



Course and Examination Fact Sheet: Spring Semester 2015

4,252: Stochastic Methods in Finance

ECTS credits: 3

Overview examination/s

(binding regulations see below)

Decentral - Oral examination (individual) (100%, 20 mins.)

Attached courses

Timetable -- Language -- Lecturer

[4,252,1.00 Stochastic Methods in Finance](#) -- English -- [Camponovo Lorenzo](#)

Course information

Course prerequisites

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Course content

The course introduces the fundamental stochastic tools for derivative pricing and portfolio theory. In particular, for derivative pricing we will analyze the following topics: Cox-Ross-Rubinstein binomial model, fundamental asset pricing theorem, Brownian motion and Itô processes, Itô's lemma, stochastic differential equations and risk neutral valuation. For portfolio theory, we will instead focus on the following topics: multivariate normal distribution, Markowitz portfolio theory, arbitrage pricing theory, portfolio theory in continuous time.

Course structure

(1) Probability Theory

- Introduction
- Distribution functions
- Normal distribution
- Multivariate normal distribution
- Lognormal distribution
- Binomial distribution

(2) Pricing and No-arbitrage

- Binomial model
- Fundamental asset pricing theorem

(3) Itô's lemma and Stochastic Integral

- Random walk and Brownian motion
- Itô processes and Itô lemma
- Derivative pricing



- Partial differential equations
- Stochastic differential equations
- (4) Risk Neutral Valuation
 - Discrete model
 - Lognormal model
 - Extensions
- (5) Markowitz Portfolio Theory
 - Markowitz approach
 - Asset liability approach
 - Shortfall constraint
- (6) Arbitrage Pricing Theory Model
 - Discussion of the model
 - Mathematics properties of the model
- (7) Portfolio theory in continuous time
 - Definition
 - Extensions

Course literature

- Neftci, S. N. "An Introduction to the Mathematics of Financial Derivatives". Academic Press, 2000.
- Watsham, T. J. and Parramore, K. "Quantitative Methods in Finance". International Thomson Business Press, 1997.

Additional course information

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Examination information

Examination sub part/s

1. Examination sub part (1/1)

Examination time and form

Decentral - Oral examination (individual) (100%, 20 mins.)

Remark

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Examination-aid rule

Extended Closed Book

The use of aids is limited; any additional aids permitted are **exhaustively** listed under "Supplementary aids". Basically, the following is applicable:

- At such examinations, all the pocket calculators of the Texas Instruments **TI-30** series and bilingual dictionaries without hand-written notes are admissible. Any other pocket calculator models and any electronic dictionaries are inadmissible.
- In addition, any type of communication, as well as any electronic devices that can be programmed and are capable of



communication such as notebooks, tablets, PDAs, mobile telephones and others, are inadmissible.

- Students are themselves responsible for the procurement of examination aids.

Supplementary aids

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Examination languages

Question language: English

Answer language: English

Examination content

Contents of the lecture.

Examination relevant literature

Lecture slides (on Studynet).

Please note

We would like to point out to you that this fact sheet has absolute priority over other information such as StudyNet, faculty members' personal databases, information provided in lectures, etc.

When will the fact sheets become binding?

- Information about courses and examination time (central/decentral and grading form): from the start of the bidding process on 22 January 2015
- Information about decentral examinations (examination-aid rule, examination content, examination relevant literature): after the 4th semester week on 16 March 2015
- Information about central examinations (examination-aid rule, examination content, examination relevant literature): from the start of the enrolment period for the examinations on 6 April 2015

Please look at the fact sheet once more after these deadlines have expired.