EE381K-18: Convex Optimization
Fall 2019
Aryan Mokhtari

Course Description:

This course deals with theory, applications and algorithms of convex optimization. The course is divided in 3 parts: Theory, applications, and algorithms. The theory part covers basics of convex analysis and convex optimization problems such as linear programing (LP), semidefinite programing (SDP), second order cone programing (SOCP), and geometric programing (GP), as well as duality in linear programming and general convex and conic optimization problems. In the next part of the course, we will focus on applications of convex optimization in engineering, statistics and operations research. The applications range from systems and control theory to estimation, data fitting, information theory, statistics and machine learning. Finally, in the last part of the course we discuss the details of optimization algorithms for solving convex programing as well as their complexity analysis. It is intended to be a first year graduate class, but assumes good familiarity and ability with linear algebra, and a relatively strong mathematical background.

Instructor:

Aryan Mokhtari
Email: mokhtari@austin.utexas.edu
Office Hours: 1:30pm-2:30pm, Mondays (EER 6.826)

TAs and their Office Hours:

Monica Ribero
Email: mribero@utexas.edu
Office Hours: 3:00pm-5:00pm, Wednesdays (TBD) & 9:00am-11:00am, Fridays (TBD)

Yiyue Chen
Email: yiyuechen@utexas.edu
Office Hours: 3:30pm-5:30pm, Tuesdays and Thursdays (TBD)

Course Expectations:

The course will use several online tools:

• *Canvas:* Announcements, scanned class notes, assignments, grades for homework sets and exams.

- *Piazza:* this facilitates discussion between students in the class. It is primarily a venue to get basic help from your student peers. Office hours are the best way to get guidance on solutions from the TAs and the instructors. The TAs will answer questions on Piazza to the best of their bandwidth. Emailed questions about the homework will not be answered; email should be restricted to logistical issues.

- *Gradescope:* Electronic homework submission and homework/exam grading platform.

Course Material:

The class will primarily be taught on the whiteboard (or chalk board if possible). The class includes material from several sources, but the primary textbook is Convex Optimization by Boyd and Vandenberghe. This is available for purchase, and also for download at http://web.stanford.edu/~boyd/cvxbook/

Homework:

There will be homework due approximately once every week, and **will be assigned on Canvas**. **Homework needs to be scanned and submitted via Gradescope before 5pm** on the day it is due. Solutions will be released on the day when the homework was due.

Submissions outside of Gradscope, and late submissions, will not be accepted.

*** One homework (the one with lowest score) will be dropped from the final grading.*

*** Discussing homework problems is encouraged. Copying is considered cheating.* Be absolutely certain to submit your own independent homework solutions, e.g., copying or letting someone else copy your homework is unacceptable.

Grading:

Homework: 35%, Midterm: 25%, Final: 40%

Regrade request policy: If you feel we have made a mistake in the way a certain problem has been graded, you will have one week - from the date the grades are returned - to inform the relevant person (TAs for homeworks, instructors for exams) about the discrepancy. Requests should be made via Gradescope.

Exams:

Midterm exam will be on Wednesday, October 23 (in class).
Final exam will be on Monday, December 16, 2:00 pm-5:00 pm.

University Honor Code:

"The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community."

College of Engineering Drop/Add Policy

The Dean must approve adding or dropping courses after the fourth class day of the semester.

Students with Disabilities

UT provides upon request appropriate academic accommodations for qualified students with disabilities. Please contact the Office of Dean of Students at 4716259 or ssd@uts.cc.utexas.edu.

Emergency Preparedness

Every member of the university community must take appropriate and deliberate action when an emergency strikes a building, a portion of the campus, or entire campus community. Emergency preparedness means we are all ready to act for our own safety and the safety of others during a crisis. Students requiring assistance in evacuation must inform the instructor in writing of their needs during the first week of class. This information must then be provided to the Fire Prevention Services office by fax (5122322759), with "Attn. Mr. Roosevelt Easley" written in the subject line.

You may want to bookmark the emergency Web site http://www.utexas.edu/emergency/ because it is updated with information during actual emergencies or campus closures.
The university collects cell phone numbers from members of the campus community for emergency text messages. You can sign up for campus text alerts online. If you would like more information regarding emergency preparedness, visit http://www.utexas.edu/safety/preparedness