

Research on Stochastic Modeling and Data-driven Optimization

Course instructors

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Application procedure

Goal and target audience

Early-stage PhD students in operations, logistics and supply chain management with an Operations Research and modelling background interested in decision-making under uncertainty.

Application process

Apply until March 31, 2024 by sending an email to: stefan.minner@tum.de

Course aims

What this course is

A structured introduction to learning methodological approaches for successful research in stochastic models and data-driven optimization in logistics and supply chain management at the beginning of the PhD program.

What this course is not

A listen and repeat lecture.

Course objectives

Knowledge Objectives

Stochastic modelling and optimization approaches required for state-of-the-art research and publications: Stochastic Processes, Markov Decision Processes and Markov Games, Reinforcement Learning, Stochastic Programming, Simulation Optimization.

Skills Objectives

Application and implementation of the methods and their theoretical evaluation to logistics and supply chain management problems.

Learning Objectives

Learn how to apply, adapt, use stochastic modeling and data-driven optimization for own research work and how to write and publish a scientific manuscript.

Preliminary schedule

Kickoff-Meeting on April 15, 2-4 pm in room 1577.

Weekly sessions (April 15 - July 15) on Mondays, 2-4 pm in room 1577

Core readings

Tijms, H.C. (2003). A First Course in Stochastic Models. Wiley.

Powell, W.B. (2021). Reinforcement Learning and Stochastic Optimization. Wiley

Additional manuscript reading list to be distributed in the first session

Course procedures

Latest research topics and challenges will be presented and discussed. Exercises and own implementations on a weekly basis deepen the understanding of core methods and principles.

Assessment

Written exam and short project report (10 pages) on a selected topic.

Workload

3 ECTS (21 hours lectures, 90 hours total workload)