

Computational Finance Seminar

This seminar offers a practice-oriented exploration of computational techniques in modern finance, with a particular emphasis on their implementation in MATLAB. Participants will work with real-world financial data to develop and apply numerical methods to core topics in asset pricing, risk measurement, and portfolio management. The seminar covers a range of applied themes, including data acquisition and processing, Monte Carlo simulation, Value at Risk, Markowitz portfolio optimization, the Capital Asset Pricing Model (CAPM) and multifactor models, as well as option pricing. The objective is to equip students with the methodological and computational skills necessary to translate theoretical financial models into practical analytical tools, preparing them for both advanced academic work and professional applications in quantitative finance.

Learning Goals

- Develop practical skills in Matlab for financial data analysis, simulation, optimization, and pricing.
- Critically assess financial risk through techniques like Monte Carlo simulation and Value at Risk (VaR).
- Understand and apply key financial models such as CAPM, Markowitz optimization, and option pricing models in a quantitative framework.
- Enhance presentation skills by preparing and delivering a session on a selected technical topic.

Seminar Specifics

- Language: English/German
- Credits: 5
- Given the course's quantitative approach, students are expected to have a solid foundation in basic finance and statistics/econometrics.
- No prior knowledge of Matlab is required. A brief introduction will be provided at the beginning of the semester, which students already familiar with the software may choose to skip.

Examination Format

- Presentation of an assigned topic in class (50% of the grade)
- Short report + code for a (small) practical research project (50% of the grade)

Students will be assigned in groups of two, based on their preferences of topics.

Dates

- **Tuesday, October 14 and 21, 09:00–12:00:** Introductory lectures and tutorial
- **Tuesday, November 18 and 25, 09:00–12:00:** Student presentations and tutorial (Block 1)
- **Tuesday, December 9 and 16, 09:00–12:00:** Student presentations and tutorial (Block 2)
- **Friday, January 16, 11:59 p.m.:** Submission deadline for student papers

The seminar will be held **in person only** on the dates listed above. In addition, students may arrange individual appointments with the lecturer to discuss questions related to their assigned project during the weeks without group meetings (online or in person).

Attendance Requirements

Attendance is mandatory; please register only if you are able to attend all sessions. If you do not wish to accept an allocated place, please inform the lecturer immediately.

Participation in the kick-off event (first meeting) is compulsory. Unexcused absence from this initial meeting will generally result in the loss of the allocated place.

The tolerated absence time for the other meetings amounts to 20% of the attendance time (1 meeting).

Registration

The allocation of participants in the restricted Master's courses will be done centrally via ORsign. Information about the registration procedure and deadlines can be found here: [Study Management](#).

Further Information

For any further information, please write an e-mail to the instructor of this course, Marco Thalhammer.