

Math 423: Mathematics of Finance

Section 005, T TH 1:10pm - 2:30pm, 1230 USB

Dr. Ahmet Duran

5836 East Hall, (734) 647-9873

durana@umich.edu, www.umich.edu/~durana

Office Hours

T TH 11:40am-1:00pm and by appointment

Description

Introduction to the mathematical models used in finance and economics, risk-free assets, risky assets, dynamics of stock prices, binomial and trinomial tree models, discrete time market models, continuous-time limit, investment strategies, martingale property, fundamental theorem of asset pricing, portfolio management, capital asset pricing model, forward and futures contracts, general properties of options, option pricing, Cox-Ross-Rubinstein formula, early exercise feature (American options), Black-Scholes formula, Black-Scholes differential equation, financial engineering, hedging option positions, hedging business risk, variable interest rates, and stochastic interest rates.

Prerequisites

Linear algebra (Math 217), basic probability (Math 425) and a course in programming (EECS 183)

Text

Mathematics for Finance: An introduction to financial engineering, Capinski and Zastawniak, Published by Springer, ISBN: 1-85233-330-8

Additional References

- Baxter and Rennie: *Financial Calculus: An Introduction to Derivative Pricing*
- Bodie, Kane and Marcus: *Investments*
- Cornuejols and Tutuncu: *Optimization Methods in Finance: Mathematics, Finance and Risk*
- Hull: *Options, Futures and Other Derivatives*
- Lamberton and Lapeyre: *Stochastic Calculus Applied to Finance*
- Luenberger: *Investment Science*
- Roman: *Introduction to the Mathematics of Finance*
- Shreve: *Stochastic Calculus for Finance Vol. I & II*
- Wilmott, Howison and Dewynne: *The Mathematics of Financial Derivatives*

Course Website

You can visit the course website via www.umich.edu/~durana and <https://ctools.umich.edu>. I will post announcements, homework assignments, messages, and other course resources on the course webpage regularly. You may access to answer files for homework, quiz and exam via only <https://ctools.umich.edu>.

Grading Policy and Important Dates

- You will be expected to read each section before it is discussed in class.
- I will assign homework problems in class (and on the course webpage) regularly; I will collect homework at the beginning of class meeting. I will drop your lowest homework grade. No late homework will be accepted.
- I will collect two computer assignments.
- We will have 6 quizzes. I do not give make up quizzes, but I will drop your lowest quiz grade.
- We will have one midterm exam on Tuesday, 10/23/07.** I do not give makeup exams.
- Our final exam is cumulative.
- All exams are closed-book, proctored tests.
- You will be allowed one 3x5" index card with hand-written formulas for the midterm exam and two for the final exam.
- Your final grade will be determined according to the following weights:

Quiz + Homework + Computer Assignment	30%
Midterm Exam	30%
Final Exam	40%

Syllabus

I plan to cover Chapters 1-10 of the text; if time permits, we may also cover Chapter 11 or other additional topics. A **tentative** course schedule appears below. If you miss a lecture, you should be sure to get the notes from a classmate.

Tentative Schedule for Math 423-005

T	TH
Ch. 1 9/4/07	Ch. 2 9/6/07
Ch. 3 9/11/07	Ch. 3 9/13/07 Quiz 1
Ch. 3 9/18/07	Ch. 4 9/20/07 HW 1
Ch. 4 9/25/07	S. 3.3 9/27/07 Quiz 2
Ch. 5 10/2/07	Ch. 5 10/4/07 HW 2

Ch. 5	10/9/07	Ch. 6	10/11/07
		Quiz 3	
Fall Study Break	10/16/07	Review, Q&A	10/18/07
EXAM 1	10/23/07	Ch. 6	10/25/07
Ch. 7	10/30/07	Ch. 7	11/1/07
Computer Assignment 1			
Ch. 8	11/6/07	Ch. 8	11/8/07
		HW 3	
Ch. 9	11/13/07	Ch. 9	11/15/07
		Quiz 4	
Ch. 9	11/20/07	Thanksgiving recess	11/22/07
Ch. 10	11/27/07	Ch. 10	11/29/07
Ch. 10	12/4/07	Ch. 11	12/6/07
Computer Assignment 2		Quiz 5	
Review, Q&A	12/11/07		

FINAL EXAM: Wednesday, December 19, 4:00 pm – 6:00 pm