

Math 5595 (Fall 2007): (Tentative) Schedule
(Revised 8/22/07)

1. Week 1.

- Reading: Ch. 1 & 2.1
- Topics:
 - Introduction, Course conduct.
 - Fundamentals of unconstrained optimization.
 - * Convex sets and functions.
 - * Matrix classes.
 - * Quadratic Forms.
 - * Types of solutions.
 - * Taylor's theorem.
 - * Optimality conditions

2. Week 2.

- Readings: 2.2–3.2
- Topics:
 - Overview of algorithms
 - Line search methods
 - “Global” convergence analysis.

3. Week 3.

- Reading: 3.3
- Topics:
 - Local convergence analysis.

4. Week 4.

- Reading: 3.4–3.5
- Topics:
 - Hessian modifications
 - Step length selection methods

5. Week 5.

- Reading: 4.1,4.2,5.1
- Topics:
 - Trust Region Methods
 - Conjugate gradient method for linear equations.

6. Week 6.

- Reading: 8.1,8.3
- Topics:
 - Quasi-Newton Methods

7. Week 6.

- Reading: 6.1,6.3 (skip 6.2)
- Topics:
 - Quasi-Newton Methods

8. Week 7.

- Reading: 12.1-12.4
- Topics:
 - Intro to constrained optimization
 - First-order optimality conditions

9. Week 8.

- Reading: 12.5–12.9
- Topics:
 - Second-order optimality conditions
 - Constraint qualifications
 - Lagrange multipliers and sensitivity
 - Duality

10. Week 9.

- Reading: 15.1–15.4
- Topics:
 - Fundamentals of of constrained optimization algorithms
 - Elimination of variables

11. Week 10.

- Reading: 16.1–16.4
- Topics:
 - Quadratic programming algorithms

12. Week 11.

- Reading: 16.5–16.7
- Topics:

- Active set methods
- Interior point methods
- Gradient projection

13. Week 12.

- Reading: 17.1–17.3
- Topics:
 - Penalty and augmented lagrangian methods

14. Week 13.

- Reading: 18.1–18.3
- Topics:
 - SQP method

15. Week 14.

- Reading: 9.1–9.3
- Topics:
 - Derivative-Free Optimization

16. Week 15.

- Topics:
 - Positive Semidefinite Programming?