Financial Engineering
LV-Nr. 203094.01E, Tuesdays, 12.15-15.30

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Office hours: upon request (per email)

Course description: Financial Engineering provides tools and solutions to pricing, hedging, trading and portfolio management problems by employing mathematical methods and computational tools. Students learn about financial instruments and derivatives, and their pricing under the principle of arbitrage-free markets, both from a theoretical perspective and from a practical perspective.

Course objective: After taking the course, students know about the most important financial instruments and corresponding models for pricing derivatives; they are able to calculate prices and related hedging strategies of derivatives in equity and in fixed income markets. A particular focus lies on the practical application using Monte Carlo simulation.

Prerequisites:
- Mathematics for Business and Economics, Statistics;
- or similar undergraduate mathematics courses

Course materials:
- Lecture script
- Problem sets and Moodle quizzes
- Practical exercises

Course assessment:
- Exam (50%; scheduled for 8 Jan 2019)
- Case study presentations in groups (50%; 15 and 22 Jan 2019)
  (see separate instructions on Moodle)

  Allowed aids: pocket calculator (non-programmable; simple one will do)

  The exam will be 90 minutes. Details of contents to follow.

Attendance policy: Attendance of at least 75% of classes is required to pass the course. In other words, you may not miss more than **four** classes. Please make sure to sign the attendance sheet when you come to class.

Class Etiquette:
- Please be on time for class!
- Please refrain from using mobile phones and laptops in class!
  (sole exception: taking notes)
- Participate and engage actively in class!

Additional reading: The **lecture script** together with **exercises** and **problem sets** are designed to be sufficient for mastering the course.

Here are a few of the many other useful textbooks and resources:

- Hull: Futures, Options and other Derivatives. Prentice Hall, any recent edition.
- Blyth: An Introduction to Quantitative Finance. Oxford University Press, 2014.
- Sundaram, Das: Derivatives. McGraw Hill, 2nd International Edition, 2016.
- Sutherland, Court: The Front Office Manual. Palgrave Macmillan, 2015.
- Albrecher, Binder, Lautscham, Mayer: Introduction to Quantitative Methods for Financial Markets. Birkhäuser, 2010.
- Shreve: Stochastic Calculus for Finance I. Springer, 2004.
- Baxter, Rennie: Financial Calculus. Cambridge University Press, 1996.
- Wilmott: Frequently Asked Questions in Quantitative Finance. John Wiley & Sons, 2007.
- Glasserman: Monte Carlo Methods for Financial Engineering. Springer, 2004.
- `http://www.wolframalpha.com`

Some "entertaining" literature:

- Michael Lewis: Liar's Poker. W. W. Norton & Company, 1989. (Insider account of 1980s Wall Street).
- Other books by Michael Lewis: The Big Short, Flash Boys, ...
- Nicholas Dunbar: Inventing Money. Wiley, 2001. (Account of the failure of the famous hedge fund LTCM)
- Roger Lowenstein: When Genius Failed. Random House, 2001. (Another account of LTCM)
- Andrew Ross Sorkin: Too Big To Fail. Penguin Books, 2010. (Account of the subprime crisis)