

## Course Overview

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Overview: Topics include geometric, linear, convex and quadratic programming, the simplex algorithm, the Karush-Kuhn-Tucker Theorem, matrix games, convex functions and duality, constrained and unconstrained iterative optimization, derivative-free methods, and likelihood maximization.

Intended audience: Optimization methods are used widely in numerous areas of applications. This is a beginning graduate course in the Applied and Computational Mathematics option of the masters program in Mathematics, but is not aimed exclusively at students in that program.

Pre-requisites Students should have completed the twelve-credit calculus sequence. Additional course work in mathematics will be helpful. There will be a brief review of basic analysis and matrix algebra, but some familiarity with these subjects is also helpful.

Class Format: There will be one three-hour lecture per week. Lecture material will be taken from the text. The topics covered will be in the order in which they occur in the text. Grades will be based on homework exercises from the text and class participation. Homework will be collected and graded twice during the semester. The problems listed below are required: 2.1, 2.4, 2.11, 2.17, 2.18, 3.1, 4.1, 4.2, 4.6, 5.2, 5.10, 5.12, 5.15, 5.17, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2, 7.4, 7.9, 8.2, 8.3, 8.4, 10.1, 10.2, 10.4, 10.5, 10.7, 10.13, 10.14, 11.1, 11.2, 11.5, 12.1, and 12.5. Please feel free to submit solutions to additional problems of your choice.

Required Text: The required text is: “A First Course in Optimization” . This text is available as a pdf file on the website, under ALL COURSES, and 92.572.