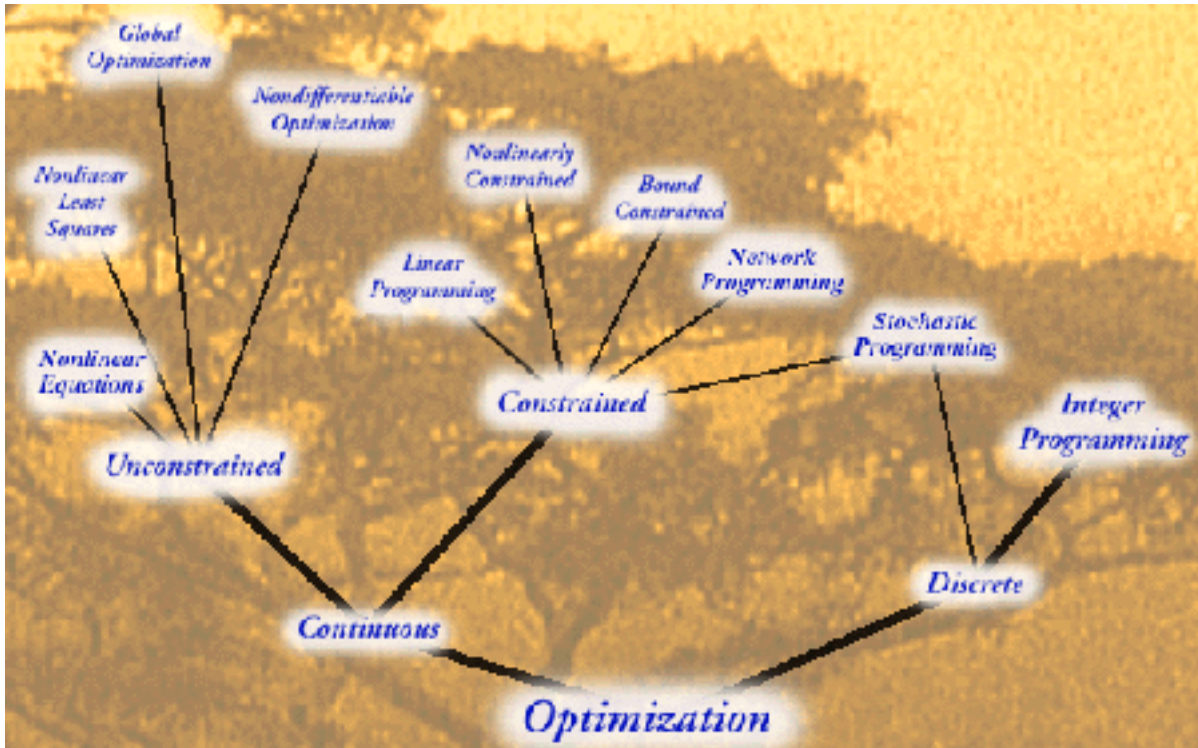


Mathematical Optimization, Applications & Analysis

MA 421

Fall 2004



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(before 8 p.m., please)

OFFICE HOURS: MWF 3:00 – 5:00 TR 8:00 - 9:00 or by appointment

About the cover: The figure shows the various branches of the tree of optimization. The original graphic is from the NEOS web site, an operations research potpourri, at: <http://www-fp.mcs.anl.gov/otc/Guide/index.html>.

Mathematical Optimization, Applications & Analysis

Course Overview – Fall 2004

Welcome! This course is the capstone of your mathematical tenure at Carroll. On our journey this semester, we will explore the application of mathematics to a variety of real-world problems. We will not only use much of the mathematics you have learned in your other courses; we will also tie together and extend it as well. You might have a few questions about the course; hopefully, many will be answered below.

“What is this course about?”

We will explore mathematical modeling as it relates to optimization. Contrary to what you may believe from Calculus, optimization isn't always as simple as taking derivatives (or partial derivatives) and finding the roots. Along our journey we will encounter

- model building
- model classification
- solution techniques
- sensitivity analysis
- exact vs. heuristic solutions

as we explore the idea of search, and how we can improve upon existing solutions by directed search. In particular, we will examine this idea of search in the area of mathematical programming – not to be confused with computer programming.

“What textbook are we using?”

The book we will be using is Introduction to Operations Research, 8th Edition, by Hillier and Lieberman. This text is the classic in the field, and although the new edition is really expensive, I think you'll find that it is a very good resource.

“So... what is the layout of the course?”

We will focus our efforts on the following:

- 1) Problem Solving with Mathematical Models,
- 2) Linear Programming
- 3) General mathematical programming
- 4) Heuristic Solution Techniques.

Throughout the semester, we will focus on understanding what type of problem we are trying to solve and how mathematics is used to solve the problem.

“How will my grade be determined?”

Your grade will be based on the following:

ASSIGNMENT	% OF TOTAL
Homework and Labs	20.0%
Mini Projects	30.0%
2 Graded Reviews	30.0%
Final Exam	20.0%

Additionally, each of you will be responsible for an in-class presentation of a project.

The final exam will take place during the last of all possible exam periods:

1:00 – 2:45 Thursday Dec, 16TH.

“Will we be meeting in the Computer Lab?”

I have the small computer lab (Simperman 147) on reserve every day. We won't be meeting there all the time, so stay tuned for directions. We will use Mathematica and Excel (and possibly other software) for many of the projects.

“What's your policy on late work?”

I collect homework and projects **at the beginning of class on the due date.** In order to be successful in this course, you must stay caught up, so I encourage you to keep up with your homework. In order for me to hand back assignments in a timely manner, it is imperative that work be turned in **on time.**

No work beyond the due date will be accepted; students will receive a grade of zero for work not turned in on the due date.

Let me know as soon as possible if you have circumstances (health or personal) that will require extended absences so that we can work out an acceptable arrangement.

“What about getting some help?”

Stop by if you need help! My office is always open; however, you may find that I'm not always the person in my office. I will be on campus MWF afternoons (1:00 – 5:00) and TR mornings (8:00 – 12:00) only. If my office hours don't work for you, **let me know and we can schedule another time for me to be on campus.**

“Anything else?”

I welcome your constructive comments to help me make this the best course possible. My goal is to help prepare you for the real world – where typically no one is looking over your shoulder to make sure that you are where you are supposed to be and doing what you are supposed to do. At the same time, this is still an environment where you have a safety net (i.e. I won't fire you... but I may confront you if you are slacking). The key to your success in this course depends mainly upon your attitude, your study habits, and your desire to learn. Let's have fun!

If you have special needs or problems, please be sure to speak to me or see Joan Stottlemeyer in the Academic Resources Center (447-4504) about them as early as possible in the semester. There is additional information in the Carroll College catalog.