Economics 172B: Introduction to Operations Research, Part B

Winter 2016, Professor Itai Sher

This course primarily studies non-linear programming. We will examine optimization problems where the objective function, the constraint, or both are non-linear. We will use computational methods to find approximate solutions and calculus to find exact solutions. The course also studies dynamic programming and search models. Dynamic programming is a method of analyzing optimization problems that exploits the sequential structure of the problem.

Prerequisites

Econ 172A or Math 171A.

Lecture and Discussion Section Schedule

	Lecture	A00	MWF	4:00p-4:50p	CENTR	109
857644	Discussion	A01	F	1:00p-1:50p	CSB	002
857645	Discussion	A02	F	2:00p-2:50p	CSB	002

Please go to the discussion section you are enrolled in. There will be no class meetings on university holidays.

Examinations

There will be two midterm examinations and a final examination. The midterm exams will take place during the normal class time on Monday February 1 and Monday February 22. The final exam will take place on Wednesday, March 18 at 3:00pm-5:59pm. The final is scheduled for three hours but we will not use the full three hours.

Class Website (Ted)

Materials will be posted at https://ted.ucsd.edu/ on the page for Economics 172B. Students should log in regularly and check for announcements.

Course Materials (Links to all material other than the textbook are posted on Ted)

- *Textbook* The text for the class is *Operations Research: Applications and Algorithms* by Wayne Winston.
- *Math Resource:* A good math resources are Martin Osborne's online Math Tutorial: http://www.economics.utoronto.ca/osborne/MathTutorial/index.html,. Students may also want to consult textbooks on calculus and linear algebra.
- *Class Notes*. Class Notes corresponding to class lectures will be posted **after** each lecture.

Piazza

We will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TAs, and myself. Rather than emailing questions to me or the TAs, please post your questions on Piazza. Piazza offers students the opportunity to answer questions posed by classmates. If you are one of the students in the top 25% of number of "good" answers (marked by me or the Ce Liu), you will earn a bonus equivalent to 1% of the class grade, and if you are in the top 10%, you will earn a bonus equivalent to 2% of the class grade. There is a link to Piazza on Ted.

Problem Sets

Problem sets will be assigned on Fridays, and answers will be posted the following Friday. Problem sets will not be graded and students do not need to submit them. However, students should think of the problem sets as if they are due in the discussion section the following week. In discussion section, the TA will go over some of the problems. You will be much better prepared for the exams if you attempt the problem sets before seeing the answers. Working on the mathematical exercises is a critical part of the learning process, so students are strongly urged to take problem sets seriously.

Grading Weights

Midterm 1 is worth 30% of your grade, Midterm 2 is worth 30% of your grade. The final exam is worth 40% of your grade. In addition, you can earn extra credit on Piazza (see above). The class will be graded on a curve.

Teaching Assistant and Contact Information and Office Hours

The TA for this class is:

Ce Liu Office Hours: Fridays 10:00-11:00 am, ECON 119 cel013@ucsd.edu

Sher's Office Hours and Location

Mondays: 12:00-2:45 pm in Econ 113.

How to Succeed in the Course

Doing well in this course requires regular attendance at lectures and discussion sections and solving practice problems. Working through the mathematical exercises is a particularly important part of the learning process. It is not enough to glance at the solutions to the exercises. Students should work on as many exercises as they can before the discussion sections and before looking at solution keys. In general, you should take an *active* approach to the material. This involves testing yourself to make sure that you understand the material, translating what you read and learn in lectures into your own words, identifying what you don't understand and working on it until you do, and working on exercises.

Preliminary Course Outline

1. Math Review
2. One-variable optimization
3. Multi-variable unconstrained optimization
4. Multi-variable constrained optimization
5. Dynamic programming
6. Search Models
7. Inventory Models (time permitting)

Administrative Notes

1. If you have a documented disability, please bring your documentation to the professor or lead TA so that suitable accommodations can be made. If you believe that you have a disability and desire accommodation, please register with the Office for Students with Disabilities as soon as possible. For information on the steps for academic accommodation, please see http://www-senate.ucsd.edu/manual/appendices/app3.htm.

2. Any student found guilty of academic dishonesty in this course will earn a failing grade for the course. In addition to this academic sanction, the Council of Deans of Student Affairs will also impose a disciplinary penalty. For UCSD policy, please see http://www-senate.ucsd.edu/manual/appendices/app2.htm.

3. You will only need a writing instrument (pen or pencil) for examinations. No books, notes, or electronic devices

(including calculators, headphones, cell phones) are allowed, and students may not consult with each other during the examinations.

4. If you arrive late to an exam, you will be allowed to take the exam in the time that remains as long as no one has submitted his/her exam and left the room. If you arrive after someone has submitted an exam, you will earn zero points on the test.

5. If you believe that an exam has not been properly graded, you must give a **written note** clearly explaining why your score is in error to your discussion section or TA's office hours **within seven days** from when exams were returned to the class. The professor and TAs will then discuss the question, review your entire exam, and increase or decrease your score as is necessary. You may not ask for another regrade or reinstate your original grade. Hence, by submitting a re-grade request you risk having your score decrease, so consider this decision carefully.

6. UCSD has automated wait-lists. If you have any questions regarding adding the class, please contact the undergraduate advisors in Sequoyah Hall 245. The economics department does not allow late additions (additions after the second week) to any class.