OR 441/MATH 441:
Deterministic Models

Professor: **Karla L. Hoffman**
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Office hours: Mondays and Wednesdays 11am-12pm, and by appointment;
via e-mail at other times
Prerequisite: Linear Algebra

All course materials will be posted at mymason.gmu.edu You must have a George Mason University email account to access these materials.

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 or via email announcements.)

Date Topic Chapters
Week of Jan 19th   Introduction; Linear Programming 1, 3.1-3.2
Week of Jan 26th   Linear Programming 3.3-3.9
Week of Feb 2st   The Simplex Method 4.1-4.5
Week of Feb 9th   The Simplex Method 4.6-4.8, 4.12-4.13
Week of Feb 16th   Sensitivity Analysis & Duality 6.1-6.3
Week of Feb 23rd   Sensitivity Analysis & Duality 6.5-6.10
Week of Mar 2nd   MPL Formulations and Use of Indices, Loops, etc.
Week of March 9th   Spring Break
Mon March 16th   Review for midterm
Wed Mar 18th   In class exam – covers through sensitivity analysis
Week of March 23rd   Intro to Networks 8.1-8.3
Week of March 30th   Network Simplex Method 8.6-8.7
Week of April 6th   Integer Programming 9.1-9.3, 9.5
Week of April 13th   Integer Programming 9.7
Week of April 20st   Nonlinear Programming 11.1-11.4, 11.6
Week of April 27th   Nonlinear Optimization
Week of May 11/19   Nonlinear Programming 11.1-11.4, 11.6
Monday May 4th   Review for Final Exam
Wednesday May 6th   Final Exam (1:30-4:15pm)

University Policies

Honor Code:
GMU is an Honor Code university; please see the Office for Academic Integrity 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.

Disability Accommodations:
If you have a learning or physical difference that may affect your academic work, you will need to furnish appropriate documentation to the Office of Disability Services. If you qualify for accommodation, the ODS staff will give you a form detailing appropriate accommodations for your instructor. In addition to providing your professors with the appropriate form, please take the initiative to discuss accommodation with them at the beginning of the semester and as needed during the term. Because of the range of learning differences, faculty members need to learn from you the most effective ways to assist you. If you have contacted the Office of Disability Services and are waiting to hear from a counselor, please tell me.

Email:

Students must use their MasonLive email account to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information.   You will need an email account to get all notices that are posted on mymason.gmu.edu (Blackboard).