

**BMGT 434; sect 0101**  
**Introduction to Optimization**  
**Spring, 2006**  
**TTh 12:30 – 1:45; VMH 1418**

**Instructor:** Dr. Michael Ball  
4471 Van Munching Hall  
Office Hours: TTh 11:30 – 12:30  
VOICE: 301-405-2227  
FAX: 301-405-8655  
mball@rhsmith.umd.edu

**Teaching Assistant:** TBA

**Description:**

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 Materials:**

Bernard W. Taylor III, *Introduction to Management Science*, 8th Edition, 2004, Prentice-Hall. ISBN: 0-13-105052-4

Microsoft Excel and the Solver add-in (available in the Smith School laboratories). QM for windows, which is provided with the book, will *not* be used.

**Course Web Site:**

The course web site 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. Please try this right away and inform the instructor if you have problems.

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.

## Required Work and Grading Policy:

The grade distribution for the course will adhere to the following guidelines: A+/A/A-: 25 → 40%; B+/B/B-: 30 → 50%; C+ and below: 10 → 35%

|   |      |
|---|------|
| (i) 6 Homework Assignments  | 10%  |
| (ii) Mid-Term   | 30%  |
| (iii) Final Exam. The exam will be cumulative.                                  | 40%  |
| (iv) Group Project #1: <i>Interfaces</i> Article Presentation                   | 7.5% |
| (v) Group Project #2: Analysis of Business Scenario Using Optimization Software | 7.5% |
| (vi) Class Participation  | 5%   |

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. Homeworks may be submitted electronically through the course web site.

## Projects and Homeworks:

**Project #1:** Identify an article in the INFORMS journal *Interfaces*. Prepare a 15 minute Powerpoint presentation on the article, which your group will deliver to the class on 4/4 or 4/6. The instructor must approve your choice of article. Your grade will be based on the quality of the presentation, your ability to answer questions during and after the presentation and the quality of your ppt slides. The Interfaces web site is: <http://interfaces.pubs.informs.org/>. 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/ejnls.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 on the last day of class.

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

For the projects, students may form their own teams. Teams should have either 3 or 4 persons. If you cannot identify a team of the appropriate size please contact the instructor for assistance.

There will be 6 homework assignments. The due dates are posted in the course schedule given below. Homework assignments will be posted on the web site.

**HW 5 & Debate:** HW 5 will include the preparation of a one-page response to an Op-Ed article that appeared in the Washington Post. The instructor will choose the best pro-response and the best con-response. The two students will then debate their positions in class on 4/25. The winner of the debate will have 15 bonus points added to the grade on their final and the loser will have 10 bonus points added. Details will be posted on the web site.

**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.studenthonorcouncil.umd.edu/code.html>

On each assignment 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/assignment*"

***Special Needs:*** Any student with special needs should bring this to the attention of the instructor as soon as possible, but not later than the second week of class.

***Homework collaboration:*** Students may discuss homework problems outside of class and help each other in finding approaches to the solution of problems. ***However, each student must hand in a solution that represents their own final work and calculations.***

| <b>Date</b>        | <b>Topic</b>   | <b>Reading</b> | <b>HW Due</b> |
|--------------------|--|----------------|---------------|
| 1/26/06            | Introduction   | Ch 1           |               |
| 1/31/06/<br>2/2/06 | Linear Programming (LP) models: formulation and graphical solution               | Ch 2           |               |
| 2/7/06             | Computer solution of LPs   | Ch 3           | HW 1          |
| 2/9/06             | Computer solution of LPs and sensitivity analysis                                |                |               |
| 2/14/06            |  |                |               |
| 2/16/06            |  |                | HW 2          |
| 2/21/06            | LP applications and advanced formulation techniques                              | Ch 4           |               |
| 2/23/06            |  |                |               |
| 2/28/06            | Integer Programming (IP): introduction   | Ch 5           | HW 3          |
| 3/2/06             | IP: advanced formulation techniques  |                |               |
| 3/7/06             | IP: advanced concepts  |                |               |
| 3/9/06             | Transportation and Assignment Problems   | Ch 6           | HW4           |
| 3/14/06            | Transportation & Assignment Problems: formulation & solution; review for midterm |                |               |
| 3/16/06            | MIDTERM  |                |               |
| 3/21-<br>3/06      | SPRING BREAK   |                |               |
| 3/28/06            | Transshipment problem & Introduction to network optimization                     | Ch 7           |               |
| 3/30/06            |  |                |               |
| 4/4/06             | ** Project # 1 presentations **  |                |               |
| 4/6/06             |  |                |               |
| 4/11/06            | Network Optimization   |                | HW 5          |
| 4/13/06            | Multi-Objective Optimization   |                |               |
| 4/18/06            |  |                |               |
| 4/20/06            |  |                |               |
| 4/25/06            | ** debate **   |                |               |
| 4/27/06            | Non-Linear Programming   | Ch 10          | HW 6          |
| 5/2/06             |  |                |               |
| 5/4/06             |  |                |               |
| 5/9/06             | Review of optimization software  |                |               |
| 5/11/06            | Final thoughts & review for final  |                | Proj #2       |