CSE /Mathematics 555
Numerical Optimization Techniques
Course Outline

Instructor
Jesse L. Barlow
312 Pond Laboratory
Office Hours: 12:45–1:45pm TR, 2:30–3:30pm F
Phone: 863-1705
URL: `http://www.cse.psu.edu/~barlow`
Electronic mail: `barlow@cse.psu.edu`

Text

- J. Nocedal and S.J. Wright, *Numerical Optimization*, Springer-Verlag, New York,1999.
- The Mathworks, Inc, Student Version of MATLAB (The Software). (Very Optional) There are several excellent books on MATLAB, any of which could be helpful.

Course Summary
The first half of the course will be about unconstrained optimization. Line-search, trust region, and conjugate gradient methods will be introduced. The practical problems of implementing these and other Newton-like methods will be discussed.

For the last third of the course, we will give the basic theory of constrained optimization followed by an introduction to the simplex and interior point methods. As time permits, we will discuss nonlinear constrained optimization.

Tentative Syllabus

September 2–12. Basics of Unconstrained Optimization. Chapters 1–2.
September 15–22. Line Search Methods. Chapter Three.
September 24–October 1. Trust Region Methods. Chapter Four.
October 3–13. Conjugate Gradient Methods. Chapter Five.
October 10 Study Break.
October 15–24 . Theory of Constrained Optimization. Chapter 12
October 27– November 5 The Simplex Method . Chapter 13.
November 7 – November 19 Interior Point Methods. Chapter 14.
November 21–24 No class.
November 26–28 Thanksgiving Break.
December 1–12 Topics in Constrained Optimization from Chapters 15 and 16.

Grading The grading in this course will be based upon homeworks (including MATLAB programs) and a take home final exam. Roughly two–thirds of the grade will be based upon the homeworks and the remained third on the final.

A homework will be given about every week to two weeks.