ECES 490: Special Topics: Financial Engineering I:
Convex optimization, utility theory, and portfolio management (Fall, 2010)

Class locations and times

Instructor	Steven Weber (ECE)
Instructor email	sweber@ece.drexel.edu
Lecture times	9-10am on Monday, Wednesday, Friday
Lecture room	LeBow 241
Instructor office hour	Monday 10-11am (Bossone 211)

Description

Covers convex optimization problems with a focus on utility maximization of financial portfolios. Topics include:

- Probability review: random variables, expectation, variance, covariance, maximum likelihood parameter estimation
- Introduction to convex optimization: convex functions, convex sets, linear constraints, Lagrange multipliers, complementary slackness
- Utility function, risk aversion, certainty equivalence
- Connections with mean-variance portfolio management (Markowitz bullet, capital asset pricing model, security market line, beta): quadratic utility, normal returns

Textbook: *Investment Science*, David G. Luenberger, Oxford University Press, 1998.

Course logistics

- Website

    - We will use Drexel's **BB/Vista** course management website for this class extensively.
    - I will mail you important information regarding the class through this system. Please make sure you setup the system to forward BB/Vista emails to an account you check regularly.
    - Lecture notes, homework, solutions, etc. will be posted on the main course page, grouped by week.
    - The gradebook will hold your homework, worksheet, and midterm exam scores.

- Lectures

    - **Partial** lecture notes will be posted on the website **after** the lecture.
    - Website will indicate what sections of the book each lecture covered.
    - **Please** ask questions. If you are confused, then there is a very good chance someone else in the class is confused as well. Without questions I have little insight regarding class comprehension.
    - **Laptops** are not to be used during lecture without prior approval by the instructor. **Cell phones** are to be turned off or put in silent mode.

- Homework

  – HW is due **in class** one week after it is assigned.
  – HW may be handed in late (printed, delivered to me in my office or my mailbox) up to one week following the due date for a 50% penalty. I will not accept homework by email.
  – HW is to be completed individually. There should not be collaboration on homework.

- Midterm and final exam

  – There will be a midterm exam on Friday October 29.
  – There will be a final exam during final exam week. The final exam is mandatory for all students.
  – The final exam is comprehensive, it will cover the entire course, but with an emphasis on the material since the second midterm exam.
  – Exams will consist of problems for you to solve that are similar to or extensions of problems assigned during homework or recitation.
  – Exams are closed-book and closed notes. You are allowed to bring in a 3"×5" index card with notes on the front and back. These index cards will be collected along with your exam.
  – I **strongly** prefer not to reschedule final exams. If you have a compelling case you should give me as much notice as possible. Rescheduling requests will be reviewed on a case by case basis.

- Office hours

  – Office hours are available to you each week on Mondays 10-11am.
  – Please come to office hours. Office hours are often a very under-utilized resource.

Grading

Homework	40%
Midterm Exam	25%
Final Exam	35%

Your course letter grade will be assigned 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

Academic Dishonesty
The Drexel University policy on academic dishonesty will be strictly enforced. Plagiarism, fabrication, and cheating will, at the discretion of the instructor, constitute grounds for failure of the course.

Course calendar

Day	Date	Lecture	HW due	HW assigned
M	9/20	Lecture1M		HW1 assigned
W	9/22	Lecture1W		
F	9/24	Lecture1F		
M	9/27	Lecture2M	HW1 due	HW2 assigned
W	9/29	**No class**		
F	10/1	**No class**		
S	10/2	MatLab tutorial (optional)		
M	10/4	Lecture3M	HW2 due	HW3 assigned
W	10/6	Lecture3W		
F	10/8	Lecture3F		
S	10/9	MatLab tutorial (optional)		
M	10/11	**No class** (Columbus Day)		
W	10/13	Lecture4W	HW3 due	HW4 assigned
F	10/15	Lecture4F		
M	10/18	Lecture5M	HW4 due	HW5 assigned
W	10/20	Lecture5W		
F	10/22	Lecture5F		
M	10/25	Lecture6M	HW5 due	
W	10/27	Lecture6W		
F	10/29	**Midterm Exam**		
M	11/1	Lecture7M		HW7 assigned
W	11/3	Lecture7W		
F	11/5	Lecture7F		
M	11/8	Lecture8M	HW7 due	HW8 assigned
W	11/10	Lecture8W		
F	11/12	Lecture8F		
M	11/15	Lecture9M	HW8 due	HW9 assigned
W	11/17	Lecture9W		
F	11/19	Lecture9F		
M	11/22	Lecture10M	HW9 due	HW10 assigned
W	11/24	**No class** (Thanksgiving Holiday)		
F	11/26	**No class** (Thanksgiving Holiday)		
M	11/29	Lecture11M		
W	12/1	Lecture11W	HW10 due	
F	12/3	Lecture11F		
	12/6-10	**Final Exam**		