

Math 431 • Mathematical Optimization I • Winter 2006

Course Instructor: Dr. Paul Choboter

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Office Hours: MTF 11AM-NOON, M 4-5PM, Th NOON-1PM, and by appointment.

Textbook: *An Introduction to Optimization*, 2nd edition,
Edwin K. P. Chong and Stanislaw H. Zak, Wiley, 2001.

The course will follow the text closely. **Part I Mathematical Review** (Chs. 1-5) will be briefly discussed at the beginning, and referred to as necessary throughout the course. **Part II Unconstrained Optimization** (Chs. 6-12) will be covered in detail. **Part III Linear Programming** (Chs. 15-18) will be discussed as time permits. The remainder of Part III and all of Part IV will be covered in Math 432 Optimization II.

Course goals and learning objectives: The student should:

- Review and be introduced to successful optimization models from operations research, physics, and engineering.
- Gain geometric insight into current successful algorithms in both constrained and unconstrained optimization.
- Obtain an understanding of the Lagrange multiplier-vector and Kuhn-Tucker-Karush vectors as dual variables (shadow prices, etc.). [This goal applies to Math 432.]
- Obtain an appreciation of the variety of mathematical techniques and theorems that are used to solve optimization problems, e.g., solving systems of equations, fixed point theorems, Weierstrass Theorem, etc.

Final Grade:

15%	Homework (5 problem sets, primarily from textbook)
25%	Midterm exam #1 (In class on Thursday, January 26th)
25%	Midterm exam #2 (In class on Thursday, February 23rd)
35%	Final exam (Thursday, March 16th, 7:10PM-10PM, Rm 38-201)

At the instructor's discretion, the lower of the two midterms may be dropped, and the weight transferred to the final. Under no circumstances will the weight of the final be reduced. The final exam is comprehensive.

Calculators: All exams will consist of questions that can be done without the use of a calculator. No calculators or other aids will be permitted during exams.

Missing a midterm: If a student misses a midterm, the score of that test will be zero unless the student phones the instructor to make alternate arrangements *before the test* or presents an acceptable official document (e.g., doctor's note) explaining the absence.

Important dates (exams):

- Thursday, January 26 Midterm exam #1
- Thursday February 23 Midterm exam #2
- Thursday March 16 Final exam