DSC 608 Special Topics in Advance Optimization
Winter 2015

Instructor	Eren B. Çil	**Class Schedule**	Tue 12:30pm-3:20pm
Office	Lillis 483	**Location**	Lillis 458
Phone	541-3468252	**Office hours**	By appointment only.
Email	erencil@uoregon.edu	**Online Access**	The Blackboard

COURSE OBJECTIVE:

This course introduces students to the fundamentals of nonlinear optimization theory and methods. Topics include unconstrained and constrained optimization, linear and quadratic programming, duality theory, interior-point algorithms and theory, Lagrangean relaxation, and semi-definite programming. Algorithmic methods used in the class include steepest descent, Newton's method, interior-point methods and penalty and barrier methods.

REQUIRED COURSE MATERIALS:

Textbook:

Nonlinear Programming- Second Edition *($85)* by *D. P. Bertsekas*. Athena Scientific, 2008. The textbook can be purchased through amazon.com via this link:http://www.amazon.com/exec/obidos/ASIN/1886529000/ref=nosim/mitopencourse-20.

Software:

Matlab, Mathematica. Both are available for free through University of Oregon IT:

- https://it.uoregon.edu/software/mathematica
- https://it.uoregon.edu/software/matlab

GRADING:

The relative weighting for the various scoring components of the course are distributed as follows:

Assignments	35%
Midterm Exam	30%
Final Exam	35%

Exams:

Both exams are closed book/notes but you can bring ONE letter-sized double-sided sheet.

Midterm exam is at **12:30pm** on **February 10, 2015** in our usual classroom and takes 3 hours.

Final exam is at **8am** on **March 19, 2015** in our usual classroom and takes 3 hours. The final exam is cumulative.

Assignments:

There will be 7 assignments. All assignments should be handed in at the beginning of the class on the due date. The assignment schedule and the weight of each homework assignment are as follows (All assignments add up to 35*% of the total grade*):

	Posting Date	Due Date	% of the Total Grade
Homework 1	January 6 (Tue)	January 13 (Tue)	5%
Homework 2	January 13 (Tue)	January 20 (Tue)	5%
Homework 3	January 20 (Tue)	January 27 (Tue)	5%
Homework 4	January 27 (Tue)	February 3 (Tue)	5%
Homework 5	February 17 (Tue)	February 24 (Tue)	5%
Homework 6	February 24 (Tue)	March 3 (Tue)	5%
Homework 7	March 3 (Tue)	March 13 (Fri)	5%

MISC. POLICIES

We will adhere to the following policies, the motivations for which should be self-explanatory.

- A missed test will result in a score of zero, so you should be sure to check now whether you have a conflict with the scheduled exam dates and times. On the subject of test-taking: Do not wear a brimmed hat during tests. Your eyes should be visible and on your own paper.
- **Academic Misconduct:** The University Student Conduct Code (available at http://uodos.uoregon.edu/StudentConductandCommunityStandards) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at http://library.uoregon.edu/guides/plagiarism/students/index.html.

UNIVERSITY OF OREGON ADA POLICY

The University of Oregon is committed to making available to all its students the opportunity for an excellent and rewarding education. The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 provide federal guidelines which help the University ensure that students with documented disabilities have equal access to this opportunity. If you have a documented disability and anticipate needing accommodations in this course, please make arrangements to meet with me soon. Please request that the Counselor for Students with Disabilities send a letter verifying your disability.

TENTATIVE SCHEDULE[1]:

WEEK 1	**January 6** • Unconstrained optimization • Convexity and optimization • **Assignment 1** (**Due Jan 13**)
WEEK 2	**January 13** • Unconstrained optimization of quadratic functions • Symmetric and positive definite matrices • **Assignment 2** (**Due Jan 20**)
WEEK 3	**January 20** • Steepest descent method • Rates of convergence • **Assignment 3** (**Due Jan 27**)
WEEK 4	**January 27** • Newton's method • **Assignment 4** (**Due Feb 3**)
WEEK 5	**February 3** • Constrained optimization • Necessary conditions
WEEK 6	**February 10** **MIDTERM EXAM**
WEEK 7	**February 17** • Constrained optimization (cont.) • Sufficient conditions and constraint qualifications • **Assignment 5** (**Due Feb 24**)
WEEK 8	**February 24** • Projection and penalty methods for constrained optimization problems • **Assignment 6** (**Due Mar 3**)
WEEK 9	**March 3** • Duality theory • Construction of the dual problem • **Assignment 7** (**Due Mar 13**)
WEEK 10	**March 10** • Duality theory (cont.) • Semidefinite optimization

[1] Subject to change.