

ME 408/608 Design Optimization

Fall 2006

- Time & Place:** M – W 4:10 – 5:25 pm, 150 RC
- Instructor:** Ravi Penmetsa, 227 RC, 775-5089,
ravi.penmetsa@wright.edu
- Office Hours:** M/W 2:30 – 3:30 PM
- Textbook:** Introduction to Optimum Design, J. S. Arora, McGraw Hill, 2004
- Description:** Concepts of minima and maxima, linear and nonlinear programming, and variational methods. Interdisciplinary engineering applications are emphasized.
- Pre-Requisites:** ME 213 and MTH 233

Course Policies

- Homework:** Homework problems are due one week from the day they are assigned.
- Exams:** Two midterm tests will be conducted. BOTH the exams are important and bad performance in either of them would lower the grade.

Course Outline:

1. Introduction to Design Optimization
2. Optimum Design Problem Formulation
 - a. Examples
 - b. Graphical Solution
 - c. Classification of Optimization Problem
3. Optimum Design Concepts
 - a. Solution of Equations
 - b. Necessary and Sufficient Conditions
4. Linear Programming
 - a. Standard LP problem
 - b. System of Equations

- c. Two Phase Simplex Algorithm
 - d. Simplex Method
5. Unconstrained Optimization
- a. One Dimensional Minimization
 - b. Equal Interval Search
 - c. Golden Section Algorithm
 - d. Steepest Descent Method
 - e. Conjugate Gradient Method
 - f. Newton's Method
 - g. Quasi-Newton Methods
6. Constrained Optimization
- a. Sequential Linear Programming
 - b. Penalty Function Methods

Grading Procedure:

Pre-Requisite (5%) -- Sep 18th 2006
Homework (20%)
Midterm Exams (30%)
Final Exam (30%)
Project (15%)

Important Dates:

Exam 1 Oct 2nd 2006
Exam 2 Oct 25th 2006