

# MATHEMATICAL FINANCE COURSES

## OFFERED BY

### THE STOCHASTIC FINANCE GROUP

This document lists the mathematical finance courses offered by our group. A recommendation of the order in which these courses should be taken is also given in a table after the description of the courses.

In addition to these courses, we are also involved in the teaching of regular courses at all levels.

**Introduction to Mathematical Finance, (MFI) 401-3888-00** (yearly, Spring, 4+1): This is the fundamental course recommended to all students interested in theoretical and computational aspects of mathematical finance. This course focuses on discrete time markets and requires a basic knowledge of measure theoretic probability theory and will be offered every year in the Spring semester. The textbook by Föllmer and Schied or lecture notes similar to that will be used.

**Mathematical Finance, (MFII) 401-4889-00** (yearly, Fall, 4+1). This is the continuation of the previous course. It focuses on continuous time markets. It covers the basic concepts such as the fundamental theorem of asset pricing, utility maximization, several modelling issues and other topics. It is offered in the Fall semester and should be taken after Mathematical Finance I.

**Topics in Mathematical Finance, (TMF)** (yearly, Spring). This course focuses on advanced aspects of the theory. Although it is taught yearly, it covers different topics such as continuous time interest rate models, filtering, stochastic optimal control, semimartingale theory, etc. Depending on the particular focus, it may be taken independently of other courses or not.

**Mathematical Foundations Finance (MFF), 401-3913-01** (yearly, Fall, 3+1). This is the required course for the master of computational finance. Computational and modeling aspects rather than the mathematical theory are more the focus. It can be taken independently of MFI and MFII.

**Interest Rate Theory, (IR) 401-4905-60** (yearly, Spring, 2+1). This course develops discrete time models for fixed income instruments. It allows an easy development of the models using discrete time. It is offered in the Spring and recommended to complement the theoretical aspects of the other courses. It requires a basic knowledge of probability theory and can be taken independently of the other courses.

Prior to these courses, students are advised to take probability courses offered by the department. These courses are:

**Probability and Statistics, (PS) Wahrscheinlichkeitsrechnung und Statistik, 401-2604-00** (Spring, 4+2). This course is required for mathematics majors and is taken in the 4th semester.

**Probability Theory, (Prob. Th.) Wahrscheinlichkeitstheorie, 401-3601-00** (Fall, 4+2). This course is required for mathematics majors and is taken in the 5th semester.

The following advanced course on stochastic processes is also recommended.

**Brownian Motion and Stochastic Calculus, (BMSC) 401-3642-00** (Spring, 4+1). This course covers fundamental topics in continuous time stochastic processes. This knowledge is essential in all mathematical models in financial economics.

The following sequence of courses is recommended.

Course	Fall	Spring
Department requirement		
Probability and Statistics		4th
Probability Theory	5th	
Strongly recommended		
Intro to Math Fin, (MFI)		6th
BMSC		6th
Math Fin, (MFII)	7th	
Topics in MF		8th
Interest Rate		6th or 8th
Also possible		
Foundations of MF	5th or 7th	
Seminars	7th and/or 9th	8th