing grade the student must

Independently seek and evaluate information for an incremental design of pavements

Contents

- Methods for planning, design and implementation of a road facility, applicable to both Swedish and international conditions. Swedish and international pavement design principles.
- Analytical design of road constructions. Calculation of stresses and strains in road material. Design according to criteria for material fatigue of exposed surfaces.
- Material selection and properties. Material models for choice of bound and unbound material in road construction.
- Quality control. Statistical acceptance control. Measurement methods from terrace to surface, falling weight deflectometer - FWD. Plate bearing test. Compaction and its importance on bearing capacity and service life of the pavements.
- Water and pavements. Effects of water on pavement materials
- Cost analysis of different solutions. Calculated and actual costs. Lifecycle analysis.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: For a passing grade the participant must hand in three projects and report. Oral examination of parts of the assigenments. A written axam is included in 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.

Admission

Assumed prior knowledge: VVBF20 Road Construction OR VVBF25 Road Construction and Production Planning
The number of participants is limited to: No
The course overlaps following course/s: VTVF15

Reading list

- Sven Agardh & Ebrahim Parhamifar: Vägbyggnad. Liber, 2014.
- Huang, Yang H.: Pavement Analysis and design. Prentice Hall, 2003, ISBN: 0-13-142473-4.
- Lecture notes.

Contact and other information

Examinator: Sven Agardh, Sven.Agardh@tft.lth.se
Course coordinator: Sven Agardh, sven.agardh@tft.lth.se
Course homepage: http://www.tft.lth.se
Further information: The course is offered in Lund. As part of engineering skills a written and oral presentation of a report is included in the course.