

SYLLABUS FOR MATH 472: LINEAR PROGRAMMING

– Southern Illinois University, Carbondale, Fall Semester 2010 –

LINEAR PROGRAMMING

Henri Schurz

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Course : Math 472 (same as CS 472), Section 1
Text Book : An introduction to Linear Programming and Game Theory,
by Paul R. Thie, 2nd edition, Wiley, NY, 1988, ISBN 0-471-62488-8
Class Meetings : MWF 8:00-8:50 am, EGRA 310

Instructor : Prof. Dr. rer. nat. Henri Schurz
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Catalog Description (Topics): An introduction to the theory for finding extreme values of linear functionals subject to linear constraints. Topics include: recognition and mathematical formulation of real-world problems - **modeling**; its solution via the **simplex algorithm**; development of the simplex algorithm; artificial variables; the dual problem and the **duality theorems**; complementary slackness; **sensitivity** analysis and simple **complexity** issues. If time permits then we discuss further applications of linear programming to integer programming, cutting plane algorithms, the distribution problem, the transportation problem, the assignment problem and aspects of game theory. Students may use a computer to study the numerical performance of these algorithms in form of an optional project, but most of the calculations are done by hand in class.

Prerequisites: Grade *C* or higher in Linear Algebra (Math 221) or equivalent

Main Teaching Methods: traditional blackboard style with notes, reading and homework assignments, optional individual computational projects

Homework and Quizzes: Homework and quizzes will be assigned and periodically collected during class hours. We plan to have collected not more than 12 homework assignments. Occasionally, selected solutions are discussed in class when they are returned to you (usually Wednesdays). The best 10 homeworks and quizzes are counted individually. All homeworks with due dates are assigned in class or, equivalently, on course webpage.

Tests: There will be at least 2 midterm tests given in class during the term as well as a two hour final exam during the assigned time in final exam week. The final examination will be at a time to be announced in the university schedule. An optional oral final exam is available, based on an agreement with the instructor.

Grading: Grading will be based on homework, quizzes, tests and the final. The weighting is as follows:

Homework and Quizzes	25 %
2 Midterm Tests	50 % (25 % each)
Final Exam	25 %

Grades will be assigned on the basis of total points accumulated in the course. Curve matching methods for grading are not used, unless there is a real good reason beyond our joint control. We make use of the following scale related to the total points accumulated:

Grading Scale

A \geq 90%, B \geq 75%, C \geq 60%, D \geq 45%, F < 45%

Withdrawal: The last day to withdraw from the course without refund through Salukinet is Sunday, Oct 17 (TBC, with refund: Sunday, Sep 5, TBC). You should also be aware that the grade of INC can only be assigned to students who are passing the course and for reasons beyond their control cannot complete all class assignments. (See Catalog.)

Make-ups: We only allow make-up tests or exams if there is a really good reason to do so, e.g. the entire class has performed badly or there is a written document from the university or your doctor which shows the objective reason of absence or failure. In case of documented illness or absence, please contact the instructor immediately to schedule a new date for missed exam, prior to the exam date. There is not any make-up on missed homeworks and missed quizzes.

Option - Computational Project: If you feel more comfortable with computing using the facilities around you then there is an option to work out a computational project (not in groups). This is also an excellent possibility to compensate up to 25% of the worst part of your grade. A project must be **indicated to me before the Thanksgiving break**, with November 14 as deadline. The theme of the project is selected with mutual agreement and must be strongly related to Linear Programming or Nonlinear Programming. The project must be documented in written form and / or defended in an oral exam to verify that it is essentially your own work.

Exam dates: all announced during class hours

Midterm exam I: Written, in class, Friday, October 8

Midterm exam II: Written, in class, Friday, November 19

Final Exam: Written, EGRA 310, Monday, December 13, 7:50 - 9:50 am (to be confirmed)
or optional **Oral**, to be announced (according to the university schedule between 12/10 – 12/17)

Course webpage: <http://www.math.siu.edu/schurz/math472.html>

Own personal webpage: <http://www.math.siu.edu/schurz/personal.html>

Emergency info: Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on BERT's website at www.bert.siu.edu, Department of Safety's website www.dps.siu.edu (disaster drop down) and in Emergency Response Guideline pamphlet. Know how to respond to each type of emergency. Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.