

# Nonlinear Optimization Theory and Algorithms

Math 7390 Fall 2022

**Time:** Monday, Wednesday and Friday, 1:30-2:20 PM, 232 Lockett Hall

**Instructor:** Name: Hongchao Zhang      Email: zhc At lsu.edu  
web page : <http://www.math.lsu.edu/~hozhang/Math7390-Fall2022/Math7390.html>

**Office Hours:** Monday, Wednesday and Friday 2:20~3:00 PM, or by email Appointment  
Zoom Meeting ID: 435 490 7449

**Text:** Lecture Notes and **Nonlinear Programming 2nd Edition (2004)**, by Dimitri P. Bertsekas, ISBN 1-886529-00-0

**Prerequisites:** Linear Algebra, Numerical Linear Algebra, Multivariable Calculus ; Basic programming abilities in Matlab, Fortran or C.

**Contents:** This class will cover classical nonlinear optimization theory and algorithms. Tentative topics include but not limited to Line search methods, Newton and quasi-Newton methods, Conjugate gradient methods, KKT optimality conditions, Penalty methods, Sequential quadratic programming, Trust region methods, nonsmooth optimization.

**Homework:** Homework will be assigned during the lecture.

**Grade:** Class Attendance: 10%; Homework: 30%; Midterm Project: 30% Final Project: 30%

**Grade Scale:** A-: 90-92 A:93-96 A+:97-100; B-: 80-82 B:83-86 A+:87-89;  
C-: 70-72 C:73-76 C+:77-79; D-: 60-62 D:63-66 D+:67-69; F: less than 60  
Final grades maybe finally scaled, but will only be scaled up.

**Note:** Except for unforeseen reasons, students must obtain advance approval from the instructor for missing any assignments