DEPARTMENT OF MATHEMATICS
SYLLABUS

Course # & Name: MAT 133: Introduction to Mathematical Finance

Recommended Text(s) & Price: *Investment Science* by David Luenberger (Oxford University Press, 1998, $83.75)

Prepared by: Roger Wets UPC Approval Date: Fall 2006

Lecture(s)	Sections	Comments/Topics
Week 1	Introduction	Cash Flow (deterministic, stochastic), math. Definition of financial instrument, examples.
Week 2	Theory of Interest	Present and future value, internal rate, evaluation criteria.
Week 3	Fixed-Income Securities	Futures market, value formulas, bonds, duration.
Week 4	Term Structure of Interest Rates	Yield curve, forward rates, expectation dynamics, floating rates bonds.
Week 5	Applied Interest Rate Analysis	Capital budgeting, optimal portfolio, dynamic cash flow process.
Week 6	Random Cash Flow	Asset return, random returns, portfolio mean and variance, Markowitz model.
Week 7	Asset Pricing Model	Market equilibrium, capital market line, capital asset pricing model (CAPM), security market, pricing formulas.
Week 8	Models and Data	Factor models, CAPM as a factor model, arbitrage pricing theory, data and statistics, estimation and calibration.
Week 9	General Principles I	Introduction, utility functions, risk aversion, utility functions and mean-variance criterion.
Week 10	General Principles II	Linear pricing, portfolio choice, finite state models, risk-neutral pricing (pricing alternatives).

Additional Notes:

Other references:

Pricing Derivative Securities by E. Pressman (Academic Press, 2000).

An Elementary Introduction to Mathematical Finance by S. Ross (Cambridge University Press, 1999).