

Advanced Mathematical Programming

IE417

Dr. Ted Ralphs

First Meeting

Administrivia

- Welcome Back!
- Class Meeting Time
- Office Hours
 - M 10-11
 - TR 2:30-3:30

What will this class be about?

- Mathematical foundations of optimization
 - Convex Sets
 - Convex Functions
- Optimality Conditions
 - Unconstrained Optimization
 - Constrained Optimization
- Nonlinear Duality Theory
- Algorithms for Nonlinear Programming
- We will not cover modeling techniques

What will I get out of this class?

- Understanding of the fundamental mathematics underlying the theory of optimization.
- Understanding of the basic theory of nonlinear programming, including optimality conditions.
- Understanding of the basic computational techniques used in nonlinear programming.
- The ability to develop a rigorous mathematical argument.
- The ability to perform accurate self-assessment of your work.

My approach to lectures

- Lectures should involve an **active dialog** between teacher and students.
- You are expected to **ask questions** and provide some feedback.
- Lectures will be at a high level in order to provide intuition and highlight what is important.
- The corresponding reading will be more in-depth and theoretical.

More on lectures

- There will be a Web site for the class at

<http://www.lehigh.edu/~tkr2/teaching/ie417>

- I will do my best to post the lecture slides there before the class so that you can prepare if you want.
- All handouts for the class will be available at the site.
- I will try to post links to relevant sites and reference materials.

Assignments and Exams

- There will be **six assignments**, approximately one every two weeks.
- Most assignments will be non-computational.
- There will be **mid-term and final exams**.
- Both exams will be 48-hour take-homes.
- I may try and work some computation in to the course later in the semester.

Homework policies

- Written assignments should be submitted in class on the date due.
- Working together is OK, but **write up your solutions independently**.
- Try the problems on your own first before consulting other references or the Internet.
- **Cite your references if you have any!**
- Lateness policy is in the handout.

Textbook

- The book is [Bazaraa, Sherali, and Shetty](#).
- This book is somewhat theoretical and abstract.
- It is very well written and provides in-depth coverage of a wide range of topics.
- We will cover most of the book.

Some philosophy and policy

- We will not adhere to a strict schedule for lectures. The course pace will be adjusted as we go.
- I will try to modify my teaching style according to the learning styles of the students.
- I'm always available for questions, but if you can make it during office hours, that's the easiest for me.
- Please drop by and let me know how it's going.

Grading

- Your grade will correspond to your learning and understanding of the course material.
- Some areas to keep in mind
 - Good proof technique
 - Level of detail and rigor
 - Accurate self-assessment
 - Class participation
- Weighting
 - 30% Homework
 - 30% Mid-term
 - 30% Final
 - 10% Class Participation

Questions?