Course Information:

- **Title:** Decision models
- **Course number:** HTM 406
- **Section:** 01
- **Instructor:** Mohammad R. Oskoorouchi
- **Office:** MARK 431
- **Telephone:** 750-4219
- **E-mail:** moskooro@csusm.edu
- **Home page:** [http://www.csusm.edu/oskoorouchi/](http://www.csusm.edu/oskoorouchi/)
- **Course page:** [http://courses.csusm.edu/htm406mo](http://courses.csusm.edu/htm406mo)
- **Password protected course page:** [http://courses.csusm.edu/htm406mo/download](http://courses.csusm.edu/htm406mo/download)
- **Office hours:** T/TH 12:00 – 1:00 PM or by appointment
- **Lecture and Lab:** T/TH 1:00 – 2:15 and 3:00 – 3:50 PM

Textbook:

**Required Text:**


**Recommended Texts:**


**Other References:**

2. **Simulation:** Evans and Olson "Introduction to Simulation and Risk Analysis", Prentice Hall, 1998. This book describes simulation using Crystal Ball.
**Course description and objectives:**

**Course Description:** Many managerial decisions -- regardless of their departmental orientation -- are increasingly being based on analysis using quantitative models from the discipline of management science. Management science tools techniques and concepts (e.g., data, models and computer systems) have dramatically changed the way business operates in manufacturing, service operations, marketing, and finance. This course is designed to introduce the fundamental techniques of using data to make informed management decisions. In particular, we will focus on various ways of modeling, or thinking structurally about, decision problems in order to enhance your decision making skills.

Rather than survey all of the management science techniques, we stress those fundamental concepts that we believe are most important for the practical analysis of management decisions. Consequently, we focus on evaluating uncertainty explicitly, understanding the dynamic nature of decision making, using historical data and limited information effectively, simulating complex systems, and allocating scarce resources. The implementation of these tools has been facilitated considerably by the development of software packages, so we will make liberal use of computer exercises.

**Objective:** Emphasis will be placed on how, what and why certain techniques and tools are useful, and what their ramifications would be when used in practice. This will necessitate some mechanical manipulations of formulas and data, but it is not our goal for you to become adept handlers of mathematical equations and computer software. Our goal is to enable you to become excellent managers and business people, and this necessitates your gaining a working knowledge of management science tools and techniques. To give you a perspective on how management science is used in practice, much of the material will be presented in the context of practical business situations from a variety of settings.

**Learning Outcomes:**

Following this course the students should be able to:

- Formulate a problem statement as a Mathematical Model (linear, nonlinear, and integer) and define decision variables, constraints and objective functions.
- Create and solve a linear optimization model in a spreadsheet.
- Interpret the "Excel solver" using sensitivity analysis.
- Solve linear, integer, and nonlinear optimization problems in Excel.
- Analyze a transportation network.
- Understand how to plan, monitor, and control projects using PERT/CPM.
- Analyze a managerial model under uncertainty by Decision Analysis and Decision Trees.
- Analyze a simulation model, using the spreadsheet as well as the computer software Crystal Ball.
**Evaluation:**
Your course grade will be based on a final exam, a midterm exam, case write-ups, a team project and class participation as follows:

**Homework Assignments: (30%)**
Homework assignments are designed to help you learn the mechanics of the methods discussed in class and to give you an opportunity to apply these concepts in a straightforward manner. In addition to their value as learning exercises, doing a careful and thorough job on the homework assignments is the best preparation for the midterm and final examinations of the course.

**Homework Rules:**
- There will be 6 assignments throughout the semester which will be posted on the webpage.
- You must submit a hard copy at the beginning of the class, when it is due.
- First page should be a cover page contains your name, homework number, course number, etc.
- Each problem must be answered in a separate page and in the same order as given.
- All pages must be stapled together.

**Team Project and group presentation: (15%)**
The objective of this is to permit students to tailor the course to their own interests, whether they are in Finance, Marketing, Accounting, Manufacturing, Systems, etc. The project is designed to acquaint students with one specific area of application of optimization and the literature in that area. Reading the work of others does this. Sources for this bibliographical research include the Libraries or the World Wide Web. A one-page proposal is due on or before **November 18**. The team project involves using optimization in solving a real problem, ideally one involving your workplace. The team project will require a written report, and the use of computer software. It should be appropriate as a consulting report. The general plan of a report should be as follows:
- A clear summary of the issues raised by the managerial situation.
- A clear, concise summary of the recommendations for the specific actions to be taken targeted at the manager who may decide to implement these recommendations.
- A detailed analysis and explanation of the analytical approach followed by the student in solving the case. This part may contain technical material.

**List of Topics (Non-exhaustive)**

**Midterm Exam:** Closed book (15%).
**Final Exam:** Closed book comprehensive exam (30%).
**Class participation:** (10%)

**Grading Standards:**

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# Tentative Course Schedule:

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<tr>
<th>Date</th>
<th>Topics</th>
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<td>Weeks 1 and 2</td>
<td>Chapters 1 and 2 - LP:</td>
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<td>• Graphical Solutions</td>
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<td>Chapter 3 - LP: Modeling:</td>
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<td>Week 5</td>
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<td>Chapter 4 - Sensitivity Analysis</td>
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<td>• Sensitivity analysis using graphs</td>
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<td>• Sensitivity analysis using solver reports</td>
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<td>Week 6</td>
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<td>Chapter 5 - Transportation Models</td>
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<td>Week 7</td>
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<td>Midterm Exam</td>
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<td>Weeks 8 and 9</td>
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<td>Chapter 6 - Integer Programming</td>
<td>Transport 3, IP1, IP2</td>
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<td>Week 9 and 10</td>
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<td>Chapter 8 - Decision Theory</td>
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<td>Week 11</td>
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<td>Group meeting</td>
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Weeks 12, 13, and 14

Chapter 10 - Simulation Modeling
- Monte Carlo Simulation
- Crystal Ball

Nov. 14: Project Proposal due
Simulation1, Simulation2, Simulation3

Week 15

Group presentation

Week 16

Final Exam

Tuesday Dec. 12, 1130-1330

**Academic Honesty Statement:** Students will be expected to adhere to standards of academic honesty and integrity, as outlined in the Student Academic Honesty Policy. All written work and oral presentation assignments must be original work. All ideas/material that are borrowed from other sources must have appropriate references to the original sources. Any quoted material should give credit to the source and be punctuated with quotation marks.

**ADA statement:** Students with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentations to the Office of Disabled Student Services (DSS). This office is located in Craven Hall 5205, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Students authorized by DSS to receive reasonable accommodations should meet with me during my office hours in order to ensure confidentiality.

**NOTE:** It is the student’s responsibility to understand and follow the University Policies as stated in the catalog.