OR 541 (001/DL) – Operations Research: Deterministic Models – Spring 2014
George Mason University

Instructor: Bjorn Berg
Office: Nguyen Engineering Building 2240
Email: bberg2@gmu.edu
Office Hours: Online and in person office hours are to be determined (also by appointment).

Class Room: Innovation Hall 133
Online via Blackboard Collaborate

Class Hours: Wednesday 7:20pm–10:00pm

Course Material: Course material will be continually updated on Blackboard at http://mymason.gmu.edu. Note: The course home page will include the syllabus, lecture notes, assignments, and other important information. Information may change during the course of the semester so check regularly.

Prerequisites: Linear Algebra

Course Text: Winston, *Operations Research: Application and Algorithms*, 4th edition, 2004, Thompson, ISBN 0-534-38058-1.

Software: Optimization software will be discussed later in the semester.

Course Objectives:

- To build a general understanding of the role of deterministic models in operations research and become familiar with the relevant methodologies and application areas
- To emphasize quantitative modeling of processes in service and manufacturing industries, government, health care, and other application areas, with an introduction to algorithmic approaches of analysis and optimization including linear and integer programming
- To develop a working knowledge of developing optimization models and solving them using a modeling language and commercial solver
- To set a foundation for advanced studies in operations research

Summary of Specific Topic Areas:

- History of Operations Research
- Model building and formulating linear programs
- Optimization methods including the simplex method, branch-and-bound, and others
- Sensitivity analysis
- Specialized models including: transportation, assignment, shortest-path problems, and other network models
- Integer programming
- Nonlinear programming

Course Schedule

Note: This is a tentative schedule and is subject to change throughout the semester.

January 22 – Introduction, Mathematical Models
January 29 – Model Formulations, Graphical Method
February 5 – Characterizing Linear Programs, Simplex
February 12 – Simplex Method
February 19 – Simplex Method
February 26 – Sensitivity Analysis
March 5 – Midterm Exam
March 12 – No Class
March 19 – Sensitivity Analysis, Optimization Software
March 26 - Duality
April 2 – Transportation and Assignment Problems
April 9 – Network Problems
April 16 – Network Problems
April 23 – Integer Programming
April 30 – Nonlinear Programming
May 7 – Final Exam

Grading:

There will be regular homework assignments (approximately one every two weeks), which will carry 25% of the total grade. All assignments are due at the beginning of class on the due date with a 20% reduction in the grade for each day late (up to a maximum of 3 days late after which the grade will be zero). Assignments are to be submitted electronically through Blackboard. There will be a midterm exam that will count for 25% of the total grade. There will be a course project on modeling and solving a real-world problem that will be 15% of the total grade. The Final Exam carries 25% of the total grade (make-up exams will only be given for students with University-approved absences). Please coordinate with me prior to class regarding any scheduling conflicts. 10% of the grade will be based on in-class participation and in-class assignments. In summary the breakdown is:

Homework Assignments: 25%
Midterm Exam: 25%
Course Project: 15%
In-Class Assignments and Participation: 10%
Final Exam: 25%

You have one week, after receiving a grade for a test or assignment, to appeal the grading. You will need to submit the regrade request in writing. The entire assignment/test will be regraded.

Academic Integrity Policy:

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. Dishonesty is unfair to everyone, especially those who do their work honestly. Academic dishonesty will be fully prosecuted. All work turned in with your name is assumed to be only your own work (including homework assignments). If what you turn in duplicates others, then it is cheating (regardless of who copied who). When in doubt (of any kind) please ask for guidance and clarification.

Disability Accommodations
If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Office of Disability Services (SUB I, Rm. 4205; 993-2474; http://ods.gmu.edu) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Email Communication
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.

Technology Requirements
For student registered for the distance learning section, in addition to accessing the course through Blackboard Collaborate, you will need a headset to use with your computer. This will reduce unwanted background noise levels. For homework assignments and exams, you will need access to a scanner in order to submit your files electronically.

Homework Assignment Information:
Include the following in your homework assignments:

- Your name and the assignment number
- Legibly written answers
- Problem Definition
- Assumptions made
- Results and Conclusions in words

While I encourage you to discuss ideas related to the homework assignments with me or your classmates, every student is expected to submit their own work individually.

Note: The numerical "answers" you get are important but the focus of the grading is on the approach to the solution and your understanding of the fundamental theory that underlies the solution. Therefore you must show all of your work leading up to the final solution. Points are allocated for each step of the solution process.