

***COURSE SYLLABUS***  
**BMGT-434 Introduction to Optimization**  
**(Section 0201, Fall 2003)**

**Course:** *BMGT-434 Introduction to Optimization Theory*, Section 0201  
 Class Time: Mon/Wed 2:00 – 3:15 pm  
 Van Munching Hall 1415

**Instructor:** Prof. Cheryl Druehl  
 Office: VMH 4318  
 Phone: 301-405-9677  
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Office Hours: TBD

NOTE: The best way to contact Prof. Druehl outside class-time and office hours is by email.

**Text Book:** Bernard W. Taylor III, *Introduction to Management Science*, 7th Edition, 2001, Prentice-Hall. ISBN: 0-13-071756-8. (A software package called “QM for Windows” is attached with the book)  
 (Additional materials will be handed out in class and available on blackboard)  
 \*\*\* **PLEASE BRING YOUR BOOK TO CLASS** \*\*\*

**Software:** (1) Excel Solver – A Microsoft Office Add-In  
 (2) QM for Windows – Comes with the textbook.  
 (**Note:** Please let me know if you have problem installing QM for Windows or the Excel Solver Add-In on your computer.)  
 These are both available in the Smith School computer labs.

**Course Overview:**

This course introduces concepts and techniques of operations research and management science for the modeling and solution of business decision problems. It gives broad coverage to the formulation of optimization models and the use of commercially available software tools for solving them. The models specifically covered are linear programming, integer programming, the transportation and assignment problems, network optimization models and non-linear programming. Emphasis is placed on the process of analyzing business scenarios and formulating models that address appropriate business decision problems. The solver option within Excel will be used extensively for solving models formulated.

**Course Homepage:** The course homepage is setup on Blackboard. Everyone registered for the course should be able to log in to Blackboard and view the course pages. URL for Blackboard is <http://bb.rhsmith.umd.edu/>. You will need your University LDAP ID and password to log in.

It is important that you access the web site frequently as any class notes, homework assignments, solutions to homeworks, special announcements, etc. will be posted there.

Discussion threads will be set up. One or more will support a discussions related to the current topics of the course. Student participation in these

discussions will count toward the course participation grade. Other threads will be set up to support group projects.

**Prerequisites:** MATH 220; or permission of department. This course is restricted to BMGT majors with 72 credit hours completed. It is primarily for students majoring in management science and statistics.

### **Required Work and Grading Policy:**

At the end of the semester, your weighted average grade determines your letter grade for the course: 25%–40% A+/A /A-; 30%–50% B+/B/B-; 20%-35% C+/C/C-/D+/D/D-/F

(i)	<b>7 Homework Assignments</b> (equally weighted)	<b>10%</b>
(ii)	<b>2 Mid-Term Exams</b>	
	<b>Exam #1</b> – October 8, <b>Wednesday</b> (during normal class time)	<b>25%</b>
	<b>Exam #2</b> – November 19, <b>Wednesday</b> (during normal class time)	<b>20%</b>
(iii)	<b>1 Final Exam – TBA. The exam will be cumulative.</b>	<b>30%</b>
(iv)	<b>Group Project #1 – Optimization Article Presentation</b>	<b>5%</b>
(v)	<b>Group Project #2 – Analysis of Business Scenario using Optimization Software</b>	<b>5%</b>
(vi)	<b>Class Participation (Attendance, Discussion, Homepage, BB Forums)</b>	<b>5%</b>

### **How to Study:**

1. During class, keep very detailed notes. In-class questions are encouraged.
2. After class, go to your notes and make sure that you really understand everything covered, especially the numerical examples.
3. Do all the homework. Exam problems will be similar to homework problems.
4. Ask for help when you begin having difficulty. I am very happy to help you during office hours. Take advantage of this.
5. I am also willing to give you a quick review of a “difficult” topic at the beginning/end of a class. But you have to ask me!

**Academic Integrity:** The University’s *Code of Academic Integrity* is designed to ensure that the principles of academic honesty and integrity are upheld. All students are expected to adhere to this Code. The Smith School does not tolerate academic dishonesty. All acts of academic dishonesty will be dealt with in accordance with the provisions of this Code. Please visit the following website for more information on the University’s Code of Academic Integrity:

[http://www.inform.umd.edu/CampusInfo/Departments/JPO/AcInteg/code\\_acinteg2a.html](http://www.inform.umd.edu/CampusInfo/Departments/JPO/AcInteg/code_acinteg2a.html)

On each exam you will be asked to write out and sign the following pledge. *"I pledge on my honor that I have not given or received any unauthorized assistance on this exam."*

**Special Needs:** Any student with special needs should bring this to the instructor’s attention as soon as possible, but no later than the second week of class.

## HOMEWORK ASSIGNMENTS

1. **All homework assignments are due in the classroom at the very beginning of the class as posted in Blackboard.** All assignments and their solutions will be posted on Blackboard.
2. Late homeworks will be accepted but 5% will be deducted from the grade for every day they are late. No homeworks will be accepted after solutions are posted or discussed in class. In some cases solutions will be presented immediately after homeworks are due in order to allow students to prepare for exams.
3. Strictly follow the instructions provided in each assignment. Computer software (Excel Solver, QM for Windows) can only be used to solve questions that *explicitly* ask you to do so. All other questions must be solved by hand.
4. Computer input and output must be printed out and attached with all work done by computer. Instructions for what must be printed and included will be distributed and posted. Failing to print everything required will adversely affect your HW grade.
5. Students may discuss homework problems outside of class and help each other in finding approaches to the solution of problems. Discussion via the threads in BB is encouraged. ***However, each student must hand in a solution that represents their own final work and calculations.***

### Other Assignments:

**Project #1:** Identify an article in the INFORMS journal *Interfaces* which uses optimization techniques studied in this class. Prepare a 15 minute PowerPoint presentation on the article, which your group will deliver to the class on 11/03 or 11/05. The instructor must approve your choice of article. A first and second choice article is due to the professor on 9/29. Your grade will be based on the quality of the presentation, your ability to answer questions during and after the presentation, the quality of your PowerPoint slides and a peer evaluation. The Interfaces web site is: <http://www.interfaces.smeal.psu.edu/>. Interfaces may be found in the UM Libraries. The recent issues are available within the UM E-Journals collection: <http://www.lib.umd.edu/ETC/EJNLS/ejnl.php3>.

**Project #2:** You will be given a description of a business scenario with appropriate data. The project will involve analyzing the business scenario and preparing a solution, including an executive summary. The solution will require solving multiple linear or integer programming problems (using one of the computer-based solver options). Project reports are due by 4:00 pm, Friday, December 5, 2003.

More information on both projects will be given on the web site.

For the projects, students may form their own teams. The same team will be used for both projects. Teams should have either 3 or 4 persons. Team lists are due to the instructor on September 22, 2003. If you cannot identify a team of the appropriate size please contact the instructor for assistance. A peer evaluation form will be part of your grade for each project.

**Planned Class Schedule:** Any changes will be posted on Blackboard.

Class	Date	Topic	Readings	Assignment
<b>PART I – Linear Programming (LP)</b>				
1	09/03	Course introduction, LP formulations	Ch. 1, p. 1-7 p. 15-20 Ch. 2	
2	09/08	LP formulations	Ch. 2	
3	09/10	Graphical method of LP	Ch. 2	Homepage Due
4	09/15	Graphical method of LP	Ch. 2	
5	09/17	Computer solutions of LP	Ch. 3 Appendix B Excel Handout	Homework 1 Due
6	09/22	Solution interpretation, sensitivity analysis	Ch. 3	Team Lists Due
7	09/24	Solution interpretation, sensitivity analysis	Ch. 3	Homework 2 Due
8	09/29	Solution interpretation, sensitivity analysis	Ch. 3	Article choice due
9	10/01	Applications, examples of LP, Review for Exam #1	Ch. 4	Homework 3 Due
<b>PART 2 – Integer Programming (IP)</b>				
10	10/06	IP formulations	Ch. 5	
11	10/08	<b>EXAM 1</b> (covers Chapters 1-4)		
12	10/13	Graphical method for IP	Ch. 5	
13	10/15	Computer solution and applications of IP	Ch. 5	
14	10/20	Review/ Catch up		Homework 4 Due
<b>PART 3 – Transportation, Transshipment and Assignment Problems</b>				
15	10/22	Transportation problem (TP) formulation and solution	Ch. 6	
16	10/27	TP applications and assignment problem	Ch. 6	
17	10/29	Transshipment problem and solution	Ch. 6	
<b>PART 4 – Project #1 Presentations</b>				
18	11/03	Presentations (material will be on exams)		
19	11/05	Presentations (material will be on exams)		Homework 5 Due
<b>PART 5 – Network Problems</b>				
20	11/10	Three basic network optimization problems	Ch. 7	
21	11/12	IP formulations and applications of network problems	Ch. 7	
22	11/17	Review for Exam 2		Homework 6 Due
23	11/19	<b>Exam 2</b> (covers Chapters 5-7, presentations)		
24	11/24	Nonlinear Programming	Ch. 10	
25	11/26	Portfolio Model	Ch. 10	
26	12/01	No Class		
27	12/03	Nonlinear Programming		Homework 7 Due
	12/05	<b>Project #2 Due by 4 pm</b>		Project #2 Due by 4 pm
28	12/08	Discussion of Project #2		
29	12/10	Catch up / Review		
	TBA	<b>FINAL EXAM (Cumulative)</b>		