

22-QA-550 & 750-901 Optimization Modeling

Fall 2009
Monday 6:00-9:30

- Instructor:** Dr. Jeff Camm
533 Lindner Hall
556-7146
Jeff.Camm@uc.edu
- Office Hours:** Monday 2:00-4:00 and by appointment
- Required Text:** Baker, K.R., Optimization Modeling with Spreadsheets, Thomson Brooks/Cole, 2006.
- References:** Fourer, R., Gay, D.M. and B. W. Kernighan, AMPL, A Modeling Language for Mathematical Programming, boyd and fraser, 1993 (ISBN 0-89426-232-7).
- www.solver.com www.ampl.com
- Prerequisites:** Permission of the instructor.
- Course Objectives:**
1. To provide a detailed understanding of the construction, computer solution and interpretation of optimization modeling as applied to problems in business and industry.
 2. To provide hands on experience in the use of available computer software for solving optimization problems. When you leave this class and graduate from UC, we want you to be able to model and solve real optimization problems and provide real value to your company/clients.
- Withdrawals:** The college policy will be followed. The last day to withdraw is the end of the 8th week of class.

Grading: Your grade will be based on assignments both written and computational, midterm and final exams and a group project.

Individual Assignments	10%
Group Cases	15%
Project	15%
Midterm Exam	30%
Final Exam	30%

Weekly Homework

One key to doing well in optimization modeling is to try a lot of problems. I will give weekly problem assignments. Most will not be graded, but trying and successfully doing these problems on a weekly basis will ensure that you understand the material and prepare you for the exams. I will provide solutions to these problems and we will discuss some of the problems in class. As an extra incentive to try all of these problems in a timely fashion, I will periodically call (randomly) on students to present their solutions to some of these problems.

Cases

Two or three cases will be assigned to be done in groups. I will create the groups. Cases will be discussed in class and groups will be asked to present their results. More detail on the format of case write-ups and presentations will be provided later.

Project

The project involves you defining and solving a *real* optimization problem. The only hard constraint is that the data must be real. You are required to hand in a written document (details of this will be provided in class). A few examples of past projects are:

- Optimization of Workload and Travel Time for Insurance Underwriters
- Bank Staff Scheduling
- A 401K Contribution Optimization Model
- Evaluation of Processing Rate of an Injection Molding Co.
- Minimizing Overtime in an Automobile Manufacturing Facility
- Least Cost Formulation for Sausage & Hot Dog Manufacturing
- Transportation Network Optimization
- Retirement Planning Risk Model
- Staffing Model with Inventory & Labor Constraints in a Seasonal Business
- Picking a Fantasy Football Team
- Transportation Optimization for a Ball Bearing Manufacturer
- Staff Scheduling for a Public Golf Course

Tentative Schedule

9/28	Overview of Optimization Modeling and Software The Modeling Process Spreadsheet Optimization Modeling - - Excel Solver Algebraic Optimization Modeling - - AMPL	Ch 1
10/5	Linear Programming Modeling	Ch 2
10/12	NO CLASS - - INFORMS Note: Project Proposal Due 10/19.	
10/19	Nonlinear Programming Models <u>Project Proposal Due</u>	Ch 7
10/26	Integer Programming Modeling	Ch 6
11/2	<u>Midterm Exam</u>	
11/9	Integer Programming Modeling	Notes
11/16	Network Modeling	Ch 3
11/23	Stochastic Programming Models/ Robust Optimization	Notes
11/30	Project Presentations and Review for Final Exam	
12/7	<u>Final Exam</u>	