EE381K-18: Convex Optimization (Unique Number: 17690)
CS395T: Convex Optimization (Unique Number: 50895)

Fall 2024

Constantine Caramanis

Course Description:

This course focuses on the theory of Convex Optimization. The first part of the class focuses on the theory of Linear Programming (LP) and its applications, as well as the analysis of Simplex Algorithm for solving LPs. During this segment of the class we will also cover some applications to combinatorial optimization, including primal-dual methods. The second part of the class focuses on the basics of Convex Optimization and covers some important classes of convex programs such as semidefinite programing (SDP), as well as duality in general convex and conic optimization problems. In the third 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 some basic optimization algorithms for solving convex programming as well as their complexity analysis. It is intended to be a first year graduate class, but assumes a solid familiarity and ability with linear algebra, and a strong mathematical background.

Instructor:

Constantine Caramanis (https://caramanis.github.io)
Email: constantine@utexas.edu
Lectures: 10:30am-12:00pm MW, ECJ 1.312.
Office Hours: 11:00am-12:00pm, Thursdays, EER 6.820.

TA and their Office Hours:

Name: Khang Le
Email: khanglnt@utexas.edu
Office Hours: TBA

Course Expectations:

The course will use several online tools:

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

- *Ed Discussion Board:* 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 TA and the instructor. The TA and I will answer questions on Ed Discussion to the best of our bandwidth. E-mail should be restricted to logistical issues.

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

Course Material:

The class will primarily be taught in person. The class includes material from several sources, but the primary reference textbook is Convex Optimization by Boyd and Vandenberghe. This is available for purchase, and also for free download at http://web.stanford.edu/~boyd/cvxbook/

We will not necessarily be following the textbook linearly, but you will be able to match up topics. We will cover some advanced topics or more sophisticated presentation that is not available in this textbook. For this, the classes themselves and any notes we hand out constitute the main references.

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 11:59pm** on the day it is due. Solutions will be released the day after the homework is due.

Submissions outside of Gradescope, 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 homework sets, instructors for exams) about the discrepancy. Requests should be made via Gradescope.

Exams:

Midterm exam: Wednesday, October 30th, during regular class time
Final exam: TBD — as announced by the registrar

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