

OK
55.

ECON 421 - Mathematical Finance

Prof: V. Arunachalam Ph.D.,

aviswana@uniandes.edu.co

This is a technical course in financial theory, aimed at advanced undergraduate and masters students in Economics learning about financial markets and mathematical models. Students should be familiar with basic probability, statistics, and some calculus. The objective of the course is to introduce mathematical finance and familiarize the student with the methodologies that are used in finance.

Modern Portfolio Theory, the Capital Asset Pricing Models(CAPM), Arbitrage Pricing Theory(APT), Options, Futures, Swaps, Fixed Income Securities and Risk Management will be discussed in depth and at a rigorous and analytical level. Some topics will be covered by using Excel Spreadsheet model calculations and computer assisted numerical solutions of the underlying problems.

TEXT BOOKS:

1. Arunachalam, V., Lecture Notes Stochastic and Finance.
<http://euclides.uniandes.edu.co/~finance/econ421/> As the course progresses, I will post Lecture Notes, homework assignments,
2. Luenberger, D.G., Investment Science, Oxford University Press, 1998.

REFERENCE BOOKS:

1. Baxter, M., and Rennie, A., Financial Calculus.. Cambridge University Press, 2001.
2. Huang, C. and Litzenberger, R.H., Foundations of Financial economics. Prentice Hall, 1988.
3. Hull, J.C., Options, Futures, and Other Derivatives. Prentice Hall, 1997.
4. Luenberger, D.G., Investment Science, Oxford University Press, 1998.
5. Pliska, S.R., Introduction to Mathematical Finance. Discrete time Models. Blackwell Publishers Ltd. 1998.
6. Wilmott, P., Howison, S., and Dewynne, J., The Mathematics of Financial Derivatives. Cambridge University Press, 1995.
7. Steven Shreve's Lectures on Stochastic Calculus and Finance.
<http://www.cs.cmu.edu/~chal/shreve.html> .

ECON421- MATHEMATICAL FINANCE

Text Book: Investment Science by G. Luenberger

Professor V.Arunachalam

NO.	DATE	TOPICS	CHAPTERS
1	August 9	Introduction-Capital Markets: Equilibrium, Arbitrage, and Inn	1
2		14 Simple Analytical Pricing Rules for Bonds and Stocks	3
3		17 Portfolio Theory- Means, Variance	6.1-6.4
4		21 Risk and Return	6.5-6.9
5		24 Capital Asset Pricing Theory(CAPM)	7.1-7.4
6		28 CAPM	7.5-8.3
7		30 Arbitrage Pricing Theory(APT)	8.3-8.9 and Class Notes
8	September 4	Quiz I - 15% - Futures Forwards	10
9		7 Hedging and Nonlinear Risk	10
10		11 Fixed Income Securities(FIS)-Bonds and Yields,	3 AND 4
11		14 Fixed Income Securities(FIS)-Duration and Immunization	3 AND 4
12		18 The Mathematics of Asset Pricing	Class Notes
13		21 Discrete versus Continuous time Analysis	Class Notes
14		25 Project I - 10% Option Pricing Theory(OPT)	12
15		28 Binomial Option Pricing and Risk Neutral Pricing	13 and Class Notes
16	October 9	Excel Applications	11 and Class Notes
17		12 Simulation Models	11 and Class Notes
18		16 Ito Calculus and Simulations	11 and Class Notes
19		19 Simulation Models	11 and Class Notes
20		23 Ito Calculus and Simulations	11 and Class Notes
21		26 Black-Scholes Formula	13 and Class Notes
22		30 Hedging, The Greeks and Volatility	13 and Class Notes
23	November 2	Stochastic Volatility	Class Notes
24		6 Quiz II - 15% and Interest Rate Derivatives	4 and Class Notes
25		9 Term Structure of Interest Rates (TSIR)	4 and Class Notes
26		13 Term Structure Models - HJM	4 and Class Notes
27		16 Term Structure of Interest Rates (TSIR)	4 and Class Notes
28		20 Term Structure Models - HJM	4 and Class Notes
29		23 The Binomial Approach and Pricing Applications	14
30		27 Project II - 10% Over Review	

Grade:

Quizzes - 30%

Projects - 20%

Final Exam - 30%

Assignments - 10%

Class Participation - 10%

Total - 100%