

STA 6934, Fall 2021

Optimization

Course Instructor

Z. Su, 207 Griffin-Floyd Hall (352-273-2993)

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Office Hours: T: 3:00 PM - 4:00 PM, R: 2:00 PM - 3:00 PM, 207 Griffin-Floyd Hall.

A virtual option is available upon request.

Teaching Assistant

Hongqiang Sun

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Office Hours: W: 3:00 PM – 4:00 PM, 115A Griffin-Floyd Hall.

Lectures

T: 12:50 PM - 2:45 PM, R: 12:50 PM - 1:40 PM.

Text

Numerical Optimization by J. Nocedal and S. J. Wright.

Course Website

Canvas

Please check this site regularly. Most course documents and important information, including suggested homework exercises and readings, course schedule, practice session schedules, and special announcements, will be posted there.

Course Description

This course aims to build a foundation for numerical optimization at both algorithmic and theoretical levels, such that students are prepared to apply the appropriate optimization algorithm to a practical problem, implement the numerical optimization approaches in R, and read literatures on optimization. The lectures are largely based on the textbook *Numerical Optimization*, and includes topics such as convex sets and functions, necessary and sufficient conditions for convergence, gradient descent, Newton method, quasi-Newton methods, conjugate gradient methods, trusted region methods, Nelder-Mead method, coordinate descent, constrained optimization and KKT conditions, linear programming and simplex methods, and penalty and augmented Lagrangian methods. R will be the primary computing platform for this course.

Homework

Homework problems are assigned weekly or biweekly. Late homework without legitimate documented reason will not be accepted. If you cannot hand in your homework during the lecture, please talk to the Teaching Assistant. All homework must be readable. R codes should be included in computing problems. Working together in groups on homework is permitted, but each student must do his/her own write-up of the solutions in his/her own words. Directly copying is not acceptable. Answers to selected exercises can be found on the course website.

Reading Assignments

Due to the limited schedule and the broadness of the topics we need to cover, some of the topics appear in the reading assignments. You are fully responsible for all the reading assignments. Materials in reading assignments, including proofs, can appear in exams.

Grading

A grade of “B” requires satisfactory completion of the homework problems and reading assignments, along with regular attendance and participation in classroom discussion. A grade of “A” requires completion of a class project involving detailed study of some aspect of the course material. Projects, which must be approved in advance, should be underway by mid-November. Potential projects are, but not limited to,

- Design a new optimization method for a problem of some importance in application.
- Compare a few existing optimization methods on a problem of some importance in application.
- Review a new optimization method (its application, algorithm, convergence, etc).

You should expect to spend about 1/4 of your time on the project.

Attendance

The course is challenging and requires steady effort throughout the semester. You are expected to attend all lectures and hand in your assignments on time. You are responsible for making up for any missed lectures.

Incompletes

Grades of “I” will be given only in extraordinary circumstances, and then only by written agreement between the instructor and the student.

Reasonable Accommodations

To request classroom accommodation, please be certain that you have made all necessary arrangements with the Dean of Students Office, and obtain from them documentation to submit to the instructor at the time of your request. A request must be made to the instructor at least one week in advance of the date for which the accommodation is requested. This course information and policies sheet can be made available in alternative formats to accommodate print-related disabilities. Contact the instructor for more information.

Academic Integrity

Please familiarize yourself with the Student Honor Code and Academic Honesty Guidelines outlined in your University of Florida Student Guide and at <http://www.dso.ufl.edu/studentguide/studentrights.php>.

Disability access statement

This material is available in alternative formats upon request.