UNIVERSITY OF GOTHENBURG

GRADUATE SCHOOL

GM1028 Quantitative Finance, 7.5 higher education credits

Kvantitativ Finans, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by School of Business, Economics and Law on 2013-08-01 and was last revised on 2017-06-08 by Faculty Board of the School of Business, Economics and Law to be valid from 2017-08-28, autumn semester of 2017.

Field of education: Social Sciences 100%
Department: Graduate School

Position in the educational system

The course Quantitative Finance is a course within the Master of Science programmes at the Graduate School, School of Business, Economics and Law, University of Gothenburg.

Main field of studies	*Specialization*
Economics	A1F, Second cycle, has second-cycle course/s as entry requirements

Entry requirements

To be eligible for the course Quantitative Finance the participant must fulfil the entrance qualifications for the Master of Science programme in Finance or Economics. For programme specific entrance requirements, see programme syllabus.

The courses “Investments”, "Financial Econometrics" and “Derivatives securities”, or equivalent, as well as basic knowledge of Matlab are strongly recommended. It is taken for granted that students feel comfortable with standard mathematics such as integrals, derivatives, matrices, basic probability theory, densities, expectations etc.

Learning outcomes

After completion of the course, the student shall be able to:

1. Know the main concepts underlying modern asset pricing theory.
2. Be familiar with the most commonly used asset pricing models.
3. Be able to evaluate the performance of asset pricing models and understand why different financial assets have different returns.
4. Know the main concepts underlying the theory and practice of financial risk management.
5. Be able to calculate risk measures such as Value-at-Risk (VaR) and Expected shortfall (ES) and implement solutions of realistic risk management problems.
6. Be able to solve complex numerical problems and study various empirical questions using the computer software Matlab.

Course content

The course will be made up of two parts. The first part focuses on asset pricing. We try to understand what underlying factors determine the prices and returns of different financial assets. This part covers the following topics:

- Mean-Variance analysis and its extensions
- Factor pricing models (CAPM and various multifactor asset pricing models)
- Empirical performance of different asset pricing models.

The second part focuses on the basic concepts of financial risk management and covers the following topics:

- Understanding different sources of risk (e.g., interest rate, market, and liquidity risk)
- Measuring risks: Value-at-Risk (VaR) and Expected shortfall (ES)
- Different methods for computing VaR and ES (e.g., analytical approximations, Monte Carlo simulations)
- How to reduce risks: implementing solutions of realistic risk management problems.

Form of teaching

Lectures.

Language of instruction: English

Assessment

The final grade will depend on the following components:

1. Three homework assignments, accounting in total for 60% of the achievable points in the course (connected to learning outcomes 3, 5, and 6).
2. A written final exam accounting for 40% of the total achievable points in the course (connected to learning outcomes 1, 2, and 4).

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In cases where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination occasions (including the ordinary examination) during a period of at least one year from the last time the course was given.

The number of examinations is limited to five.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).
For Pass on the course, the student has to achieve 50 % of the total points that are possible to achieve on the three homework assignments together, and 50 % of the total points that are possible to achieve on the final exam. For Pass with Distinction, the student has to achieve 80% of the total points that are possible to achieve in the course.

Course evaluation

The course will be evaluated upon completion.

The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.