Department of Mathematical Sciences
WORCESTER POLYTECHNIC INSTITUTE
MA571 Financial Mathematics I, Fall 2003
web page for the course: http://www.wpi.edu/~bogdand/fin1/

Financial Mathematics I
SYLLABUS

Instructor: Bogdan Doytchinov, e-mail: bogdand@wpi.edu
Office: SH105D, Office hours: TBA.

TEXT. J.Hull, *Options, Futures, and Other Derivatives*, Prenice Hall (fifth edition), ISBN 0-13-009056-5.

COURSE CONTENTS. This course starts with discrete-time financial models, giving an introduction to arbitrage-based pricing of derivative securities and their uses for hedging and risk management. The key probabilistic concepts of conditional expectation, Markov processes, martingales and change of measure are all introduced within this framework. The course then makes a transition to continuous-time models by a limit argument. Topics include:

- securities markets, futures,options, swaps, and other derivatives;
- arbitrage and risk-neutral pricing;
- binomial trees, martingales, stochastic difference equations;
- Black-Scholes formula and partial differential equation via limit transition;
- pricing of American options, convertible bonds, options on dividend paying stock and on futures.
- sensitivity measures (the "greeks"), implied and estimated volatilities;
- use of derivatives for hedging and risk management;
- Real Options in capital investment appraisal.

GRADING POLICY. There will be two exams (one mid-term, and one final). Also, each week there will be a homework assigned, due at the following lecture.

The grade will be calculated in the following way:
40% of the grade come from the Homework,
30% of the grade come from the Midterm Exam,
30% of the grade come from the Final Exam.