



## Syllabus

### MGT 621 – Management Models

#### **Course Objectives:**

In this course we shall be concerned with problem solving techniques used in “management science”, an approach to managerial decision making based on the scientific method. The process of problem solving can be described in seven steps:

- Define the problem
- Determine the set of alternatives
- Determine the criteria used to evaluate the alternatives
- Evaluate the alternatives
- Choose an alternative
- Implement the selected alternative
- Evaluate the results

The first five steps can be referred to as decision making, the first three of which constitutes “modeling the problem” and the last two amount to “analyzing” the problem. Analysis has two forms, qualitative and quantitative, both of which are important in the decision making process. One of our purposes here is to study some of the important techniques of quantitative analysis that have found use in the real world. However, those techniques are of limited use if the model of the problem is inaccurate or if the results of the analysis are misinterpreted. Thus we shall also be very concerned with the modeling and interpretation aspects of the decision making process as well.

Our approach will be to use the specific methods to drive the course all the while embedding modeling and interpretation into each application. The particular areas of quantitative analysis that we will cover include linear, integer programming, goal programming, queuing theory, PERT/CPM, and if time permits computer simulation and dynamic programming. We begin with linear integer and goal programming (LP) and devote the first two modules and part of the third to this topic.

In Module I we introduce the student to the nature of an LP problem via three specific examples and also discuss the graphical solution technique in the case of two decision variables. Some of the anomalies of these kinds of problems are considered. In Module II we continue our analysis of two dimensional problems. We introduce the basic notions of sensitivity analysis in this context. Module III is devoted to a study of modeling and interpreting the results of computer solutions of more complicated LP scenarios as well as an introduction to the utility of 0, 1 LP model through the study of the general assignment problem. We also discuss the network model for this problem. In Module IV we present several examples of mixed integer problems where some, possible all, of the variables are restricted to integer values and/or 0, 1 values. Modules V and VI are devoted to the topics of goal programming and PERT/CPM analysis of projects respectively.

The modules have been written in the narrative but utilize problems solved by us, taken from the current edition as well as previous additions of the text to illustrate and introduce the ideas. Moreover selected readings from the text are suggested at the beginning of each module and exercise taken from the current edition and previous editions are assigned as the student progresses through the module. Those that are to be submitted for grading are indicated. Dates for the submissions are given in the calendar. Solutions to all exercises are provided but access to the problems to be submitted can be gained only AFTER submission.

### **Course Outline:**

- Week 1. **Linear Programming**
- Week 2. **Linear Programming continued then Sensitivity Analysis**
- Week 3. **Sensitivity Analysis continued**
- Week 4. **Applications of Linear Programming**
- Week 5. **Applications of Linear Programming continued**
- Week 6. **Integer Programming**
- Week 7. **Integer Programming continued**
- Week 8. **Goal Programming and Midterm Exam**
- Week 9. **Goal Programming continued**
- Week 10. **Goal Programming continued**
- Week 11. **PERT/CPM**
- Week 12. **PERT/CPM Continued**
- Week 13. **PERT/CPM Continued and Final Exam**

### **Course Material:**

*Text book(s)* **An Introduction to Management Science 11<sup>th</sup> Edition**  
*Anderson, Sweeney and Williams*

ISBN 0-324-20231-8

### **Grades:**

*Available Points*

Examinations:

- ✓ Proctorial midterm (200 points),
- ✓ Proctorial final (200 points)
- ✓ Submitted exercises: total of 200 points
  - A: 480 – 600 points
  - B: 390 – 479 points
  - C: 300 – 389 points
  - F: 0 – 299 points

All submissions must be made on time. Should some emergency befall you (which can be documented) that makes it impossible for you to be able to submit a homework assignment on time the grade for submitted exercises will be computed on a prorated basis. At most two situations are permitted. Unexcused missing or late assignments receive a grade of zero.

Bonus points for contributing to bulletin board discussions may be earned at the discretion of the instructor.