

## ETLS 602 Management Science

Tom Mason  
Spring Semester 2006

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**Instructor:** Tom Mason [atmason@stthomas.edu](mailto:atmason@stthomas.edu)

**Time / Location:** Tuesday Evenings, 6:00 – 9:00 pm  
St. Paul, OSS 428

**Required Text:** *Introduction to Management Science – A Modeling And Case Studies Approach with Spreadsheets*, 2nd Edition (2003), by Hillier and Hillier, McGraw-Hill. ISBN: 0-07-249368-2. Be sure the text you buy includes the CD: *Student CD-ROM for use with Introduction to Management Science*.

**Bibliography:** Several journal articles are referenced in the textbook. Others will be referenced in class.

**Course Description:** On one-level, management science is a set of tools based on mathematical models of business actions such as allocating resources, planning production, scheduling work, and managing inventory. On another level, it is computer software that implements these models and converts business data into useful solutions. At a higher level, management science is a philosophy of observation and analysis of business systems with the goal of minimizing costs and maximizing resource utilization and profit. This course looks at all three levels with emphasis on generating computer solutions and interpreting and implementing the results.  
*Prerequisites: ETLS 504 Excellence in Operations (MMSE 510) and ETLS 506 Statistical Methods for Manufacturing Quality (MMSE 615)*

**Related Courses:** ETLS 552—Supply Chain Synchronization (MMSE 740),  
ETLS 570—Purchasing, Logistics and Distribution (MMSE 607),  
ETLS 601—Program/Project/Team Management (MMSE 663),  
ETLS 785—Simulation of Logistics and Industrial Systems (MMSE 806).

**Course Objectives:** The course will present management science (MS) as a body of knowledge developed to aid managers in making effective decisions. Students will learn a variety of MS tools such as linear optimization, inventory analysis, system simulation, and PERT/CPM. The course will examine how these tools derive from an underlying “management science approach.” Applications of MS to all areas of business will be presented, but the focus will be on application to manufacturing and service operations. Students will learn to develop models of business systems and analyze those models using spreadsheets. Finally, they will explore the value and limitations of this analysis for the manager in making decisions.

**Learning Outcomes:**

After successfully completing this course the student will be able to:

- Demonstrate the ability to describe the management science (MS) approach and its applicability to a variety of business systems (MS6, TM3) [**P,C**]
- Demonstrate the ability to develop models of business systems using MS tools and analyze these models using Microsoft Excel (MS5, SE6) [**P**]
- Demonstrate the ability to assess the strengths and weaknesses of model solutions as aids to management decisions (TM4, MS1) [**A, E**]
- Demonstrate that she/he can recognize opportunities for using MS to increase the efficiency and effectiveness of manufacturing and service operations (SE1, MS7) [**A, E, P**]

Note: The designators in parenthesis refer to the Program Learning Outcomes of the master degrees (SE=MMSE, MS=MSMS, TM=MSTM). The boldface letters in brackets indicate the assignments (listed below) that will help you achieve these outcomes.

**Course Methodology:**

During the course we will use chapters of the course textbook as a guide, augmented by lectures, discussions, and in-class demonstrations. The reading assignments are designed to provide background to the weekly subjects. They are designated by a chapter number. If further designated – skim then only a brief review of the text is required.

**Major Assignments:**

Two exams ( <b>E</b> )	30 percent
Six homework assignments ( <b>A</b> )	30 percent
Course project report ( <b>P</b> )	30 percent
Class participation and project discussion ( <b>C</b> )	<u>10 percent</u>
Total	100 percent

Note: These assignments will be discussed during the first class session.

**Grading Policy:**

100 – 95	A
94 – 92	A-
91 – 89	B+
88 – 86	B
85 – 83	B-
82 – 80	C

**Academic Integrity:**

All students are expected to understand and follow the University of St Thomas policies on Academic Integrity. These are described at: <http://www.stthomas.edu/engineering/graduate/policies>

Exams: Exams are one of the instruments used to evaluate the knowledge gained by an individual student of the class subject matter, and the progress towards meeting the outcomes of the class and the degree. To this end all exams (in class or take home) are intended to represent the effort of the individual and not a group effort unless specifically stated otherwise.

**Attendance Policy:**

Students are expected to attend all class sessions. Circumstances which prevent attendance will be honored up to two instances. Absences in excess of two times may result in a lower grade for the course. Contact the instructor when a special situation arises. All absences require that the instructor be informed in advance.

**Students with Disabilities** Qualified students with documented disabilities who may need classroom accommodations should make an appointment with the Enhancement Program – Disability Services office during the first two weeks of the semester. Appointments can be made by calling 651-962-6315 or in person in O’Shaughnessy Educational Center, room 119.

**Instructor Biography:** Tom has a BS from The Johns Hopkins University, an MS from the University of Massachusetts at Amherst, and a PhD from Purdue University, all in Operations Research/Industrial Engineering. He has been employed with a defense contractor and a pharmaceutical manufacturer. He has taught courses in quantitative methods for business and general management for more than thirty years.

<b>ETLS 602 – 05 Management Science</b>		
<b>Spring Semester 2006</b>		
<b>Date</b>	<b>Topics</b>	<b>Assignments</b>
Jan 31 Week 1	1. Decision Analysis  2. Introduction to the Course and Overview of Content  3. Linear Programming (Planning)	Chapter 12 – pp. 317-325  Chapter 1 – skim  Questionnaire  Chapter 2 - skim
Feb 7 Week 2	1. Linear Programming continued  2. Modeling with Spreadsheets (Using Microsoft Excel)	Chapter 2  Chapter 3 – skim
Feb 14 Week 3	Applications of LP in Several Functional Areas	Chapter 4
Feb 21 Week 4	1. Sensitivity Analysis in LP: Answering “What-If?” Questions  2. More LP Applications: Shipping From A to C, Maybe Through B	Chapter 5  Chapter 6 – skim
Feb 28 Week 5	1. More LP Applications: Flows (of money, people, goods, electricity, etc.) in networks.  2. Review of LP	Chapter 7
Mar 7 Week 6	Applications that don’t fit LP:  1. Integer Programming: When Decision Variables Must Be Integers  2. Nonlinear Programming: When The Performance Measure Is Not A Linear	Chapter 9  Chapter 10 – skim

	Function	
Mar 14 Week 7	1. <b>Exam I</b>  2. Goal Programming: When More Than One Performance Measure Must Be Considered	Chapter 11 – skim
Mar 28 Week 8	Analyzing Decisions:  1. With Uncertainty About The Environment  2. Sequentially	Chapter 12
Apr 4 Week 9	1. Decisions: Value of Information  2. Computer Simulation: The Most Versatile Approach to Modeling	Chapter 12 (continued)  Chapter 15
Apr 11 Week 10	Simulation with Excel and Crystal Ball	Chapter 16
Apr 18 Week 11	Topic and reading to be selected during the course	
Apr 25 Week 12	Topic and reading to be selected during the course	
May 2 Week 13	1. Topic and reading to be selected during the course  2. Course Projects Discussion	
May 9 Week 14	1. <b>Exam II</b>  2. <b>Course Project Reports Due</b>	