



AH2174 Trafiksimulering, modellering och applikationer 7,5 hp

Traffic Simulation Modelling and Applications

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för AH2174 gäller från och med HT12

Betygsskala

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

Utbildningsnivå

Avancerad nivå

Huvudområden

Särskild behörighet

A completed Bachelor's degree in Engineering, Science, Economics or Planning and documented proficiency in English B or equivalent.

For program students:

AH2171 Traffic Engineering and Management

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

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 completion 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.

Kursinnehåll

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.

Kurslitteratur

- S. M. Ross, Simulation, 4th edition, Elsevier, 2006
- A. M. Law and W. David Kelton, Simulation Modeling and Analysis, 4th edition, McGraw Hill, 2006.

- R. Dowling, A. Skabardonis, and V. Alexiadis, Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, FHWA-HRT-04-040.
- R. Roess, E. Prassas, and W. McShane, Traffic Engineering, 3rd edition, Prentice Hall, 2004.
- S. Washington, M. Karlaftis, and F. Mannering, Statistical and Econometric Methods for Transportation Data Analysis, Chapman & Hall/CRC, 2003.
- Selected papers and class notes
- Manuals of traffic simulation software to be used for projects and case studies

Examination

- PRO1 - Assignments, 3,5 hp, betygsskala: A, B, C, D, E, FX, F
- TEN1 - Examination, 4,0 hp, betygsskala: A, B, C, D, E, FX, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

PRO1 - Assignments, 3.5 credits, grade scale: A, B, C, D, E, FX, F

TEN1 - Examination, 4.0 credits, grade scale: A, B, C, D, E, FX, F

Övriga krav för slutbetyg

A mandatory oral examination equivalent to 4.0 ECTS credits on the A-F grading scale and a mandatory project assignment equivalent to 3.5 credits with grading scale A-F. The course will be determined by the grade of both

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.