Course Syllabus
CSU Math 510: Linear Programming and Network Flows, Fall 2022

Instructor: Henry Adams
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Office: Weber 120
Lectures: TR 9:30–10:45am, in Clark C360
Class Webpage: http://www.math.colostate.edu/~adams/teaching/math510fall2022

Textook: *Understanding and Using Linear Programming* by Jiří Matoušek and Bernd Gärtner. This book is freely available as a PDF to CSU students if you login on the CSU library webpage.

Course Overview: Optimization methods, linear programming, simplex algorithm, duality, sensitivity analysis, max flow and min cut, integer linear programming, Farkas lemma, ellipsoid method, interior point methods, total unimodularity, optimal transport, sparsity-promoting L^1 norm, quadratic programming.

Goals: Students will become fluent with the main ideas and the language of linear programming, and will be able to communicate these ideas to others.

Prerequisites: The official prerequisite is MATH 261 or MATH 315. The unofficial prerequisite is a certain level of mathematical experience, such as undergraduate-level linear algebra.

Requirements: You will be asked to do two mini-projects this semester, with the first due on **Thursday, October 13**, and with the second due on **Thursday, December 8** (the last day of class). A great way to know if you have learned something is to try to communicate it with others. Therefore, I am asking you to make your mini-project publicly available (typically meaning that it has a url), with the goal of helping teach folks from outside of CSU. The medium for your mini-projects is wide-open: it could be a blog post, a video tutorial, a small webpage explaining a topic, an expository note on a topic, a small report on a research topic, a summary of an academic paper, a computer program you have written using linear programming, an interview with somebody who uses linear programming in their work, or a presentation for a local data science club, etc! The possible topics for your mini-projects are also wide-open: it could be on some aspect of the history of linear programming, an explanation of the solution to an exercise, an explanation of the proof of a theorem, a topic from a lecture, a topic that wasn't covered in any lectures (but that you perhaps wish was), an academic paper you are interested in, or a description of how linear programming relates to your research area, etc. I am excited to see what mini-projects you all come up with and propose!

Standard mode of communication: I will primarily communicate announcements in class and via emails through Canvas.

Academic Policies and Integrity: Students are expected to adhere to the CSU Academic Integrity Policy as found on the Students' Responsibilities page of the CSU General Catalog and in the Student Conduct Code. CSU policies apply for illness, religious or spiritual holidays, unexpected events, university-sanctioned activities, etc. Colorado State University is committed to providing reasonable accommodations for all persons with disabilities, and students with disabilities are encouraged to contact the Student Disability Center. A good summary of this information is available at the Syllabus Resources and Policies page, corresponding to the below QR code.

Covid: My understanding of CSU policies this semester is that you may wear a mask or not. If you are sick or suspect you may be sick, please do not come to class, and do send me an email. The following information is from the university:

- All students are expected and required to report any COVID-19 symptoms to the university immediately, as well as exposures or positive tests (even home tests).
- If you suspect you have symptoms, or if you know you have been exposed to a positive person or have tested positive for COVID (even with a home test), you are required to fill out the COVID Reporter (https://covid.colostate.edu/reporter).
- If you know or believe you have been exposed,including living with someone known to be COVID positive, or are symptomatic, it is important for the health of yourself and others that you complete the online COVID Reporter. Do not ask your instructor to report for you.
- If you do not have internet access to fill out the online COVID-19 Reporter, please call (970) 491-4600.
- You may also report concerns in your academic or living spaces regarding COVID exposures through the COVID Reporter. You will not be penalized in any way for reporting.
- When you complete the COVID Reporter for any reason, the CSU Public Health Office is notified. Students who report symptoms or a positive antigen test through the COVID Reportermay be directed to get a PCR test through the CSU Health Network?s medical services for students.
- For the latest information about the University?s COVID resources and information, please visit the CSU COVID-19 site: https://covid.colostate.edu.