Math 3225   Mathematics of Finance 1
Fall 2016   University of Pittsburgh
Dr. Song Yao, songyao@pitt.edu

Lectures: Monday 6:00-8:30 pm in 300 Old Engineering Hall.

Office Hours: Wednesday, Friday 1:30-3:00 pm in 404 Thackeray Hall or by appointment.

Description

This course and its sequel MATH3226 present fundamental principles and standard approaches used in mathematical finance. We will study discrete and continuous-time stochastic models with applications in various fields of mathematical finance including prcing and hedging financial instruments, risk management and financial decision making etc. We will first cover the volume 1 of Shreve's book on discrete-time stochastic models which includes Binomial pricing model; discrete-time martingale theory, arbitrage and risk-neutral pricing; capital asset pricing model, American options and fixed-income derivatives. Then we will discuss the first few chapters of volume 2 of Shreve's book:general probability theory and sigma algebra of information, random walk, Brownian motion and stochastic integrals if time permits.

Prerequisite

Calculus and Calculus-based Probability.

Text

1. "Stochastic Calculus for Finance I: The Binomial Asset Pricing Model" by Steven Shreve (Springer, ISBN-13: 978-0387401003 ISBN-10: 0387401008 Edition)
2. "Stochastic Calculus for Finance II: Continuous-Time Models" by Steven Shreve (Springer , ISBN-13: 978-1441923110 ISBN-10: 144192311X)

Supplementary Text

- "Arbitrage Theory in Continuous Time (3rd edition)" by Tomas Björk
(Oxford University Press, ISBN-13: 978-0199574742 ISBN-10: 019957474X)
- "Options, Futures, and Other Derivatives (9th Edition)" by John C Hull
(Pearson Education, ISBN-13: 978-0133456318 ISBN-10: 0133456315)
- "An Elementary Introduction to Mathematical Finance (3rd edition)" by Sheldon M. Ross
(Cambridge University Press, ISBN-13: 978-0521787222 ISBN-10: 052178722X)
- "Financial Calculus: an introduction to derivative" by Martin Baxter and Andrew Rennie
(Cambridge University Press, ISBN-13: 978-0521552899 ISBN-10: 0521552893)
- "The Concepts and Practice of Mathematical Finance (2nd edition)" by Mark S. Joshi
(Cambridge University Press, ISBN-13: 978-0521514088 ISBN-10: 0521514088)

Grades

Homework assignments	30%
Midterm exam	30%
Final exam	40%