This course is a graduate introduction to Mathematical Finance and Stochastic Calculus, but we will also cover some general finance topics. If there is enough time, the following subjects will be covered.

**Part 1**

- The No-arbitrage Principle
- Sigma-algebras and filtrations
- Conditional expectation
- Martingales
- Brownian motion.

**Part 2**

- Discrete time models
- Cox-Ross-Rubenstein model
- Stochastic integrals
- Stochastic differential equations
- Change of Measure and Girsanov theorem
- Black and Scholes model
- Partial differential equations
- Feynman-Kac formula
- Yield curve and bond options
- Classical interest rate models
The Heath-Jarrow-Morton (HJM) model

Textbooks


[3] Subscription to *The Wall Street Journal* (done through the class at a special rate)

The texts [1] and [2] are for guidance only and may not be followed closely. THE COURSE WILL ESSENTIALLY BE BASED ON LECTURE NOTES. There will be a number of handouts.

Supplementary material

These include articles published in either the general press, e.g., newspapers, for example, as relevant financial news occurs regularly. These will be discussed in class.

Other books you may want to look at:


Tentative grading:

Homework: 30 - 60%

Midterm: 20 - 40%

Final: 20 - 40%

*Extra bonus:* A nicely rewritten set of lecture notes.