OR 541: Deterministic Operations Research Models

GEORGE MASON UNIVERSITY

Systems Engineering and Operations Research Department

Spring, 2011

Time: Mondays, 7:20-10:00p.m
Professor: Steven Charbonneau
Phone: (571) 303-2173 (wk) from 8:30 am to 5:30 pm
       (703) 550-5006 (hm) from 6:30 pm to 9:00 pm;
       (703) 993-1521 (fax) at GMU SEOR office, ask them to hold it for me
email: scharbo2@gmu.edu
Office hours: By appointment

Text: *Operations Research Applications and Algorithms*, Winston, Wayne L. (4th ed) Duxbury Press, 2003.

Software: You will use MS Excel (or some spreadsheet with an optimization package), the MPL modeling language, and the Gurobi solver to complete your coursework. MPL is available free of charge for student use. Go to Maximal Software (http://www.maximal-usa.com/academic/) and follow the link at the bottom of the page (MPL Academic Program Application) to download the latest version of the software. I will provide more detailed instructions as the class moves on. You will not be using it immediately, but you will be required to use it to solve larger problems later in the course. Gurobi is also available for students free of charge at the following URL: (http://www.gurobi.com/html/download_academic.html).

Course Description: An introduction to deterministic operations research modeling and methodology with an emphasis on optimization models. It is designed to strengthen the students' knowledge and application of operations research techniques, provide the student with hands-on experience using micro-computer software, and to evaluate the applicability of such techniques to industry, government and science. A working knowledge of matrix algebra is essential.

Course Objectives: The course focuses on 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.

Course Schedule (Subject to change as course progresses):

Lesson	Date	Topic	Prep Work
Lesson 1	24-Jan-11	Introduction to Deterministic Modeling/Optimization	Chapters 1, 2, and 3-1 through 3-3
Lesson 2	31-Jan-11	Model Formulation Part I	Chapter 3
Lesson 3	7-Feb-11	Simplex Method	Chapter 4-1 through 4-6
Lesson 4	14-Feb-11	Simplex Method (cont'd)/Sensitivity Analysis	4-7, 4-8, 4-11, 4-12, 4-17
Lesson 5	21-Feb-11	Sensitivity Analysis (cont'd)	6-1 though 6-3
Lesson 6	28-Feb-11	Duality	6-4 though 6-9
Lesson 7	7-Mar-11	Mid-Term Exam	Chapters 1-6 will be covered
Spring Break March 14-18			
Lesson 8	21-Mar-11	Model Formulation Part II (Using MPL)	Chapter 4-16, MPL and Gurobi
Lesson 9	28-Mar-11	The Transportation Problem	Chapter 7-1 through 7-4, 7-6
Lesson 10	4-Apr-11	Networks Part I	8-1, 8-2, 8-3, 8-5, 8-6
Lesson 11	11-Apr-11	Networks Part II	Section 8-7
Lesson 12	18-Apr-11	Integer Programming (Part I)	Chapter 9-1 through 9-4
Lesson 13	25-Apr-11	Integer Programming (Part II)	Chapter 9-5 though 9-8
Lesson 14	2-May-11	Non Linear Optimization	Chapter 11
Final Exam	9-May-11	Tentative date until exam schedule is announced	Chapters 7-11 will be covered

Grading Scheme:

      Homework: 10%
      Class participation: 10% (we'll see how this works out over the internet)
      Midterm Exam: 25%
      Project: 20%
      Final Exam: 35%

Coursework & Grading

Unless otherwise indicated, you are expected to work individually on homework assignments, projects, and exams. You can submit homework directly to me via email, through the SEOR department office if you happen to be there and find it convenient to drop off course work, or via via fax (703-993-1521).

Academic Integrity

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

GMU Email Accounts

Students must use their Mason email accounts to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information. Please *do not* use the email system within http://courses.gmu.edu to contact me, since it is not integrated into the main campus email system.

Additional Notes:

Mid-term and final exams will be in-class exams. I will make every effort to use Blackboard to post homework, assignments, lecture notes, and grades. I will send out email notices each time I have uploaded new information to blackboard. Homework will be docked 10% for each day it is late. Failure to turn in homework will result in a 0% for that submission. Best way to contact the professor is by email.