



# 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 Spring 2011

## 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 and English A (for courses given in Swedish). For courses given in English requires English B 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

The literature is mostly electronic and free of charge for those following the course. The student can print out those pages he/she wishes to view in paper form. The course literature consists of reviews, examples and solved assignments. The course also includes self correcting exams and systems for hand in assignments (which together make up the examination of the course). Lang, H.: Lecture Notes on Financial Mathematics (pdf-file updated 7/1-2006)

Hull. John C.: Options, Futures and Other Derivatives 3rd, 4th or 5th edition (Prentice-Hall) is recommended as reference literature

## 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.