

OR441: Deterministic Operations Research Models

Systems Engineering and Operations Research Department

George Mason University

Mondays and Wednesdays, 1:30-2:45p.m.
Robinson Hall Room B118

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Office hours: Mondays: 11:00-12:00p.m. and by appointment
I am on campus on Mondays and Wednesdays from 9:30 to 6:30. I cannot be available after class on Wednesdays since that is my office hours for my other course.

Text: W.L. Winston, *Operations Research: Applications and Algorithms*. Duxbury Press. Fourth Edition, 2003

Course Description: This course is designed to introduce deterministic operations research modeling and methodology. 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 in the field and to evaluate the applicability of such techniques to industry, government and science. A working knowledge of matrix algebra is essential.

Software: You will be expected to use a modeling language to complete your project. You need to download:

MPL (Maximal Software Corporation), available by downloading from the internet (<http://www.maximal-usa.com>).

Main Goals:

- 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

Basic Skills:

Formulating basic optimization problems and solving them using a modeling language

Understanding the effects of uncertainty in decision-making.

Homework and Grading:

Homework problems will be assigned at each session. Some or all of the assignments will be collected and graded.

There will be one in-class midterm exam and the final will also be in class. All exams will be open book and open notes.

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 25%,

The project will count for 20%,

Homework will count 10%,

Participation will count 10% and

The final will be worth the remaining 35%.

Course Outline:

The course will include all or part of the following chapters from the Winston text, covered in the indicated sequence. The exact scheduling will depend upon the interests of the class, which will determine the amount of time that will be devoted to each topic.

WEEK	CHAPTER(S)	TOPIC
Week One modeling (optimization)	Chap.1, 2, 3-1 to 3-4	Intro to Deterministic
Week Two techniques and graphing	Chap. 3	Formulation
Week Three	Chap. 4-1 to 4-7	The Simplex Method
Week Four Method	Chap 4-8 to 4-12	More Simplex
Week Five & Duality	Chap. 6-1 to 6-2	Sensitivity Analysis
Week Six Analysis	Chap. 6-3 to 6-10	More Sensitivity
Week Seven simplex and duality)	Monday class: Midterm I	EXAM (Exam covers
Transportation Prob.	Wednesday	Introduction to the
Problem	Chap. 7-1 to 7-5	The Transportation
Week Eight and Networks	Chap 7-1 thru 7-5	Finish Transportation
	Handout on Networks	Networks
Week Nine Programming	Chapt 9-1 to 9-4	Being Integer
Week Ten	Chap. 9-5 to 9-8	Integer Programming

Week Eleven	Monday class: Midterm II	EXAM
Nonlinear Programming	Wednesday class: Chap 12-1 to 12-3	Intro to
Week Twelve	Chap. 12-4 to 12-8	Nonlinear
Programming		
Week Thirteen	Complete NLP	Nonlinear
programming		
Week Fourteen	May 3 rd Review for Final.	NOTE: Class is
cancelled May 1		
Week Fifteen	Final Exam	

Fundamental Rules:

- (1) Make-up exams will only be given for extreme situations, and only if I am contacted before the exam is given and full arrangements are established. Full adherence to this policy is the responsibility of the student.
- (2) The exam dates above are tentative, and it is the student's responsibility to keep abreast of changes.
- (3) Homework will be assigned each class, and usually collected. All work must be clearly written. Illegible work will not be accepted.
- (4) There is a penalty of 10% of the total grade for each day that the homework is late.