

UIC Department of Mechanical and Industrial Engineering
IE 576 - Nonlinear Optimization
Fall 2011

Instructor

Elodie Goodman, Department of Mechanical and Industrial Engineering
Office: 3025 ERF (842 W. Taylor St.)
Phone: 312-996-8777
email: elodie@uic.edu
Office hours: Monday and Wednesday 12-1pm or by appointment

Meeting times

The class meets for lecture on Mondays and Wednesdays at 3:00-4:15pm in 3290 SEL. Please arrive on time and turn your cell phones off during the lectures.

Fall 2011 Catalog Description

4 hours. Convex analysis, line search techniques, unconstrained and constrained optimization, optimality conditions, duality, convex and nonconvex optimization, large-scale optimization, and real-world applications. Prerequisite(s): IE 471 or equivalent.

Textbook

Bertsekas, *Nonlinear Programming*, 2nd Edition, Athena Scientific, 1999.

Web page

Course-related information announcements, and homework assignment and solutions can be found on Blackboard.

Homework

Homeworks are assigned on Blackboard, and are due by 3pm on the due date. You may submit your assignment electronically on Blackboard or in person as a hard copy at the lecture. A homework turned in by someone else or a late homework will not be accepted. Students with documented medical reasons may be excused. The homework solutions will be posted on Blackboard after 3pm on the due date or shortly after. Students must commit not to upload the solutions or other course material on any course material-sharing or other websites. Partially graded homeworks will be returned in class the following week. Collaboration with other students is encouraged; you may discuss with your classmates possible approaches to solving the problems in the

homework, but **each student should write her/his solution and computer code independently**, and you should indicate the names of the students you collaborated with. The use of Matlab or another programming language will be necessary for most assignments.

Grading

Midterm and final exams are graded numerically. The course grade will be determined as follows:

Homework and class participation	15 %
Midterm	35 %
Final Exam	50 %

The homework and class participation grade is evaluated based on class attendance, class participation, and homework evaluations.

Tentative course outline

Week 1	Aug. 22 – 24	Introduction and motivation	
Week 2	Aug. 29 – 31	Basic notions	HW 1 assigned on Aug. 31
Week 3	Sep. 7	Convexity	HW 1 due on Sep. 7 HW 2 assigned on Sep. 7
Week 4	Sep. 12 – 14	Unconstrained Optimization: Optimality conditions	HW 2 due on Sep. 14 HW 3 assigned on Sep. 14
Week 5	Sep. 19 – 21	Unconstrained Optimization: Algorithms (1)	HW 3 due on Sep. 21 HW 4 assigned on Sep. 21
Week 6	Sep. 26 – 28	Unconstrained Optimization: Algorithms (2)	
Week 7	Oct. 3 – 5	Constrained Optimization: Optimality conditions (1)	HW 4 due on Oct. 5
Week 8	Oct. 10 – 12	Constrained Optimization: Optimality conditions (2)	Midterm on Oct. 10 HW 5 assigned on Oct. 12
Week 9	Oct. 17 – 19	Constrained Optimization: Duality (1)	HW 5 due on Oct. 19 HW 6 assigned on Oct. 19
Week 10	Oct. 24 – 26	Constrained Optimization: Duality (2)	HW 6 due on Oct. 26 HW 7 assigned on Oct. 26
Week 11	Oct. 31 – Nov. 2	Constrained Optimization: Algorithms (1)	HW 7 due on Nov. 2 HW 8 assigned on Nov. 2
Week 12	Nov. 7 – 9	Constrained Optimization: Algorithms (2)	HW 8 due on Nov. 9 HW 9 assigned on Nov. 9
Week 13	Nov. 14 – 16	Interior Point Methods	HW 9 due on Nov. 16 HW 10 assigned on Nov. 16
Week 14	Nov. 21 – 23	Conic Optimization	HW 10 due on Nov. 23 HW 11 assigned on Nov. 23
Week 15	Nov. 28 – 30		HW 11 due on Nov. 30
	Dec. 5, 8–10am		Final exam