Syllabus

Course title
Financial Mathematics

Course code
25425/27504

Scientific sector
SECS-S/06

Degree
Master in Accounting and Finance/ Master in Data Analytics for Economics and Management

Semester and academic year
1st semester 2023/2024

Year
1

Credits
6

Modular
NO

Total lecturing hours
36

Total lab hours
-

Total exercise hours
-

Attendance
suggested, but not required

Prerequisites
not foreseen

Course page

Specific educational objectives
The purpose of the class is to expose students to the mathematical concepts and techniques used in the financial industry. Students will learn basic concepts as "time-value of money", interest rate conventions, pricing interest-sensitive securities, portfolio theory, sensitivity measures (e.g. duration, beta), the structure, mechanics and the pricing of derivatives (forwards, futures, swaps and options) using the no-arbitrage principle, the use of derivatives.

Lecturer
Alex Weissensteiner
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Scientific sector of the lecturer
SECS-S/06

Teaching language
English

Office hours
please refer to the lecturer’s web page

Lecturing assistant
-

Teaching assistant
-

List of topics covered
Time value of money, interest rate markets and conventions,
pricing of bonds, duration and convexity, interest rate term structure determination and yield spreads, mechanics of forward and future markets; determination of forward and future prices; swaps; mechanics of option markets; trading strategies involving options; binomial trees; Wiener processes; Black-Scholes-Merton model; options on stock indices, currencies, and futures; the Greek letters; volatility smile.

Learning outcomes

- **Knowledge and understanding:**
  Knowledge of the major financial instruments and how to price them. Understand the principle of diversification and portfolio theory. Understanding of the no-arbitrage pricing principle (fundamental theorem of asset pricing).

- **Applying knowledge:**
  Ability to measure financial risks and to hedge them with financial derivatives, to price risky assets by applying the fundamental theorem of asset pricing.

- **Making judgments:**
  Relevant examples should encourage students to express their own judgments in classroom and to improve their problem-solving skills.

- **Communication skills:**
  The applied teaching method (mix of theory and applications) should stimulate the participation of students in classroom discussions. Even though the course is given in German, particular attention will be dedicated also to technical English expressions (and English slides are used).

- **Learning skills:**
  The course should provide the necessary foundations in financial mathematics in order to attend other finance classes in the Master program.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Written exams after 50% and at the end of the semester.</th>
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<tbody>
<tr>
<td>Assessment language</td>
<td>English</td>
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<tr>
<td>Evaluation criteria and criteria for awarding marks</td>
<td>Assessment based on mid-term (33%, counts for the January exam session only) and final exam (67%, or 100% in case of missed mid-term exam). Threshold (18 out of 30+ points). For exam sessions after January, 100% of the assessment is based on the final exam.</td>
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<tr>
<td>Required readings</td>
<td>John Hull: Optionen, Futures und andere Derivate, Pearson, 9th ed, 2017</td>
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</tbody>
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University Press, 1995
Selected chapters from CFA Institute Curriculum 2018 edition, Level I – III