Economics 172B: Introduction to Operations Research, Spring 2003, Luis Ubeda

This part of the Introduction to Operations Research sequence covers two kinds of important nonlinear mathematical optimization problems: nonlinear programming and integer programming. The class will teach you how to formulate economic and business problems as nonlinear or integer programming problems, teach you how to solve them, and teach you how to interpret their solutions. Economics 172A (linear programming) is an essential prerequisite.

Lectures are Tuesdays and Thursdays from 8:00-9:20am in Center Hall 214. The textbook is Hillier and Lieberman, *Introduction to Mathematical Programming* (2nd edition); copies have been ordered for the bookstore, and more are on reserve in Geisel Library. (Hillier and Liebermann's *Introduction to Operations Research* contains *Introduction to Mathematical Programming*. If you have access to that book or the first edition of *Introduction to Mathematical Programming* , you should have no trouble finding the relevant reading.) Other course information and materials, including this syllabus, will be posted on the class web page http://econ.ucsd.edu/classes/172B/.

Your grade will be based on written homeworks (max 15%); a midterm in class on Thursday, May 8 from 8:00-9:20 (max 35%); and a final on Wednesday, June 11 from :8:00-11:00 (50%). Exams will normally be given only at the regularly scheduled times; it is your responsibility to avoid conflicts. If there is any reason why you cannot take the final examination at the scheduled time or if you require special consideration, you must talk to me during the first two weeks of class. If you do not do so, then you must take the final at the scheduled time and place. I take violations of academic honesty seriously. You may use calculators (but not other electronic devices) during exams. You may not consult notes, books, or your classmates' exam papers during exams. Any act of academic dishonesty may be grounds for failure in the course.

Homeworks will be announced in class and posted on the class web page. I encourage you to discuss your homework assignment with your classmates, but you should write your answers independently. Assignments should be turned in by the start of class on the announced due date, or put in TA Dan Vine's mailbox in Economics 210 by that time; late assignments will not be accepted. The text also contains many good practice problems.

My office hours are Tuesdays and Thursdays 9:30-10:20 in Economics 112 or by appointment (lubeda@ucsd.edu, 858-534-5476)

TA Dan Vine's office hours are on Mondays 3pm-5pm in Economics 121 . (dvine@weber.ucsd.edu).

Course Outline and Readings (all in Hiller and Lieberman):

1 Nonlinear programming (Chapter 13 and Appendixes 2,3 and 4)
1.1 Introduction
1.2 Nonlinear versus linear programming: graphical illustration
1.3 Mathematical preliminaries: concave and convex functions Convex sets
1.4 One-variable unconstrained optimization
1.5 Multivariable unconstrained optimization
1.6 Equality constrained optimization
1.7 Inequality constrained optimization
1.8 Quadratic programming
1.9 Separable programming
1.10 Convex programming.
1.11 Other nonlinear programmingproblems

2. Integer programming (Chapter 12)
2.1 Introduction
2.2 Binary integer programming
2.3 Pure integer programming
2.4 Mixed integer programming