Course Description

This course concentrates on building financial models for portfolios and derivatives valuation models. The classes will be directed towards applying the theory of finance in building implementable models, with Excel used as a programming vehicle.

Classes will be interactive—use your laptop during lectures!

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>readings</th>
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| 1-2 | Technical topics:  
• Data tables in Excel  
• Portfolio choice: Introduction | FM, Ch. 28: Data tables  
FM, Ch. 31: Array functions  
FM, Ch. 10: Introduction to portfolios  
Adding formulatext |
| 3-6 | Portfolio choice  
Efficient portfolio theorems  
Constructing efficient portfolios  
In class exercise: constructing efficient portfolios | FM, Ch. 11: Efficient portfolio theorems |
| 7-8 | Building variance-covariance matrices  
Testing the CAPM | FM, Ch. 12: Variance-covariance matrices  
FM, Ch. 13: SML testing |
| 8-10 | Monte Carlo simulations  
• Introduction to Monte Carlo  
• Lognormality—generating price simulations  
• Introduction to VaR | FM4, Chapter 21-24  
FM4, Chapter 25 |
| 11-12 | Options pricing  
• Black-Scholes  
• Monte Carlo for options  
• Structured securities? | FM4, Ch. 16: Option intro.  
FM4, Ch. 18: Black-Scholes  
FM4, Ch. 26 and 27 |

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**Course Goals**

At the end of the course, students should be able to:

1. Understand how to implement portfolio theory to better manage investments,
2. Perform Monte-Carlo simulations,
3. Understand how to model stock prices and,
4. How to price complex path-dependent derivatives.

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**Grading**

The course grade is based on a bi-weekly assignment (done in groups of 2-3 students) and an open-book final take-home examination.

Class participation and assignments count for 10% of the grade and the exam counts for 90%.

**Attendance:**

- In accordance with the university’s regulations, there is an 80% attendance requirement in the classes.
- Below are the instructions regarding attendance:
  - 10 classes out of 13 in the semester means full attendance;
  - Missing up to 3 additional classes is acceptable, but results in subtracting 5 points from the final grade for each class missed; That is, for a student who only attended 9 lessons - 5 points will be deducted from the course grade, only 8 lessons - 10 points will be deducted from the course grade, only 7 lessons - 15 points will be deducted from the course grade;
  - A student who attends only 6 classes or less - will not pass the course, will receive a failing grade, and will have to repeat it the following year.
- All of the above is not valid if it is a justified absence approved by the director of students according to the regulations (illness, reserve, etc.). It is the responsibility of the students to contact the student manager themselves >> show them a permit >> the student manager will inform the lecturer about the permit. Absence is as justified as presence;
- Class attendance is essential and significantly correlated with success in the course;
- It is recommended to repeat the material learned in the previous lesson before each lesson;
- During the lesson itself, it is strictly forbidden to:
  - use of cell phones;
  - Browsing the Internet on subjects not related to the lesson;
  - Reading newspapers (including solving crosswords and sudoku).
  - I do not approve late entry to class, except by prior arrangement.
  - During the lessons, students sit with a nameplate.

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**Lecturer Office Hours**

before or after class – please coordinate by mail.
Reading List

We will use chapters from my book:

*Financial Modeling* (5th edition, 2022) — chapters from this book are indicated by FM5 below.

we will also use the new materials that I am currently developing.