Math 485 – Introduction to Mathematical Finance

Course Description from Bulletin: This is an introductory course in mathematical finance. Technical difficulty of the subject is kept at a minimum, while the major ideas and concepts underlying modern mathematical finance and financial engineering are explained and illustrated. The course covers binomial model for stock prices, and touches on continuous time models and Black-Scholes formula. Credit may not be granted for MATH 485 and MATH 548. (3-0-3)

Enrollment: Elective for AM and other majors.

Textbook(s): The Mathematics of Finance: Modeling and Hedging, by Joseph Stampfli and Victor Goodman (2009), AMS. ISBN 978-0821847930.

Other required material:

Prerequisites: MATH 475 or consent of the instructor

Objectives:
1. Students will understand the basics of financial instruments such as stocks, bonds, futures, forwards, options and other derivatives.
2. Students will learn about arbitrage free pricing and hedging.
3. Students will understand the role of risk neutral probability measure the use of some elements of stochastic calculus in mathematical finance.
4. Student will understand the binomial model for stock prices and its use for pricing and hedging European and American type options.
5. Students will learn the basics of continuous time models and Black-Scholes option pricing formula.
6. Students will learn how to use mathematical software (Matlab, Mathematica) to price and hedge financial instruments in discrete time models.

Lecture schedule: 3 50 minutes (or 2 75 minutes) lectures per week

Course Outline: Hours
1. Financial Markets: Stocks, Bonds, Futures, Options   6
2. Arbitrage, Hedging and Valuation of Contingent Claims   12
3. Binomial Model for stock price   15
    a. European Options
    b. American Options
    c. Exotic Options
4. Continuous time models. Black-Scholes formula   12

Assessment:		
Homework	10-30%	
Computer Programs/Project	10-20%	
Quizzes/Tests	20-50%	
Final Exam	30-50%	

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