AH2174 Traffic Simulation Modelling and Applications 7.5 credits

Trafiksimulering, modellering och applikationer

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

Establishment

Grading scale

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

Education cycle

Second cycle

Main field of study

The Built Environment

Specific prerequisites

Bachelor's degree or equivalent in civil engineering, geography, technical physics, computer science, statistics, economics, or mathematics.

At least 3 hp respectively in basic programming, linear algebra and numerical methods, as well as probability theory and statistics.

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

Intended learning outcomes

In this course, students obtain fundamental knowledge on the principles and applications of transport simulations.

Transport simulators are complex computer programs that solve complex model systems. The models describe real transport phenomena, such as traffic flow dynamics in urban networks. They are typically solved through mathematical techniques, in particular stochastic simulation methods. Real transport problems are analyzed with free or commercial software implementations of these models and solvers.

After successful completition of the course, students should be able to

- understand and apply the basic principles of simulation;
- interpret and analyze stochastic simulation results;
- select application-specific models and simulation methods;
- collect and use real data to calibrate and validate transport simulators;
- deploy simulations for scenario analysis, prediction, and optimization.

Course contents

This is an advanced course on transport simulation. It consists of lectures and exercises. The lectures are structured in two blocks of roughly equal size.

The first half of the lectures teaches fundamental concepts of simulation and its application in transport. This comprises: taxonomy of simulation approaches, scientific principles and mathematical simulation framework, input data preparation, computer simulation techniques, analysis of simulation outputs. These lectures provide a solid foundation to understand and use transport simulations.

The second half of the lectures treats a selection of more specific topics. This comprises: calibration and validation of simulators, experimental design, on-line simulation, simulation-based optimization. Students will have the opportunity to influence what topics the course focuses on. These lectures provide the ability to solve complex, real transport problems with simulation.

Examination

- TEN3 - Written examination, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- PRO2 - Project Assignments, 3.5 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.

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.