SF271V Web Based Course in Financial Mathematics 7.5 credits

Webbaserad grundkurs i finansiell matematik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for SF271V valid from Autumn 2013

Grading scale

P, F

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

- •60 credits that consist of 7,5 academic credits in Mathematics and
  •6 credits in Mathematical Statistics or 7,5 credits in Statistics and
  •documented proficiency in Swedish B/ Swedish 3 and English A/English 6 (for courses given in Swedish).
  For courses given in English requires English B/ English 6 or equivalent.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

To give the participants a basic knowledge of expressions and mathematical models within the field of Financial Mathematics and to give them the ability to modify and analyze such models. The participants should also know the most common types of financial contract: terms (forwards and futures), options, bonds and swaps. This means that the student after taking the course should be able to:

- Calculate the price of some financial contracts such as currency terms, other term contracts and options with different underlying (e.g. shares, bonds, currencies, futures and raw materials)
- Calculate the duration for rent portfolios
- Decide on optimal hedge positions

The student should also have such an understanding and familiarity with the mathematical model that he/she (to some extent) can adapt existing models to new situations and carry out a mathematical analysis.

Course contents

- The correlation between now prices, forward prices, future prices and rate of interest.
- Rent theory; bonds, yield and duration, term structure; (long and short rates), rent swapping and FRAs (Forward Rate Agreements), term rates,
- Arbitrage-pricing; risk-neutral pricing, market price for risk, martingal pricing,
- Financial derivatives; terms (forwards and futures) and options with different underlying (shares, bonds, currencies, “futures” and raw materials), bonds, optimal hedging.

Disposition

Web based course in financial mathematics (mathematical modeling of financial contracts) on a basic level. The course is foremost directed to those wishing to get a general education of financial mathematics, e.g. professionals working with banking and finance but also for those who have a degree in financial economics and wish to broaden their understanding of the mathematical modeling and analysis of these models.

Course literature

Kurslitteraturen är till största delen elektronisk och gratis för den som går kursen, (kurskompendiet finns dessutom i pdf-format för nedladdning av vem som helst). Studenten skriver själv ut de sidor han/hon vill titta på i pappersformat. Kurslitteraturen består av genomgångar, exempel och lösta övningsuppgifter. I kursen ingår också självrättande prov och system för inlämningsuppgift (vilket tillsammans utgör examinationen på kursen). Lang, H.: Lec-

ture Notes on Financial Mathematics (pdf-fil; fri nedladdning via kursens informationssida) Hull. John C.: Options, Futures and Other Derivatives 3:e, 4:e eller 5:e upplagan (Prentice-Hall) rekommenderas som referenslitteratur.

Equipment

Computer with Internet connection, web reader handling Flash and Java applets. There is no need of specific installment of a specific programme.

Examination

- TEN1 - Examination, 1.5 credits, grading scale: P, F
- TEN2 - Examination, 1.5 credits, grading scale: P, F
- TEN3 - Examination, 1.5 credits, grading scale: P, F
- TEN4 - Examination, 1.5 credits, grading scale: P, F
- TEN5 - Examination, 1.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Examination: Examination is carried out on Internet. For further information, please contact the teacher/contact person concerned.

The course ends with an oral or written exam.

Other requirements for final grade

Passed examinations.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.