OR 541 – Operations Research I - SPRING 2009
Monday 4:30 p.m. –7:10 p. m, Robinson Hall, room B103

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Office Hours: Tuesday 4:00 p.m. – 6:00 p.m. or by appointment.
Texts: ***Wayne.L.Winston, Operations Research Applications and Algorithms, Fourth Edition***, Thomson***, Brooks/Cole 2003.***

Course Summary:
In the introduction we discuss real life applications, which led to linear (LP) and nonlinear (NLP) optimization problems.
In the first part of the course we will concentrate on the basic concepts and algorithms for LP. It includes Simplex Method, Duality and Sensitivity Analysis. The role of pricing in real life applications will be particularly emphasized.
In the second part of the course we will discuss network optimization problems including Classical Transportation, Shortest Path and Max Flow. Applications, which lead to Integer LP, will be discussed along with the Branch and Bounds Method for solving Integer LP. We conclude the course by discussing some basic NLP concepts. It will be home work assignments. Computational project will be offered. It requires modeling real life problem and using one of the three modeling languages: **GAMS** (General Algebraic Modeling System), student version is available at www.amazon.com., **MPL** available at www.maximal-usa.com. **AMPL** (A Mathematical Modeling Language), student version is available at www.amazon.com.

Grading: 15% homework; 35% midterm exam; 10% computational project; 40% final exam.

Course Schedule:

Weeks	**Topics**
1	Introduction
2	Linear Programming Models
3	Simplex Method
4	More on Simplex Method
5	Sensitivity Analysis
6	Duality
7	Transportation problems
8	SPRING BREAK
9	**MIDTERM EXAM**
10	Network Models
11	Integer programming: modeling and algorithms

12 Nonlinear Programming: models
13 Optimality Criteria and some methods for solving Nonlinear programming problems
14 Basic Concepts of Interior Point Methods in LP and NLP
15 Review
16 **FINAL EXAM** -- May 11 ,2009

Prerequisite: MATH 203 or equivalent
This course assumes some knowledge of Linear Algebra and Calculus, which we will review in process of developing the course.