

ECE 194BB/594BB-Fall2010

University of California, Santa Barbara
Department of Electrical and Computer Engineering

ECE 194BB/594BB Applied Optimization for Computer Engineers
Course Syllabus

A. Basic Course Information

Instructor: Prof. Volkan Rodoplu
Room 4113, Engineering I
Email: vrodoplu@ece.ucsb.edu
Office Hours: 1:00 - 2:00 PM Monday & Wednesday

Lecture Hours and Location:
3:30 PM - 4:45 PM Monday & Wednesday NH 1111

Course web page:

http://www.ece.ucsb.edu/courses/ECE194/194BB_F10Rodoplu/Home.html

Textbook and References:

- (Required) R. Fourer, D. M. Gay, B. W. Kernighan, "AMPL: A Modeling Language for Mathematical Programming", 2nd Edition, Brooks/Cole, 2003.
- (Optional) E. D. Nering, and A. W. Tucker, "Linear Programs and Related Problems", Academic Press, 1992.

Grading: 60% Homework
40% Final Project Report and Presentation

Prerequisites: Linear algebra, and vector analysis (at the undergraduate level)

B. Tentative Course Calendar and Topics:

<u>Week of</u>	<u>Topics in the week</u>
Sep.27	(1) Formulation of mathematical programs (2) Linear Programs in Canonical Form; Duality Equation
Oct.4	(1) Kuhn-Tucker tableaus, pivoting The 4 Alternatives; General Linear Programs (2) Simplex Method, and its geometric interpretation

Oct.11	(1) Assignment Problem; Hungarian Method Shortest Path Problem; Dijkstra's Method (2) Max-flow Problem; Ford-Fulkerson Method Transportation Problem; Networking Pivoting
Oct.18	(1) Karmarkar's Method; Interior point methods Dynamic Programming (2) Non-linear Programming; KKT conditions
Oct. 25	(1) Convex Programming; Geometric Programs (2) Quadratic Programming; Sequential Quadratic Programming Non-convexity, and its pitfalls
Nov. 1	PROJECT PROPOSAL DUE (1) Stochastic Programs (2) Optimization Decomposition
Nov. 8	(1) Combinatorial Optimization: Integer Programs Binary Integer Linear Programs (BILP) Pseudo-integer linear programs (2) MiniSAT+
Nov. 15	(1) Genetic algorithms; metaheuristics (2) Ant colony optimization
Nov.22	Formulation of research problems as optimization programs
Nov.29	STUDENT PROJECT PRESENTATIONS

C. Graded Course Work and Rules:

Rules:

Homework is due at the beginning of class. Late homework gets a zero. The only exception to this is a well-documented, legitimate emergency.

You are allowed to collaborate with other students in this class on the homework assignments. You may not copy someone else's solutions, solutions from the instructor's manual or solutions from previous years.

You may not have someone outside the course (e.g. a student who has taken the course before) do your homework for you. You may discuss the homework assignments and solution strategies with anyone, but the work you hand in must be your own write-up.