DEPARTMENT OF MATHEMATICAL SCIENCES

MMG810 Options and Mathematics, 7.5 higher education credits

Optioner och matematik, 7,5 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Mathematical Sciences on 2016-08-17 to be valid from 2016-09-01, autumn semester of 2016.

Field of education: Science 100%

Department: Department of Mathematical Sciences

Position in the educational system

The course can be part of the following programmes: 1) Mathematical Sciences, Master's Programme (N2MAT) and 2) Bachelor's Programme in Mathematics (N1MAT)

Main field of studies	*Specialization*
Mathematics	G1F, First Cycle, has less than 60 credits in first-cycle course/s as entry requirements

Entry requirements

General entry requirements and the equivalent of the courses *MMG200 Mathematics 1* and *MSG110 Probability theory*.

Learning outcomes

On successful completion of the course the student will be able to

- describe financial derivatives of European, American and Asian type
- explain the concept of arbitrage
- describe algorithms for pricing and hedging financial derivatives in the binomial model

- compute numerically the price of American puts in the binomial model
- derive the Black-Scholes model as a limit of the binomial model
- compute the Black-Scholes price of call and put options
- price call and put options when the underlying stock pays a dividend
- treat currency options in the Black Scholes model
- treat options on the maximum and minimum of the price of two stocks in the Black-Scholes model
- treat elementary Portfolio theory.

Course content

The Dominance Principle. Binomial model. Self-Financing Portfolios. Probability theory and Brownian Motion. Black-Scholes Model. Black-Scholes formula. Call and Put options. Exotic Options. Dividends. Currency Derivatives. Elementary portfolio theory.

The course deals with the options pricing theory within the binomial model and the Black-Scholes model.

Form of teaching

Language of instruction: English
The language of instruction is English unless all involved are Swedish speakers.

Assessment

The examination consists of assignments and a written examination. Some of the assignments are based on Matlab.
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).

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

Course evaluation

Course evaluation will be performed with a questionnaire and discussions with student representatives.
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.

Additional information

The course *MMG810 Options and Mathematics* has partially the same content as the course *MMA700 Options and Mathematics*. It is not allowed to be registered and/or examined in more than one of these courses.