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

Course syllabus for AH2174 valid from Autumn 2010

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

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

Language of instruction

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

Intended learning outcomes

The overall objective of the course is to provide fundamental knowledge on the principles, characteristics, and application of traffic simulation models. After succesful completion of the course students should be able to:

• Understand the basic principles of simulation;

• Understand the structure of different approaches and types of traffic simulation models (macroscopic, mesoscopic, microscopic) and the underlying assumptions that govern their behavior;

• Identify applications for which simulation is the apprpriate model for use;

• Identify the specific simulation approach (microscopic, mesoscopic, macroscopic) that is the most appropriate for a particular application;

• Develop and apply appropriate methods for the calibration of traffic simulation;

• Identify and apply appropriate methods (including statistical tests) to validate traffic simulaiton models;

• Interpret results from simulation models;

• Develop proper experimental designs to test and evaluate alternative designs using a traffic simulation model;

• Compare alternative designs and make recommendations on the basis of the simulation results.

Course contents

Advanced course on traffic simulation. Introduction to general concepts of simulation modeling and use, including the scientific principles that govern the development and use of simulation models. In depth presentation of traffic simulation models and the undelying models and algorithms. Traffic simulation model dichotomy including principles and characteristics of macro, meso, and micro traffic simulation models. Application of traffic simulation models for analysis of dynamic traffic systems and design: input data preparation, calibration, validation, analysis of output. Case studies and examples. Students will become familiar with existing commercial and research traffic simulation models (for example, VISSIM, Mezzo, NETCELL, MITSIMLab, DynaMIT, DYNAMEQ). Students will have hands-on experience with the use of traffic simulation models for alternatives analyses and evaluation through project work and case studies.

Course literature

A. M. Law and W. David Kelton, Simulation Modeling and Analysis, 4rth 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 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 4.0 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.