University of St.Gallen

Course and Examination Fact Sheet: Spring Semester 2018

8,152: Derivatives

ECTS credits: 4

Overview examination/s

(binding regulations see below)
Decentral - Written examination (100%, 90 mins.)

Attached courses

Timetable -- Language -- Lecturer
8,152,1.00 Derivatives -- Englisch -- Ammann Manuel , Schaub Nic

Course information

Course prerequisites

As prerequisites the courses "Financial Markets" and "Quantitative Methods" are required. No previous derivatives courses are required.

Course content

The primary objective of this course is to provide students with an advanced introduction to derivative instruments, concepts, applications, and models necessary to analyze those instruments. The course is designed for students interested in modern financial instruments, their applications, and quantitative methods.
The separate MBF-course “Financial Modeling Workshop: Derivatives”, also offered in the spring semester, is tailored to the structure of this course. In the workshop students implement the models introduced in the Derivatives course using Excel and VBA. This helps students to gain a deeper understanding of the topic and its applications.

Course structure

Session 1: Introduction and Hedging

- Hedging
- Hedge ratio
- Basis risk
- Cross hedging

Session 2: State Preference Theory

- Arbitrage
- Arrow-Debreu securities
- Complete and incomplete markets

- Risk-neutral valuation

Session 3: Binomial Model

- Binomial trees
- Replication
- Risk-neutral valuation
- American and European options

Session 4: Black-Scholes I

- Stochastic calculus
- Replication
- Fundamental partial differential equation
- Risk-neutral valuation
- Black-Scholes formula

Session 5: Black Scholes II

- Options on indices, currencies, futures
- Implied volatility
- Volatility smile
- Greeks
- Dynamic hedging

Session 6: Advanced Models and Model Estimation

- Volatility smile
- Stochastic volatility
- Jumps
- Estimation and calibration of model parameters

Session 7: Numerical Methods and Exotic Options

- Monte Carlo simulation
- Variance reduction
- Finite differences
- Categorization of exotic options
- Pricing of exotic options

Session 8: Financial Engineering

- Engineering payoff structures
- Structured products

Session 9: Interest Rate Derivatives

- Black's model
- Bond options
- Caps and Floors
- Swaptions

Session 10: Credit Derivatives

- Modeling credit risk
- Credit default swaps (CDS)
- Collateralized debt obligations (CDO)

University of St.Gallen

Course literature

John C. Hull, *Options, Futures, and Other Derivatives*, 10th Ed., Pearson, 2017

Manuel Ammann, Lecture Notes, *Introduction to Option Pricing.*

The course material (slides & lecture notes) will be made available on StudyNet.

Additional course information

The independent studies include the lecture notes as mandatory reading. Additionally, four problem sets will be made available on StudyNet and discussed in the respective sessions. In the first lecture, recommended chapters in Hull for reading will be given.

Examination information

Examination sub part/s

1. Examination sub part (1/1)

Examination time and form
Decentral - Written examination (100%, 90 mins.)

Remark
--

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 mono- or bilingual dictionaries (no subject-specific 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
You may bring a double-sided A4-cheat-sheet.

Examination languages
Question language: English
Answer language: English

University of St.Gallen

Examination content

The exam covers all topics discussed in the course.

Examination relevant literature

John C. Hull, *Options, Futures, and Other Derivatives*, 10th Ed., Pearson, 2017

Manuel Ammann, Lecture Notes, *Introduction to Option Pricing*.

Lecture notes and course material will be made available 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 25 January 2018
- Information about decentral examinations (examination-aid rule, examination content, examination relevant literature): after the 4th semester week on 19 March 2018
- Information about central examinations (examination-aid rule, examination content, examination relevant literature): from the start of the enrolment period for the examinations on 09 April 2018

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