OR 541 – Deterministic Operations Research , FALL 2008
Wednesday 4:30 p.m. – 7:10 p.m., Thompson Hall, room 106.

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Office Hours: Monday 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 programming (LP).
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 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 concepts of nonlinear optimization and their applications.

It will be home work assignments; midterm and final exams as well as a computational project which 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.

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

Course Schedule:

Weeks Topics

1 Introduction.
2 Linear Programming models.
3 Simplex method for solving LP.
4 More of Simplex method.
5 Sensitivity analysis.
6 Duality.
7 Transportation problems.

8 **MIDTERM EXAM**

9 Network models: shortest path algorithm and its applications.

10 Network Models: max flow and assignment problem.
11 Integer programming: modeling and algorithms.
12 Elements of Nonlinear Programming (NLP).
13 Optimality Criteria and some methods for solving NLP problems.
14 Basic Concepts of Interior Point Methods in LP
15 Review
16 **FINAL EXAM** – December 10, 2008

This course assumes some knowledge of Linear Algebra and Calculus, which we will review in process of developing the course.