OR 541: Deterministic Models

Spring 2012

Nguyen Engineering Building 1108

Mondays 4:30-7:10pm

Professor: Professor: Karla L. Hoffman
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Office hours: Monday/Tuesday 2pm-3pm, and by appointment; via e-mail at other times
Prerequisite: Linear Algebra

All course materials will be posted at mymason.gmu.edu

Textbook: *Operations Research Applications and Algorithms*, Wayne L. Winston (4th edition)

Software: *MPL*, available from www.maximal-usa.com

Objectives: The course introduces the basic mathematical ideas and method of Deterministic Operations Research. We will discuss modeling real life problems, and show how to develop, solve, and interpret a variety of deterministic optimization models. Students will gain experience in converting a variety of applied problems to optimization models, representing these models in a sophisticated modeling language, solving these models with a variety of algorithms and software, and interpreting the results using sensitivity analysis and other approaches.

- **Main Goal:**
  - To improve decision-making with operations principles and methods, specifically:
  - To learn about a broad range of contemporary operations research methods and their applications to the real world.
  - To learn about the role of uncertainty and use of data in decision-making.
  - To learn to communicate effectively.
- **Homework and Grading:**
- Homework problems will be assigned at each session. Some or all of the assignments will be collected and graded.
- There will also be one project that will require the formulation and solution to an optimization problem.

  Grades will be computed as follows:

  - The midterm will count as 30%,
  - The project will count for 20%,
  - Homework will count 15%, and
  - The final will be worth the remaining 35%.

Tentative Course Schedule (This schedule may change as course progresses. It is the responsibility of the student to know the schedule – posted on mymason.gmu.edu)

Date Topic Chapters

1/23 Introduction; Linear Programming 1, 3.1-3.2

1/30 Linear Programming 3.3-3.9

2/6 The Simplex Method 4.1-4.5

2/13 The Simplex Method 4.6-4.8, 4.12-4.13

2/20 Sensitivity Analysis & Duality 6.1-6.3

2/27 Sensitivity Analysis & Duality 6.5-6.10

3/5 Midterm (in class – entire period)

3/12 No class (Spring Break)

3/19 MPL formulations and Use of Indices, Loops, etc.

3/26 Transportation Problem 7.1, Intro to Networks 8.1-8.3

4/2 Network Simplex Method 8.6-8.7

4/9 Integer Programming 9.1-9.3, 9.5

4/16 Integer Programming 9.7

4/23 Nonlinear Programming 11.1-11.4, 11.6

4/30 Nonlinear Programming 11.8-10

5/7 Reading Period

5/14 *Final Exam (4:30-7:15pm)*