

FIN-417

Quantitative risk management

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Cursus	Sem.	Type
Financial engineering minor	H	Opt.
Financial engineering	MA1, MA3	Obl.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Written
Workload	120h
Weeks	14
Hours	4 weekly
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

This course is an introduction to quantitative risk management that covers standard statistical methods, multivariate risk factor models, non-linear dependence structures (copula models), as well as portfolio allocation and diversification.

Content

- Basics of risk management
- Standard statistical methods
- Multivariate risk factor models
- Modelling dependencies (correlation, copula)
- Dynamic EVT models
- Credit risk models
- Risk aggregation and diversification

Keywords

risk management, copula, diversification, credit risk

Learning Prerequisites**Recommended courses**

- Calculus and Linear Algebra (undergraduate level)
- Statistics and Probability (first university course)
- Some knowledge of financial derivatives
- Previous experience with Matlab is very useful

Learning Outcomes

By the end of the course, the student must be able to:

- Use the main statistical tools used to model financial risk
- Conduct important volatility and credit risk models
- Identify and apply appropriate tools to describe and quantify the risk of a portfolio

Transversal skills

- Use a work methodology appropriate to the task.

Teaching methods

- Lectures
- Exercises
- Homework

Expected student activities

active attendance at lectures, completing exercises

Assessment methods

- 40% midterm exam
- 60% final exam

Resources**Bibliography**

- Quantitative Risk Management - McNeil, Frey, Embrechts (primary reference)
- An Introduction to Statistical Modeling of Extreme Values - Coles
- Analysis of Financial Times Series - Tsay
- Statistical Models - Davison

Ressources en bibliothèque

- [Quantitative Risk Management / McNeil](#)
- [An Introduction to Statistical Modeling of Extreme Values / Coles](#)
- [Statistical Models / Davison](#)
- [Analysis of Financial Times Series / Tsay](#)

Moodle Link

- <https://go.epfl.ch/FIN-417>