ECES 490/690: Special Topics: Financial Engineering II (Winter, 2009)

Instructor: Steven Weber

Course sequence overview. The Financial Engineering course sequence covers selected topics from finance from an engineering perspective. The goals of the course sequence are:

- Prepare students to be competitive applicants for jobs in the financial sector.
- Help students apply their math and programming skills to an area outside of electrical engineering.
- Give students the skills to make more informed decisions in their personal investments.

The course sequence will consist of three courses, roughly divided as follows:

- Fin. Eng. I (Fall, 2008): Time-value of money, portfolio management, Capital Asset Pricing Model
- Fin. Eng. II (Winter, 2009): Derivative securities, option pricing, betting strategies, auctions,
- Fin. Eng. III (Spring, 2009): Financial time-series analysis, heavy-tailed disbns, parameter estimation

Each of the courses may be taken individually, i.e., I is not a prerequisite for II, nor is II a prerequisite for III. Each course will consist of lectures twice a week (Tuesdays and Thursdays), midterm and final exams, and homework assignments due every two weeks (roughly five per term). The homework assignments will involve programming (in Java), and will focus on coding up the concepts discussed in class.

Course description. Financial Engineering II will cover the following topics:

- Risky assets and risk-neutral probability
- Discrete time market models and the principle of no arbitrage
- Forwards and futures contracts
- Options (European and American, put and call)
- Option pricing and the Black Scholes formula

Prerequisites. Students must have taken ENGR-361: Probability and Statistics for Engineers and ECE-203: Programming for Engineers, earning a grade of C or better in each.

Class locations and times. Matheson 412, Tuesdays and Thursdays 12:30-1:50pm.

Textbook. Mathematics for Finance: An Introduction to Financial Engineering
Marek Capinski and Tomasz Zastawniak, Springer Undergraduate Mathematics Series, 2003

Class logistics.

- *Homework.* There will be five homework assignments, each due two weeks after being assigned. The purpose of the assignments is to help cement understanding of the lecture material and highlight practical issues in algorithm implementation.
- *Exams.* There will be a midterm and final exam. Exams will cover lecture concepts and will emphasize problem, and will be similar to problems asked on the homework assignments. The midterm exam will cover the first half of the course and the final exam will cover the second half of the course (not cumulative).
- *Vista.* I will send email to the class through Vista. I will also use Vista to post lecture notes and homework assignments and post your grades.

Grading. Your final course score will be computed as follows:

Homework	40%
Midterm Exam	30%
Final Exam	30%

(1)

Your final letter grade will be computed from your final courses score as follows:

95	100	A
90	94	A-
87	89	B+
83	86	B
80	82	B-
77	79	C+
73	76	C
70	72	C-
65	69	D+
60	64	D
0	59	F

(2)