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## Linear and Nonlinear Programming

MATH-434\*

The course is concerned with theory and technique of optimization of functions of several variables, restricted by equality and inequality constraints.

**Textbook:** *Class Notes*

**Prerequisite:** MATH-221\*/223\* or 280\*/281\*; 110 or 111.

**Instructor:** N. M. Rice

<b>Evaluation:</b>	Weekly Assignments	10%
	Midterm Test	20%
	Final Examination	70% (or 100%)

### Outline:

#### I. LINEAR PROGRAMMING:

Convexity and basic theory

Simplex algorithm

Duality, complementary slackness, sensitivity

#### II. UNCONSTRAINED NON LINEAR OPTIMIZATION:

Convexity and descent algorithms

Simplex search

One-dimensional search

Steepest descent

Newton's method

Conjugate directions

Quasi-Newton methods

#### III. CONSTRAINED NON-LINEAR OPTIMIZATION:

Elementary Kuhn-Tucker conditions

Gradient projection and reduced gradient projection methods

Penalty methods

Convexity and duality

Lagrangian and augmented Lagrangian techniques