MATH441/OR441 Operations Research I
Fall 2008

George Mason University
Department of Systems Engineering and Operations Research

Tuesday and Thursday 3:00pm-4:15pm,
Lecture Hall, Room 3

Instructor: Yifan Liu
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Office Hour: Wednesday 4:00-6:00pm, or by appointment

TA: TBA

Text: Wayne L. Winston, *Operations Research Applications and Algorithms*, Fourth Edition, 2003.

Course Website: All course material will be posted on http://courses.gmu.edu .

Course Summary: This course will introduce the basic mathematical ideas and methods of Deterministic Operations Research. We will discuss modeling real life problems, the basic concepts of Linear Programming (LP), and methods for solving LP problems. We are going to discuss briefly some concepts of nonlinear optimization and their applications. There will be a project, which requires modeling real life problems using MPL languages available for downloading from the Internet (www.maximal-usa.com).

Tentative Course Schedule (subject to slight change, depending on the pace of the course)

Date	**Topic**	**Chapters**
8/26	Introduction to Operations Research	1
8/28	Linear Programming (I)	3.1-3.2
9/2	Linear Programming (II)	3.3-3.4
9/4	Linear Programming (III)	3.5-3.9
9/9	The Simplex Method (I)	4.1-4.2
9/11	The Simplex Method (II)	4.5
9/16	The Simplex Method (III)	4.6-4.8
9/18	The Simplex Method (IV)	4.12
9/23	Sensitivity Analysis & Duality (I)	6.1-6.2

9/25	Sensitivity Analysis & Duality (II)	6.3
9/30	Sensitivity Analysis & Duality (III)	6.5-6.7
10/2	Sensitivity Analysis & Duality (IV)	6.8-6.9
10/7	Review	
10/9	The Transportation Problem (I)	7.1
10/14	*(Tuesday classes do not meet this week because of Columbus Day recess)*	
10/16	**Midterm (Transportation problem NOT on midterm)**	
10/21	The Transportation Problem (II)	7.2
10/23	Networks (I)	8.1-8.2
10/28	Networks (II)	8.3, 8.6
10/30	Integer Programming (I)	9.1-9.2
11/4	Integer Programming (II)	9.3
11/6	Integer Programming (III)	9.5
11/11	Integer Programming (IV)	9.7
11/13	Nonlinear Programming (I)	11.1-11.3
11/18	Nonlinear Programming (II)	11.4, 11.6
11/20	Nonlinear Programming (III)	11.8
11/25	Nonlinear Programming (IV)	11.9
11/27	*(Thanksgiving, no class)*	
12/2	Nonlinear Programming (V)	11.10
12/4	Review	
12/16	**Final Exam**	

Note: *Sensitivity Analysis & Duality seems to be the* ***most difficult*** *part of this course according to the feedback from previous years. Be prepared to spend more time on preview before coming to the class, and on the homework.*

Grading:

Class Participation: 10%. I will try to use the examples **different** from those in the textbook to illustrate the same content, and leave the textbook examples for you to read before and after class, so that you will have more examples to understand the stuff better. Therefore, class participation is mandatory, and coming to most of the lectures counts for 5%. From time to time, I will offer chances for the students to volunteer to do some in-

class exercises on the board, on which 3% based. The rest 2% is awarded for other kinds of active participation, such as asking or answering good questions in class.

Homework: 10%. At the end of each class, I will assign 1 or 2 problems for homework, which will be collected, graded and returned in a weekly pattern. The homework will be collected 12 times. All homework will be graded. The lowest two scores will be dropped, and the rest 10 will count 1% each towards your final grade. (See attached homework collecting and returning schedule for details.)

Midterm: 25%. Thursday, 10/16, class time, open book, open notes, **NO** computer allowed (calculator OK).

Computational Project: 20%. Use MPL languages software, available for downloading from www.maximal-usa.com, for a real-life problem. The project problem will be assigned on 10/16, shortly after the midterm, and be due on 12/4, the last day of class. The grading of the project is composed of three parts: Formulation (6%), Programming (8%), and Writing (6%).

Final Exam: 35%. Tuesday, 12/16, 1:30-4:15pm, open book, open notes, **NO** computer allowed (calculator OK). Final exam will be mainly based on the part not covered in the mid-term, but may use some of the knowledge learned in the first half of the semester.

Make-up exams will only be given for extreme situations (religious reasons, family emergency, sickness, conference or business trips, etc.), and only if I am contacted before the exam is given and full arrangements are established. Early leave for the winter break does **NOT** qualify for an alternative time for the final exam.