Infra Informatics - Simulation Methods, 2.0 credits

Infrainformatik - Simuleringsmetoder, 2.0 hp

Third-cycle education course

6FITN68

Department of Science and Technology

Valid from: First 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.