AH2905 Advanced Pavement Engineering Analysis and Design 7.5 credits

Avancerad analys och design av vägbeläggningar

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

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

Establishment

Course syllabus for AH2905 valid from Autumn 2021

Grading scale

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

Education cycle

Second cycle

Main field of study

Built Environment,Technology

Specific prerequisites

Documented knowledge in Road Construction and Maintenance, Road- and Railway Track Engineering, equivalent to at least 15 ECTS corresponding to the content in courses AF2903 and AF2901.

Eng B/6 according to the Swedish upper secondary school system.

Language of instruction

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

Intended learning outcomes

This course deals with the design and analysis of asphalt and concrete pavements. Upon completion of this course the student should:

- Be able to perform mechanics based analyses of pavement structures.
- Have a basic knowledge of fracture mechanics and its applications to pavement engineering.
- Learn about the fracture mechanics testing for characterization of infrastructure materials.
- Be able to apply fundamental concepts of viscoelasticity and fracture mechanics to the optimization of flexible pavement cracking resistance.
- Understand the basics of plasticity and visco-plasticity and be able to use the FEM to evaluate the performance of the pavement structures at inelastic deformations.
- Have a basic understanding of the effect the internal structure of asphalt mixture has on the material performance.
- Be familiar with the modern methods for the characterization of the internal structure of asphalt.
- Understand the mechanisms of cohesive and adhesive interactions in asphaltic materials.

Course contents

- Mechanics of flexible pavements and infrastructure materials
- Fracture mechanics
- Theory of viscoelasticity
- Theory of plasticity and visco-plasticity
- FE modeling of the pavement structures
- X-Ray computed tomography & digital image analysis
- Micromechanics of infrastructure materials

Examination

- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Exercises, 3.0 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.

There will be 5 homeworks and 1 project assignment. In order to pass the course all exercises should be handed in and considered passed by the instructor.

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.