Instructor: Stephen C. Billups, CU-Denver Bldg., Rm 607, (303)556-4814
email: Stephen.Billups@ucdenver.edu,
URL: http://www-math.cudenver.edu/~billups
Course Website: http://www-math.cudenver.edu/~billups/courses/ma5593/
Office hours: posted on my website

Class Hours: MW 5:30-6:45 CU-Denver Bldg, Room 641

Prerequisites: Linear Algebra (Math 3191)


Overview: A linear program is an optimization problem that seeks to minimize or maximize a linear function subject to a system of linear inequality and/or equality constraints. Applications of linear programs include transportation problems, flight scheduling, corporate planning, linear and nonlinear curve fitting, product mix, load balancing, production scheduling, inventory control, and many others. There are two major classes of algorithms for solving linear programs: simplex methods and interior point methods. Simplex methods stem from a basic operation, called pivot algebra, whereas interior point methods are based on the use of penalty functions. This course will cover the simplex method in detail, emphasizing both mathematical foundations as well as computational considerations for effective computer implementations. A brief introduction to interior point methods will also be given. In addition to covering these two algorithms, the course will discuss theoretical aspects of linear programming, such as polyhedral theory, duality theory, optimality conditions, convexity, degeneracy, and convergence theory, as well as sensitivity analysis. Additional topics include network flows problems and large scale optimization.

The course will rely heavily on the use of MATLAB. Many of the assignments will involve MATLAB programming. However, prior knowledge of MATLAB is not a prerequisite for the course.

Assignments and Grading: You should expect to spend 6-9 hours per week outside of class. If you routinely spend more than this amount of time, please let me know!!

Homeworks: Homework will be assigned regularly throughout the semester. Homeworks will usually involve some amount of MATLAB programming. Homework will typically be due at the beginning of class one week after it is assigned. NO LATE HOMEWORKS WILL BE ACCEPTED. You are encouraged to discuss the homeworks with classmates; however, you should write up the solutions on your own.

Presentation: Each student will give an oral presentation based on a recent journal article related to linear programming. This will be a formal presentation, using visual aids.

Tests: There will be a mid-term exam and a final exam. Both exams will be closed book.

Participation: You are expected to come to class prepared to participate actively. To encourage active involvement, there will be a variety of short in-class assignments. To help you prepare for class, I will put a study guide on the Course Web Page each week indicating the material you are responsible for. Additionally, each of you will occasionally be assigned topics to present to the rest of the class.

Grading Grades will be weighted as follows: Homework (40%), Presentation (15%), Midterm (15%), Final 20%, Participation 10%.

Course Policies:

- Late Policy: Unless otherwise stated, no late assignments will be accepted.
- Academic Honesty:
Plagiarism is the use of another person’s words or ideas without crediting that person. While I encourage you to discuss homework problems with other students, you must write-up your solutions in your own words, and give credit for any help you received. Plagiarism and cheating will not be tolerated and may lead to failure on an assignment, in the class, and/or dismissal from the University.

You are responsible for being attentive to or observant of campus policies about academic honesty as stated in the University’s Student Conduct Code: (http://thunder1.cudenver.edu/studentlife/studentlife/discipline.html)

- **Access, Disability, Communication:** UCD is committed to providing reasonable accommodation and access to programs and services to persons with disabilities. Students with disabilities who want academic accommodations must register with Disability Resources and Services (DRS), 177 Arts Building, 303-556-3450, TTY 303-556-4766, FAX 303-556-2074. I will be happy to provide approved accommodations, once you provide me with a copy of DRS’s letter.

- **Incompletes:** Incomplete grades (IW or IF) are NOT granted for low academic performance. To be eligible for an incomplete grade, students must 1) Successfully complete a minimum of 75% of the course; 2) Have special circumstances beyond their control that preclude them from completing graded assignments; and 3) Make arrangements to complete missing assignments with me.

- **Fall 2008 CLAS Academic Policies:** Students are responsible for reading and complying with the CLAS Academic Policies (separate handout). This handout includes a list of Important Dates, which you should be aware of.