

# Math 423: Mathematics of Finance

Section 001, T TH 11:30am - 01:00pm, 1060 East Hall

Dr. Ahmet Duran

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## Office Hours

T TH 1:00-2:30 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, Rennie: *Financial Calculus: An Introduction to Derivative Pricing*
- Bodie, Kane and Marcus: *Investments*
- Hull: *Options, Futures and Other Derivatives*
- Lamberton, Lapeyre: *Stochastic Calculus Applied to Finance*
- Luenberger: *Investment Science*
- Roman: *Introduction to the Mathematics of Finance*
- Shreve's Lecture Notes: [www.cs.cmu.edu/~chal/Shreve/shreve.pdf](http://www.cs.cmu.edu/~chal/Shreve/shreve.pdf)
- Wilmott, Howison and Dewynne: *The Mathematics of Financial Derivatives*

## Course Website

You can visit the course website via [www.umich.edu/~durana](http://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.
- I will collect one computer assignment.
- 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, 2/20/07.** I do not give makeup exams.
- Our final exam is cumulative.
- All exams are closed-book, proctored tests.
- 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 423-001

T	TH
	1/4/07
	Ch. 1
1/9/07	1/11/07
Ch. 2.	Ch. 3
	<b>Quiz 1</b>
1/16/07	1/18/07
Ch. 3	Ch. 3
	<b>HW 1</b>
1/23/07	1/25/07
Ch. 4	Ch. 4
	<b>Quiz 2</b>
1/30/07	2/1/07
Ch. 5	Ch. 5
	<b>HW 2</b>
2/6/07	2/8/07
Ch. 5	Ch. 6
	<b>Quiz 3</b>
2/13/07	2/15/07
Ch. 6	Review, Q&A

<b>EXAM 1</b>	2/20/07	Ch. 7	2/22/07
Winter recess	2/27/07	Winter recess	3/1/07
Ch. 7	3/6/07	Ch. 8	3/8/07
		<b>HW 3</b>	
Ch. 8	3/13/07	Ch. 8	3/15/07
		<b>Quiz 4</b>	
Ch. 9	3/20/07	Ch. 9	3/22/07
		<b>HW 4</b>	
Ch. 9	3/27/07	Ch. 10	3/29/07
		<b>Quiz 5</b>	
Ch. 10	4/3/07	Ch. 10	4/5/07
		<b>Computer Assignment</b>	
Ch. 11	4/10/07	Ch. 11	4/12/07
<b>Quiz 6</b>			
Review, Q&A	4/17/07		

**FINAL EXAM: Monday, April 23 1:30pm – 3:30pm**