

Course Description - Spring 2017

Math 484 - Nonlinear Programming

Sections C13 and C14: 10:00-10:50 MWF, 345 Altgeld Hall

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

Web page: http://www.math.uiuc.edu/~molla/2017_spring_math484/

Office hours: 11:00 - 12:00 PM MWF or by appointment

FINAL EXAM: 1:30-4:30PM, Friday, May 12

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:

- Homework:
 - There will be at least 9 homework assignments, which are each due in class. The top eight homework scores will count for a total of 160 points.
 - If you cannot attend class, students can submit a scanned copy of their homework via email (a photo is acceptable) before class begins.
 - If the homework is received after class on the due date and before the next class, the homework is considered late and 2 points will be deducted from the total score.
 - Students can submit at most two late homework assignments.
 - Homework will not be accepted after the class following the class in which it was due for ANY REASON.
- Midterm exams:
 - There will be three midterm tests and a make-up midterm and each is worth 100 points.
 - Midterm tests will be in the evening and for each midterm exam a class will be canceled.
 - The top three scores will be counted for a total of 300 points.
 - Students are only required to take three of the four tests.
 - Students are required to provide a valid medical excuse for ALL of the missed exams prior to or soon after the exam date if they miss at least two of the four tests.

- Final exam:
 - The final exam is worth 200 points and will cover all of the course material.

The total number of points for the semester is then $8 \times 20 + 3 \times 100 + 200 = 660$.

The grading scale is: A \geq 615, A- \geq 587, B+ \geq 559, B \geq 531, B- \geq 503, C+ \geq 475, C \geq 447, C- \geq 419, D+ \geq 391, D \geq 363, D- \geq 335.

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.