Infra Informatics - Simulation Methods, 2.0 credits

Infrainformatik - Simuleringsmetoder, 2.0 hp

Third-cycle education course

6FITN68

Department of Science and Technology

Valid from: Second half-year 2024

Approved by
The Board of PhD Studies

Approved
2025-03-26

Registration number

Entry requirements

Admitted as a doctoral student.

Specific information

The course aims to

- give an overview of general simulation theory and concepts
- discuss methodology, tools, and practices for applied simulation-based research,
- present simulation-based research projects within Infra Informatics.

Learning outcomes

After completing the course, participants will be able to:

- describe and categorize various simulation methods,
- describe and discuss the suitability, possibilities, and limitations of different simulation methods in relation to certain problem settings,
- identify, select, and plan the necessary steps for conducting a successful simulation-based research project,
- describe and suggest simulation-based research within Infra Informatics.

Contents

The course is held during HT1 each year. The schedule consists of

- A half-day startup meeting, presenting the common framework for the whole course and first lectures on the course topics.
- Two full day seminar days, with lectures on the course topics and presentations by senior researchers at KTS about projects where simulation has been applied.
- A computer lab session introducing a traffic simulation program.
- An individual homework assignment using the traffic simulation program.
- A half-day final meeting, with student presentations and discussions.

Educational methods

The following topics will be covered (in varying depth):

- Simulation concepts as agents, entities, processes, demand, parameters, etc.
- Time discrete and event based simulation
- Verification, calibration, validation and the risk for overfitting
- Stochastic simulations (statistical distributions, random seeds, number of required replications, statistical analysis of output distributions, etc.)
- Experimental design
- Simulation tools and programming languages

Examination

Responsible for the Simulation Methods course is Johan Olstam.
The examination for the simulation methods course consists of:

- Mandatory participation in the four seminar occasions and the lab session
- Conducting, documenting, and presenting an individual assignment

Examiner for the course is Mats Janné.

Grading

Two-grade scale

General information

The course is mandatory for all doctoral students in Infra Informatics. It is also open to doctoral students in other fields.

To register for the course, contact the course coordinator and Mats Janné.