

**Saint Leo University**  
**COM 315**  
**Decision Support Systems**

**Course Description:**

With better computer data analysis and the application of statistical concepts, decision making can be enhanced. This course provides the knowledge and skills to create these applications.

**Prerequisite:**

COM 130 or COM 140

**Textbooks:**

**The textbook information which appears on our Saint Leo Bookstore ordering site is as follows:**  
Saint Leo University. Quantitative Analysis for Management (Custom). ISBN: 9780134725123

**Your custom textbook was created from the following National text(s):**

Quantitative Analysis for Management: Render, B., Stair, R. M., Hanna, M. E., & Hale, T. S. (2018). Quantitative analysis for management(13th ed.). Harlow, England: Pearson. ISBN: 9780134543161

**Learning Outcomes:**

At the completion of this course students should be familiar with several methods of decision making in a business environment. Students will find that almost every type of problem in the business world that requires a quantitative solution has been explored and methods for solving them have been devised. Students should be able to apply these methods to the real-world situations in which they will one day find themselves. Students should be able to:

1. Demonstrate an understanding of the theory of decisions and decision analysis including probability, decisions under uncertainty, risk taking, and real-world problems.
2. Describe and understand the concept of decision support systems including collection of data, database management, modeling, group and organizational decision support systems, executive information systems, and expert systems.
3. Utilize commercial decision support and graphic presentation software packages to prepare typical business decision packages utilizing methodologies such as forecasting, linear programming, and decision trees.
4. **VALUES OUTCOME:** In this class we will study how to make decisions that make optimal use of resources, essentially practicing Saint Leo University's core value of **Responsible Stewardship** of the resources with which we are entrusted.

**Core Value:**

*Responsible Stewardship:* Our Creator blesses us with an abundance of resources. We foster a spirit of service to employ our resources to university and community development. We must be resourceful. We must optimize and apply all of the resources of our community to fulfill Saint Leo University's mission and goals.

**Evaluation:**

The following criteria will be used to determine a final grade in the course:

- Quiz 1 – 12%
- Quiz 2 – 12%
- Quiz 3 – 12%
- Chapter Problems (8) – 54%
- Discussions (9) – 10%

<b>Grade</b>	<b>Score (%)</b>
A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D+	67-69
D	60-66
F	0-59

**Quizzes**

There will be three quizzes consisting of 30 multiple-choice questions. The test-taking period will be 75 minutes for each quiz. Quizzes will consist of multiple-choice questions demonstrating the student's mastery of the material. **There will not be a final examination in the course.** Make-up quizzes will be permitted only for excused absences, which will require written evidence in advance of the quiz-taking period.

**Chapter Problems**

Essentially this is a problem-solving class and is fundamentally about using technology to solve problems. Students will be given specific graded Chapter Problems in each module of the course, all of which must be satisfactorily completed in order to complete the course. Chapter Problems must be turned in electronically to the professor. All exercises and laboratory work for each module must be submitted **no later than Sunday 11:59 PM EST/EDT** of the respective Module. Late submission will result in the deduction of 10% marks per day.

**Discussion**

There are a total of eight (8) discussion questions for each Module, and one (1) Core Value Discussion in Module 8. Students will be provided several discussion questions. The initial response should be to a question that has not been answered. If all questions have been answered, the student will choose the question with the last initial response.

**Course Schedule:**

**Module 1 Introduction to Managerial Decision Modeling**

**Objectives**

At the conclusion of this module, students will be able to:

- Formulate a decision model and describe its importance.
- Explain two types of decision models: deterministic and probabilistic models.
- Explain the steps involved in developing decision models in practice.
- Construct spreadsheets to solve decision models.
- Discuss possible problems in developing decision models.

**Assignments**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Post an introduction to the class	Thursday 11:59 PM EST/EDT
Read assigned material from the textbook	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Submit Chapter 1 Problems	Sunday 11:59 PM EST/EDT

**Module 2 Linear Programming Models: Graphical and Computer Methods**

**Objectives**

At the conclusion of this module, students will be able to:

- Explain the basic assumptions and properties of linear programming (LP).
- Formulate LP problems.
- Explain graphical solution procedures for LP problems with only two variables.
- Discuss special situations such as redundancy, infeasibility, unboundedness, and alternate optimal solutions in LP problems.
- Construct a spreadsheet and solve LP problems using Excel's Solver.

**Assignments**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read assigned material from the textbook	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Submit Chapter 7.1 to 7.6 Problems	Sunday 11:59 PM EST/EDT

**Module 3                      Linear Programming Modeling Applications with Computer Analysis in Excel**

**Objectives**

At the conclusion of this module, students will be able to:

- Formulate a wide variety of linear programming (LP) models using more than two decision variables and constraints.
- Examine major business application areas for LP problems: manufacturing, marketing, labor scheduling, blending, transportation, finance, and multi-period planning.
- Construct spreadsheets for complex LP problems and solve them using Excel's Solver.

**Assignments**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read assigned material from the textbook	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Submit Chapter 8 Problems	Sunday 11:59 PM EST/EDT

**Module 4                      Linear Programming Sensitivity Analysis**

**Objectives**

At the conclusion of this module, students will be able to:

- Explain the impact of changes in objective function coefficients, right-hand-side values, and constraint coefficients on optimal solution of a linear programming problem.
- Create answer and sensitivity reports using Excel's Solver.
- Interpret all the parameters in a sensitivity report for maximization and minimization problems.
- Determine the impact of simultaneous changes in input data values using 100% rule.
- Determine the impact of the addition of new variables using pricing-out strategy.

**Assignments**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read assigned material from the textbook	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Submit Chapter 7.7 Problems	Sunday 11:59 PM EST/EDT
Complete Quiz 1	Sunday 11:59 PM EST/EDT

**Module 5                      Transportation, Assignment, and Network Models**

**Objectives**

At the conclusion of this module, students will be able to:

- Formulate special LP network flow models.
- Compile and solve transportation models using Excel’s Solver to determine minimum cost shipping routes in a network.
- Extend the basic transportation model to include transshipment points.
- Compile and solve facility location and other application problems as transportation models.
- Compile and solve maximal-flow, shortest-path, and minimal-spanning tree network models.

**Assignments**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read assigned material from the textbook	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Submit Chapter 9 Problems	Sunday 11:59 PM EST/EDT

**Module 6                      Integer Programming Models and Project Management**

**Objectives**

At the conclusion of this module, students will be able to:

- Formulate integer programming (IP) models.
- Compile and solve IP models using Excel’s Solver.
- Explain the difference between general integer and binary integer variables.
- Understand the use of binary integer variables in formulating problems involving fixed (or setup) costs.
- Formulate goal programming problems and solve them using Excel’s Solver.
- Formulate nonlinear programming problems and solve them using Excel’s Solver.
- Explain how to plan, monitor, and control projects using PERT/CPM.
- Determine earliest start, earliest finish, latest start, latest finish, and slack times for each activity.

**Assignments**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read assigned material from the textbook	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Submit Chapters 10 and 11 Problems	Sunday 11:59 PM EST/EDT
Complete Quiz 2	Sunday 11:59 PM EST/EDT

**Module 7****Decision Analysis and Queuing Models****Objectives**

At the conclusion of this module, students will be able to:

- Describe different types of decision-making environments.
- Make decisions under uncertainty and under risk.
- Develop accurate and useful decision trees.
- Discuss trade-off curves for cost of waiting time and cost of service.
- Describe basic queuing system configurations.
- Describe the assumptions of common queuing models.
- Use Excel to analyze a variety of operating characteristics of queuing systems.

**Assignments**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read assigned material from the textbook	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Submit Chapters 3 and 12 Problems	Sunday 11:59 PM EST/EDT

**Module 8****Forecasting and Inventory Control Models****Objectives**

At the conclusion of this module, students will be able to:

- Describe various types of forecasting models.
- Compute a variety of forecasting error measures.
- Compute moving average, weighted moving average, and exponential smoothing time-series models.
- Analyze trends and seasonality in time-series data.
- Use Excel to analyze a variety of forecasting models.
- Explain the importance of inventory control.
- Use the Economic Order Quantity (EOQ) model to determine how much to order.
- Compute the reorder point (ROP) in determining when to order more inventory.
- Use Excel to analyze a variety of inventory control models.

**Assignments**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read assigned material from the textbook	
Post initial response to the Core Value Discussion	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates' Core Value Discussion	Sunday 11:59 PM EST/EDT
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Submit Chapters 5 and 6 Problems	Sunday 11:59 PM EST/EDT
Complete Quiz 3	Sunday 11:59 PM EST/EDT