

Course Description - Fall 2014

Math 484 - Nonlinear Programming

**Sections D13 and D14: 11:00-11:50 MWF, 345 Altgeld Hall**

INSTRUCTOR: Theo Molla, 226 Illini Hall molla@illinois.edu

Web page: [http://www.math.uiuc.edu/~molla/2014\\_fall\\_math484/](http://www.math.uiuc.edu/~molla/2014_fall_math484/)

Office hours: 3:00 - 4:00 PM MW or by appointment

FINAL EXAM: 8:00-11:00AM, Wednesday, December 17

DESCRIPTION: The aim of this course is to give an introduction to optimization problems, which are an important part of mathematics. We emphasize techniques, but also present proofs of theorems. Some of the topics covered are: Iterative and analytical solutions of constrained and unconstrained problems of optimization; gradient and conjugate gradient solution methods; Newton's method, Lagrange multipliers, duality and the Karush-Kuhn-Tucker theorem; and quadratic, convex, and geometric programming. Most of the class will follow the textbook. If time permits, we may also discuss semidefinite programming, which is not covered in the textbook.

PREREQUISITES: Math 241 (Calculus III); Math 347 (Fundamental Mathematics) or Math 348 (Fundamental Mathematics ACP) or equivalent; Math 415 (Applied Linear Algebra) or equivalent; or consent of instructor.

TEXT: **A. Peressini, F. Sullivan and J. Uhl: The Mathematics of Nonlinear Programming**, Undergraduate Text in Mathematics, Springer

REQUIREMENTS: The top ten homework scores will count towards your grade and each is worth 20 points. To account for illness and other unexpected events, there will be at least 11 homework assignments, so at least one homework score will be dropped. There will be three midterm exams and each will be worth 100 points. The final will be worth 200 points. The total number of points for the semester is then  $10 \times 20 + 3 \times 100 + 200 = 700$ .

The grading scale is: A  $\geq$  650, A-  $\geq$  620, B+  $\geq$  590, B  $\geq$  560, B-  $\geq$  530, C+  $\geq$  500, C  $\geq$  470, C-  $\geq$  440, D+  $\geq$  410, D  $\geq$  380, D-  $\geq$  350.

4 CREDITS: One has to register (soon!) in the Math Office in Altgeld Hall to take the class for 4 credits. Students registered for 4 credit hours will be required to do more homework and the exam will be more difficult. For example, the students registered for 4 credit hours will be required to do more proofs.

RESOURCES: Electronic mail is a medium for announcements and questions. Do not hesitate to contact the instructor by email. The website will also have announcements, including important information about all exams.