MGT 2251 TSB
Introduction to Management Science
Fall 2012

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Office: COB 448, Tel: 404-894-4334
Class Time: T/TH 9:35-10:55AM at COB (Tech Square) 200
Office Hours: T/TH 1:35-3PM and by appointment

Course Description

Management science is a general methodology that uses scientific approaches in solving decision problems. Typical problem solving process includes problem definition, modeling, solution, analysis, implementation and communication. In this course, we will introduce you to this process with the special emphasis in dealing with the quantitative decision problems. In particular, we would like to achieve the following objectives:

- To introduce you to the general classes of management science models and techniques.
- To develop your ability to formally structure decision problems and to analyze them in a logical manner.
- To understand the sensitivity of problem information and parameters.
- To improve your ability as a rational decision-maker.

This is not a course in mathematics, although mathematics is used in the course as the language for formally defining models and as means of finding solutions. The emphasis in this course is on the basic structure and logic of the models, not on their mathematical details and proofs. The requirements for particular mathematical operations should be within your capabilities, the most important of which is the ability to deal with abstract symbols and relationships (algebra, geometry, probability, basic statistics, and elementary calculus).

The course will be divided roughly into two sections. The first covers an approach of making decisions in a setting that the information is generally deterministic, i.e., where most of the variables and data are controllable and predictable. Examples of this are resource allocation, transportation scheduling and assignment, investment portfolio allocation, and production planning problems in business and public environments. We will spend about half the semester on this type of problems with the use of linear programming and mathematical programming and some extensions.

The second section deals with decisions in which important variables and information in the model are uncontrollable by the decision-maker or models that have to deal with uncertainty. A common example would be the decision to drill an oil well, where the decision-maker cannot control whether or not oil actually exists in a particular location. We will introduce techniques such as Bayesian theory, decision tree and payoff analysis to deal with this situation. Another example is the capacity planning decision for a commercial bank where customer arrivals are uncertain. In such environment, the patterns of customer arrivals and waiting, and the service structure affect the system performance. Queuing models are typically employed to evaluate the performance. The other common approach of dealing with uncertainty is simulation, which attempts to mimic the real world system by assigning probabilities to specific events. The simulation of these events will then help to evaluate the performance of the system. This course will cover various types of models that deal with uncertainty.

Text and Materials

Quantitative Analysis for Management, 11th Edition, by Render, Stair and Hanna. Published by Pearson Prentice Hall, 2012 (ISBN 0132149117).

Extra class materials and homework solution will be posted on T-square.

Prerequisite

MGT 2250 Introduction to Management Statistics or equivalent

Grading Policy

Grade for the course will be based on exams, attendance and participation. Students missing a scheduled exam due to an **official Georgia Tech** event must prearrange an alternate time to take the exam. **Health excused** absences must be documented, and arrange a make-up time to take the exam as soon as the excuse is over. All other excuses for **personal matter** will receive a grade of zero for the missed exam. The distribution of the grading is as follows:

Exams:	22.5% each
Attendance and Participation:	10%

Exams
All exams are non-cumulative closed book, individual efforts. Students may bring one (8 ½ x 11 inches, two sides) **original hand-written or typed note and formula sheet** to the exams. To help students understand the material and prepare the exams, homework problems will be assigned. Students are required to do the homework problems. Assigned homework will not be collected and the solution will

be posted on T-square. Many problems in the exams are very likely related to the homework problems. Hence, you should solve them independent of homework solutions. Short test review session will be offered before each test. **NOTE: Students are expected to have their own calculator for each exam!!**

<u>**Cases**</u>

Short cases will be assigned for illustration of applications in management science. Class time will be allocated to solve and discuss each case. The class is expected to offer insightful suggestions during the case discussion. Active and enthusiastic participation is strongly encouraged. Assigned questions to help you to prepare each case will be provided. No case presentation and report is required. *Case materials will be tested in the exams*.

<u>**Attendance and Participation**</u>

Class participation refers to **regular class attendance; significant contribution to class discussion; and being courteous and professional** to both your instructor and your fellow classmates. Contribution to class discussion will require that you prepare for the class lesson ahead of time by reading the material that is to be covered and keeping up with case and homework assignments. This is not just an attendance grade, but rather a participation grade. Needless to say, attending class is a necessary but not sufficient condition to participate. Any absence will hinder your learning and readiness for the exams. *I will take the class roll every class*.

Final cumulated scores of the class will be analyzed to determine if an adjustment or curve is necessary.

To protect the honest majority, any cheating in any exam, big or small, will be penalized by an "**F**" in the course and will be referred to the Dean of Student Affairs for disciplinary action.

If Georgia Institute of Technology is closed for any reason on a scheduled class day, you should be prepared to adjust the schedule accordingly including taking an exam during the next class session.

<u>**CLASSROOM ENVIRONMENT**</u>

CLASS DOES ENTAIL A CERTAIN AMOUNT OF CIVILITY. The following outlines the basic rules of respectful behavior that must be followed to permit the classroom to be a positive learning experience for all. **Please turn off CELL PHONES. Do not use LAPTOPS or other electronic equipment unless you are taking notes, displaying Power Points, or solving cases/assignments for the class; do not talk to your neighbors; and do not read anything other than the class material currently being discussed. Surfing the internet not relating to the class is inappropriate and will be penalized for your participation grade.**

NOTE

1. The course syllabus provides a general plan for the course; deviations may occur.
2. Students are responsible for the information contained in the Academic Honesty policies found at http://www.honor.gatech.edu/.

Topics and Sequence:

The tentative sequence of the materials covered in the class is listed below. Modification may be made as the semester progresses and any change will be announced in the class.

Week	Class	Date	Topic	Chapter	Cases and Examples
1	1	8/21 (T)	Introduction to Management Science	1	
1	2	8/23 (TH)	Formulation of linear programming (LP)	7	Consolidated Company
2	3	8/28 (T)	Excel and Solver Solution	7	Mexicana Wire Works (P. 300)
2	4	8/30 (TH)	Graphical Solution of LP's	7	
3	5	9/4 (T)	Sensitivity Analysis	7	Valley Chassis
3	6	9/6 (TH)	Applications	8	Consolidated Company
4	**7**	**9/11 (T)**	**Exam 1**		
4	8	9/13 (TH)	Integer LP	10	Consolidated Company
5	9	9/18 (T)	Integer LP	10	Puyallup Mall. (Internet Case)
5	10	9/20 (TH)	Transportation Problems	9	Tru-Rainbow Company
6	11	9/25 (T)	Assignment Problems	9	Andrew-Carter, Inc. (P. 391)
6	12	9/27 (TH)	Network Models	11	
7	13	10/2 (T)	Network Models	11	Money in Motion
7	14	10/4 (TH)	Network Models	11	Southwestern University Traffic Problems (P. 456)
8	**15**	**10/9 (T)**	**Exam 2**		
8	16	10/11 (TH)	Project Scheduling: PERT/CPM	12	
9		**10/16 (T)**	**Fall Recess**		
9	17	10/18 (TH)	Project Scheduling: PERT/CPM	12	Igloo Frozen Yogurt
10	18	10/23 (T)	PERT/Cost and Budgeting	12	Southwestern University Stadium Construction (P. 494)
10	19	10/25 (TH)	Project Scheduling and Crashing	3	
11	20	10/30 (T)	Decision Analysis	3	
11	21	11/1 (TH)	Decision Analysis	3	Pickens Exploration Company
12	22	11/6 (T)	Decision Analysis	3	Blake Electronics (p. 111)
12	**23**	**11/8 (TH)**	**Exam 3**		
13	24	11/13 (T)	Queuing Analysis	13	
13	25	11/15 (TH)	Queuing Analysis,	13	
14	26	11/20 (T)	Queuing Analysis	13	Shelly's Supermarket
14		**11/22 (TH)**	**Thanksgiving**		
15	27	11/27 (T)	Queuing Analysis	13	New England Foundry (P. 530)
15	28	11/29 (TH)	Simulation	14	
16	29	12/4 (T)	Simulation	14	Four Wheel Tire Shop
16	30	12/8 (TH)	Simulation	14	Alabama Airlines (P. 570)
		12/13 (TH)	**Final Exam (8-1050AM) Room 200**		