SPRING 2025 MATH 195 COURSE SYLLABUS
INTRODUCTION TO CONVEX OPTIMIZATION METHODS

Lecture time: Monday, Friday 2:30-4:00, and as needed

Lecture room: ACS 372

Instructor: Juan C. Meza

E-mail address: jcmeza@ucmerced.edu

Office: ACS 372

Office hours: By appointment: https://calendly.com/profmeza/office-hours

COURSE GOAL AND TOPICS

This course will introduce the student to some of the fundamental concepts used in computational and applied mathematics research and modeling. In particular, we will focus on problems in convex optimization, which arise in many scientific and engineering problems. Along the way, we will also highlight some of the numerical analysis algorithms used today including those from linear algebra, nonlinear equations, optimization. These ideas will be demonstrated through several case studies taken from real-world computational mathematics applications.

COURSE LEARNING OUTCOMES

Upon completion of this course, students should:

- Understand some of the basic skills and resources necessary to start research in computational and applied mathematics
- Be familiar with key mathematical concepts used in developing convex optimization algorithms
- Be able to implement, test, and validate numerical codes to solve a given problem
- Be able to analyze the results of numerical simulations
- Be aware of basic communications skills needed to present mathematics clearly to a broad audience in writing and in speaking

COURSE MATERIALS

Textbook. No text or other materials are required for this course. We will make frequent references to some of the well-known papers in convex optimization. Some familiarity with these papers and their concepts will be useful to the student but is not required prior to the course. In addition, having access to one or two good numerical analysis books (similar to the ones used in Math 130/131) throughout the course will help students in their appreciation of the techniques we will discuss. References to all relevant materials will be provided as needed.

Course webpage. Math 195 website is part of the CatCourses course management

system. All course materials will be posted under the course website.

Grade determination. Your grade in this class will be determined by the following combination:

> 50% Class participation
> 15% Reading/Writing Assignments
> 15% Coding Assignments
> 20% Final Written Report

Assignments will be comprised of both analytical and computational problems and will be graded for correctness of **content, clarity of technical writing, and overall presentation**.

Late Policy:
- All students will be allowed a one-time token for a 24 hour extension to any assignment without any penalty. However, you must submit a request in writing no less than 24 hours prior to the deadline.
- Otherwise, late assignments will generally not be accepted unless there are extenuating circumstances (along with proper documentation), please contact me as soon as you are aware of the situation and an extension may be granted. A 20% penalty will normally be assessed on late homeworks.
- In all cases there will be **no extensions without prior approval**.

ADDITIONAL COURSE INFORMATION

Please make sure to check the Resources & Policy section of the CatCourses website: https://catcourses.ucmerced.edu/courses/25827/external_tools/1282

The Resource & Policy section will contain important information on many of the UCM course policies and resources available to all students. This will include topics such as:

- Principles of Community
- Course Add/Drop/Withdrawal Information
- Accommodations for Students
- Academic Honesty Policy
- etc.