

UALR Department of Systems Engineering

SYEN 3312 – Optimization Methods in Systems Engineering

Spring 2010

Instructor

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Office hour: T-R: 2-3 pm or email me for an appointment

Meeting times

The class meets on Tuesdays and Thursdays at 9:25 pm – 10:40 pm in ETAS 262.

Catalog Description

Prerequisites: MATH 2453 and 3312. Foundation of linear programming, nonlinear programming, integer programming, dynamic programming, discrete time optimal control, continuous time optimal control, and artificial intelligence (AI) techniques for solving optimization problems. Three hours lecture. Three credit hours.

Textbook

An Introduction to Optimization, 3rd Edition

Edwin K. P. Chong, Colorado State University, Fort Collins, Colorado

Stanislaw H. Zak, Purdue University, West Lafayette, Indiana

ISBN: 978-0-471-75800-6

Publisher: Wiley Inter-science

Web Page

Course related information announcements, and homework solutions:

<http://syen.ualr.edu/nxbouaynaya/Teaching.htm>

Homeworks

Homeworks are due on Tuesdays at the beginning of the lecture. Since the solution will be posted on the course web page immediately after the lecture, no late homework will be accepted. Students with documented medical reasons may be excused.

Study Guidelines

In order to get the most out of the course, try to stay ahead. By the weekend, make sure you have reviewed the material covered in the lectures of the preceding week. Read the assigned material, but at a minimum, make sure to review your lecture notes. This way, the next lectures will be much more informative and meaningful. Feel free to go to the instructor's office hours if you have questions regarding the material covered in the lecture or solutions of homeworks that were

posted on the web page, if you want to discuss your work, etc. Also, it is a good idea to retain a copy of your homework before you turn it in. This lets you compare them with our solutions right away, rather than waiting a week until they come back to you graded. In the exams and the homeworks, we expect you to concisely explain your reasoning. Giving a numerical answer, even correct, does not guarantee full credit if you don't justify it. Partial credit may be given if you show a correct understanding of the problem and the concepts involved.

Grading

Homework	10%
Quizzes	15%
Midterm I	20%
Midterm II	25%
Final	30%

Tentative Exam dates

Midterm I: Tuesday, Feb. 23

Midterm II: Tuesday, April 1

Final: Tuesday, May. 6

Tentative Topics Covered

1. Mathematical Review: vector spaces and matrices; concepts from geometry; elements of calculus.
2. Unconstrained optimization: one-dimensional search methods; gradient methods; Newton's method; conjugate direction methods, solving linear equations.
3. Linear programming: Introduction to linear programming; simplex method; nonsimplex method.
4. Nonlinear constrained optimization: problems with equality constraint; problems with inequality constraints; convex optimization problems; algorithms for constrained optimization.

Matlab:

Knowledge of the Matlab software environment will be a required part of this course. Matlab will be required for solving many weekly homework assignments.

UALR Academic Offenses

According to UALR academic offenses, the following offenses are subject to grade penalty and/or disciplinary action:

Cheating on an examination or quiz: To give or receive, to offer or solicit information on any quiz or examination including (a) copying from another student's paper; (b) using prepared materials, notes, or texts other than those specifically permitted by the professor during an examination; (c) collaborating with another student during an examination; (d) buying, selling, stealing, soliciting, or transmitting an examination, or any material purported to be the unreleased content of an upcoming examination, or the use of such material; (e) substituting for another person during an examination or allowing such substitution for oneself; (1) bribing a person to obtain examination information.

Plagiarism: To adopt and reproduce as one's own, to appropriate for one's own use and incorporate in one's own work without acknowledgment, the ideas of others or passages from their writings and works.

Collusion: To obtain from another party, without specific approval in advance by the professor, assistance in the production of work offered for credit to the extent that the work reflects the ideas or skills of the party consulted rather than those of the person in whose name the work is submitted.

Duplicity: To offer for credit identical or substantially unchanged work in two or more courses, without specific advance approval of the professors involved.

Reference: <http://ualr.edu/deanofstudents/index.php/home/academic-offenses/>

For example, copying from an instructor manual is *plagiarism* because the student is attempting to use someone else's work without acknowledgement. It is also *collusion* because the student is getting help from sources unapproved by the instructor.

Students with Disabilities: It is the policy of the University of Arkansas at Little Rock to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or to accurate assessment of achievement—such as time-limited exams, inaccessible web content, or the use of non-captioned videos—please notify the instructor as soon as possible. Students are also welcome to contact the Disability Resource Center, telephone 501-569-3143 (v/tty). For more information, visit the DRC website at <http://ualr.edu/disability/>.