

Department of Mathematics
ETH Zürich
Introduction to Mathematical Finance
401-3888-00L
Spring 2015
Lecture:

- HG E 33.1, Wednesday, 10 - 12
- HG D 5.2, Friday, 8 -10

Problem Sessions: To be arranged.

Instructors:

Prof. H. Mete Soner
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Course URL:

<http://www.math.ethz.ch/education/bachelor/lectures/fs2015/math/imf>

Textbooks: We will follow

- *Stochastic finance: An introduction in discrete time*, (3rd rev. and extended ed.), Föllmer, Hans, & Schied, Alexander. (2011). Berlin: De Gruyter.

The following textbook is also useful

- *Stochastic calculus for finance. 1, The binomial asset pricing model*, Steve Shreve, Springer, (2004).

Lecture notes will be provided when needed.

Course :

This course focuses on discrete time financial markets and requires a basic knowledge of measure theoretic probability theory and will be offered every year in the Spring semester.

This course is the first of a two sequence courses on mathematical finance. The second course Mathematical Finance, (MFII) 401-4889-00 focuses on continuous time models. It is advisable that this course is taken prior to MFII.

The following topics in finite discrete time models are studied:

1. Notion of Arbitrage;
2. Fundamental Theorem of Asset Pricing;
3. Complete and incomplete markets;
4. Super-replication;
5. Utility theory;
6. Utility maximization and portfolio management.

Particular models related to above topics will be studied in homework assignments.

Exam: There will be a 3 hours long written examination at the end of the semester. We will provide almost weekly homework assignments. Students are advised to study them in a timely manner.

Table 1: Tentative Schedule of Lectures

Lecture	Date	— Section(s) in Föllmer and Schied (FS) or Topic —
		Arbitrage: One Step Models
1	18.02.2015	Sections 1.1, 1.2 in FS
2	20.02.2015	Sections 1.1, 1.2 in FS
3	25.02.2015	Sections 1.3, 1.4 in FS
4	27.02.2015	Sections 1.3, 1.4 in FS
5	4.03.2015	Sections 1.5, 1.6 in FS
6	6.03.2015	Section 1.6 in FS
		Arbitrage: Multi Step Models
7	11.03.2015	Sections 5.1, 5.2 in FS
8	13.03.2015	Sections 5.1, 5.2 in FS
9	18.03.2015	Sections 5.3, 5.4 in FS
10	20.03.2015	Sections 5.1, 5.2 in FS
11	25.03.2015	Section 5.5 in FS
12	27.03.2015	Section 5.7 in FS
		Super-replication
13	1.04.2015	Chapter 7
14	15.04.2015	Chapter 7
15	17.04.2015	Chapter 7
		Utility and Preferences
16	22.04.2015	Chapter 2
17	24.04.2015	Chapter 2
18	29.04.2015	Chapter 2
		Equilibrium
19	6.05.2015	Chapter 3
20	8.05.2015	Chapter 3
21	13.05.2015	Chapter 3
		Utility Maximization - Merton problem
22	15.05.2015	Lecture Notes
23	20.05.2015	Lecture Notes
24	22.05.2015	Lecture Notes
25	27.05.2015	Lecture Notes
26	29.05.2015	Lecture Notes