IE 2082: Linear Optimization
Fall 2019 Syllabus

Basic information

Instructor:Dr. Oleg A. Prokopyev, `droleg@pitt.edu`
Lectures: MW 2:30 pm-3:45 pm
Classroom: Benedum 1045
Office: Benedum 1031
Office hours: TBD
Course website: http://courseweb.pitt.edu
Textbook(s): Most of the discussed material will be from *Introduction to Linear Optimization* by Bertsimas & Tsitsiklis and *Linear Programming: Foundations and Extensions* by Vanderbei. Some topics will be covered using research papers.

Prerequisites

1. Introductory course in Linear Programming/Operations Research and familiarity with the simplex algorithm.

2. Knowledge of (a) linear algebra, (b) differential calculus, and (c) basic mathematical concepts such as sets, functions, vectors, matrices etc.

3. An interest in mathematical methods.

Topics

We will focus on linear programming, including modeling, solution methods (simplex algorithm, interior-point algorithms), a particularly in-depth look at the simplex algorithm, duality and sensitivity analysis, and decomposition techniques. We will also discuss some basics of integer programming including modeling and solution approaches. Depending on time, we will also look at some related problems/techniques: network flows, robust optimization, quadratic and convex programming.

The tentative order of topics is as follows: modeling with linear (integer) programs, simplex algorithm(s), duality and sensitivity, interior-point algorithm(s), computational issues, basics of integer programming, network problems, decomposition techniques, elements of robust optimization, additional topics.

Assignments and Exams

There will be regular homework assignments and 2 exams: the mid-term (in-class, October 21) and the final (take-home).

Grading

Tentative weighting is 30% homework, 35% mid-term and 35% final.

Attendance

No attendance will be taken, but **the students are responsible for the announcements made in the class.**

Homework collaboration: You can learn a lot from working with other people. Therefore, you are allowed to work together to solve homework problems. You must **write up** your homework solutions **on your own**, however, without assistance from other people. This is to help you and me ensure that you understand the solutions that the group came up with.

Exam collaboration: No collaboration is allowed on exams.

If you are ever unsure about the collaboration policy, please contact me for clarification.

Supplemental texts

- *Linear Programming and Network Flows* by Bazaraa, Jarvis, and Sherali. The first alternative I would consider if you do not like Vanderbei's text.

- *Operations Research* by Winston (or *Introduction to Mathematical Programming* by the same author). Typical undergraduate level text.

Academic Integrity

All students are expected to adhere to the standards of academic honesty. Any student engaged in cheating, plagiarism, or other acts of academic dishonesty would be subject to disciplinary action. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity http://www.provost.pitt.edu/info/ai1.html. This may include, but is not limited to the confiscation of the examination of any individual suspected of violating the University Policy.

Disability Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890, `drsrecep@pitt.edu`, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Statement on Classroom Recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Student Opinion of Teaching Surveys

Students in this class will be asked to complete a Student Opinion of Teaching Survey. Surveys will be sent via Pitt email and appear on your CourseWeb landing page during the last three weeks of class meeting days. Your responses are anonymous. Please take time to thoughtfully respond, your feedback is important to me. Read more about Student Opinion of Teaching Surveys.

Diversity and Inclusion

The University of Pittsburgh does not tolerate any form of discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity or other factors as stated in the University's Title IX policy. The University is committed to taking prompt action to end a hostile environment that interferes with the University's mission. For more information about policies, procedures, and practices, see:

http://diversity.pitt.edu/affirmative-action/policies-procedures-and-practices.

I ask that everyone in the class strive to help ensure that other members of this class can learn in a supportive and respectful environment. If there are instances of the aforementioned issues, please contact the Title IX Coordinator, by calling 412-648-7860, or e-mailing `titleixcoordinator@pitt.edu`. Reports can also be filed online:

https://www.diversity.pitt.edu/make-report/report-form.

You may also choose to report this to a faculty/staff member; they are required to communicate this to the Universitys Office of Diversity and Inclusion. If you wish to maintain complete confidentiality, you may also contact the University Counseling Center (412-648-7930).