OR 441 001 - Math 441 001

Deterministic Operations Research

George Mason University

Spring 2012

Instructor: Ursula Morris   *Class Room: Science and Technology I, R 126*

Class Time: Tu. Th. 10:30 - 11:45   *Office Hours: after class and by appointment in*

Engineering Building, R. 2248

Email: **UMorris1@gmu.edu**

Prerequisite: MATH 203 (Linear Algebra)

Course Description

This course introduces the basic mathematical ideas and methods of Deterministic Operations Research. The modeling of real life problems, basic concepts of Linear Programming (LP), and methods for solving LP problems are introduced. The simplex method, sensitivity analysis and duality are the main focus during the first part of the lecture.

Introductions into various topics, i.e. network problems, integer programming problems, non-linear optimization etc., and their applications are presented during the second part of the lecture.

Course Objectives

The students will model deterministic optimization problems.

The students will understand the importance of linear algebra in solving optimization problems.

The students will apply the simplex method to solve linear programming problems.

The students will perform sensitivity analysis to an optimal LP problem.

The students will apply duality to solve an LP.

The students will be able to solve some network problems and integer programming problems.

The students will solve certain non-linear optimization problems.

The students will use the software package LINDO/LINGO and/or MPL to solve optimization problems.

Text: *Operations Research, Applications and Algorithms*, by Wayne L. Winston, (4th edition), 2004.

Software: A free version of the LINDO/LINGO software package can be found at *http://www.lindo.com*. Go to this website, click on *Downloads* at the left side and download 'classic LINDO' and LINGO asap.

A free student version of the software package MPL can be obtained by obtained by going to *http://www.maximalsoftware.com* downloading the student version, and requesting an activation code asap.

Course Topics (tentative)

	Topic	Lecture Notes
1	Introduction	**Tu 1/24/2012**
2	Linear Programming	
3	The Simplex Method	
4	Sensitivity Analysis	
5	Duality	
	Review	
	Midterm	**3/8/2012 10:30 – 11:45**
	Spring Break	**Mo 3/12/2012 – Sun 3/18/2012**
6	Networks	
7	Integer Programming	
8	Nonlinear Programming	
9	Additional Topics	
	Review	
	Final Exam	**Th 5/10/2012 10:30-1:15pm**

Grading OR 441:

Homework	15%
Midterm	35%
Final exam	35%
Computational project	15%

In the beginning of the course, each student will be requested to sign the George Mason Honor Code.

A legible paper copy of the homework is due in the beginning of each class. The teacher decides if every homework problem or just a selection of the problems will be graded.

Make-up midterm exams will be 10% harder.

Class Website: http://classweb.gmu.edu/umorris1