



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.

Establishment

Course syllabus for AH2905 valid from Autumn 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

The Built Environment, Technology

Specific prerequisites

At least 120 credits academic studies in Engineering, Science, Economics or Planning and documented proficiency in English B or equivalent (TOEFL, IELTS e.g).

AF2901 Road and Railway Track Engineering, or similar

AF2903 Road Construction and Maintenance, or similar

Language of instruction

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

Intended learning outcomes

Part of this course deals with the design and analysis of asphalt and concrete pavements. Part of the course also deals with design and analysis of railway track. Upon completion of this course the student should be able to:

- Design asphalt and concrete pavements using different design methods such as AASHTO, PMS-Object and FMM.
- Understand the difference and application of empirical, mechanistic-empirical, and calibrated mechanistic design procedures.
- Have a basic understanding of fracture mechanics and its applications to pavement engineering.
- Learn about the Superpave IDT test.
- Apply basic concepts of viscoelasticity and fracture mechanics to the optimization of flexible pavement cracking resistance.
- Learn the function of the railway tracks.
- Use numerical tools to analyse the dynamics of railway tracks.
- Identify the sources of train and track vibration.
- Understand the dynamic properties of track components such as rails, rail pads, sleepers, ballast and subgrade.

Course contents

- Review of distribution of stresses and strains in layered pavement systems
- Layered elastic analysis and layered modulus back-calculation
- Rutting and fatigue cracking performance criteria for flexible pavements
- Low temperature cracking in flexible pavements
- Traffic impact spectrum
- Environmental effects on pavement performance
- Mechanistic-empirical pavement design procedures
- Overview of the theory of viscoelasticity
- HMA fracture mechanics and application to top-down, bottom-up, and low temperature cracking in pavements

Examination

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

Other requirements for final grade

Passed written exam (4.5 ECTS credits)

Passed exercises (3 ECTS credits)

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.