

## Saint Leo University

### GBA 334

### Applied Decision Methods for Business

#### Course Description:

This course explores the use of applied quantitative techniques to aid in business-oriented decision making. Emphasis is on problem identification and formulation with application of solution techniques and the interpretation of results. Included are probability theory; decision making under certainty, risk and uncertainty; utility theory; forecasting; inventory control; PERT/CPM; queuing theory; and linear programming.

#### Prerequisite:

MAT 201

#### Textbook:

**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

#### Software

The use of statistical software is a required component in this class. It is expected that you already have a basic understanding of computers and Microsoft Excel. In-depth training is provided during the course on the appropriate use of the following packages:

- Excel QM, version 5.2
- Analysis Tool Pack for Microsoft Excel Must Be Activated

To access the information needed to install the software, click the Software Installation Information link located under Resources in the course menu or click [this link](#).

#### Learning Outcomes:

At the completion of the course you should be familiar with several decision methods of decision-making in a business environment. You will find that almost every type of problem to which you will be exposed in the business world has been explored and methods of solving them have been devised. You should be able to apply these methods to the real-world situations in which you will one day find yourself. The skills developed during this class include:

1. Explain the key attributes and differences between the normal, standard normal, and binomial distribution of variables.
2. Identify and explain the underlying assumptions, key variables, theoretical basis, and solution techniques for the following decision-making problems:
  - a. Decision Analysis
  - b. Probability Theory and Analysis
  - c. Regression Analysis
  - d. Forecasting Methods
  - e. Inventory Control Methods
  - f. Project Management (including PERT/CPM)
  - g. Network Models
  - h. Queuing Theory
  - i. Linear Programming Approaches and the Transportation and Assignment Special Cases
  - j. Statistical Process Control
3. Formulate and execute a solution to a variety of decision-making problems using computer software;

4. Identify, explain, and interpret the key areas of computer output for the various decision-making problems; and
5. Apply one of the approaches covered in class to a real-world issue and present the findings.

The focus of this course will not be on the development of the mathematical models used to analyze data. Instead the focus will be on the application and use of statistical methods. Each of the above outcomes will be accomplished through an examination of the following areas:

- What is the methodology? What questions does it answer?
- Define the problem. Develop the model. Determine what data is necessary.
- How do we analyze the data?
- What do the results look like?
- How do we interpret the results; i.e., what do the results mean?

**Core Value:**

The Management Department has identified excellence as the Saint Leo University core value of focus in this course.

*Excellence:* Saint Leo University is an educational enterprise. All of us, individually and collectively, work hard to ensure that our students develop the character, learn the skills, and assimilate the knowledge essential to become morally responsible leaders. The success of our University depends upon a conscientious commitment to our mission, vision, and goals.

**Evaluation:**

Your grade in the course will be based on the following:

<b>Assignment</b>		<b>Total points</b>	<b>% of total</b>
Discussion	(8 at 25 points each)	200	20%
Application	(8 at 35 points each)	280	28%
Quizzes	(4 at 30 points each)	120	12%
Exams	(2 at 100 points each)	200	20%
Project	(1 at 200 points)	200	20%
<b>Total</b>		<b>1000</b>	<b>100%</b>

**Discussion (20%):**

Discussion question responses are made in the discussion board for the appropriate module. To earn full credit, you must answer the question and make a proper citation for a reference which supports your answer. I will not be grading on “volume,” rather I will be looking for discussions that answer the question and give a good description of all of the factors involved in arriving at that answer. If asked to give an example from your experience and you have no relevant experience in that topic, state you have no experience and then propose an example that you believe would be appropriate in answering the question. Review the guidelines posted for Discussion Question responses. Participation is integral to the Discussion grade; this aspect will be graded based on your participation in the discussion board. As a general rule, you are required to post thoughtful responses to at least two other students. In your response, you cannot simply agree or disagree, you must also state why you agree or disagree with the post. References that support your reasoning in the response are also required.

**Application (28%):**

Application assignments require solving problems from the textbook. You may use QM for Windows, Excel QM, or Excel to solve the problems. The answers must be submitted to the Dropbox in a Microsoft Word or Microsoft Excel file, depending upon the preference of your instructor. You must state your answers within a complete sentence so that your understanding of applying the results of the computations can be observed. You should also include the work for your computation; this will assist in applying partial credit if your answers are not correct. DO NOT SUBMIT QM for Windows files as server security policies do not allow many of these files to be

passed in the system. If you need to show the QM work, either save as an Excel file (a function within QM) or paste a screen capture of the QM Entry Screen before solving AND the QM result screen(s).

**Quizzes (12%):**

Quizzes will be administered in the online testing system. Quizzes will consist of ten (10) multiple choice questions with one hour (30 minutes) to complete. Some of the questions will cover theory, definitions, and applications with short textual answers that will be found among the multiple choices. Some of the questions will require computations with numerical answers that will be found among the multiple choices.

**Exams (20%):**

Exams will be administered in the online testing system. Exams will consist of thirty (40) multiple choice questions and two essay questions with two and a half (2-1/2) hours (150 minutes) to complete. Some of the questions will cover theory, definitions, and applications with short textual answers that will be found among the multiple choices. Some of the questions will require computations with numerical answers that will be found among the multiple choices. The essay questions will require you to incorporate what you have learned and apply it to a specific business scenario.

**Group Project (20%)**

The Decision Models term project is fairly flexible in terms of the types of projects that are acceptable. You may come up with your own project topic or choose from a list of topics in the separate document. In either case, the project topic must be approved by the professor. Each group is expected to prepare a full report that addresses all areas noted in Appendix II. At the discretion of the instructor, this may include (a) make a short PowerPoint or Prezi presentation to the class reporting on their project (18 minutes including Q&A), or (b) writing a paper. Either way that is chosen, each group must submit files containing all of their project-related materials (e.g. Excel files, PowerPoint presentation files, Word files). Sample topics include:

- Conduct an analysis of a real decision problem (personal or managerial) that you are familiar with.
- An analysis of an important decision problem (again, real) "in the public domain".
- An experiment involving decision making and decision-analytic tools.

**Grading Scale:**

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

**Course Schedule:**

**Module 1                      Introduction to Quantitative Analysis, Probability Concepts, and Applications**

- Objectives:**
- When you complete this module, you should be able to:
- Apply mathematical modeling to solve business problems.
  - Solve to find the break-even point.
  - Apply basic probability analysis.
  - Calculate expected values and variance.
  - Solve problems using binomial, normal, exponential, and Poisson probability distributions in Excel.

**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 the assigned materials	
Post an 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
Complete practice problems	
Submit Application Assignment 1	Sunday 11:59 PM EST/EDT

**Module 2                      Decision Analysis**

- Objectives:**
- When you complete this module, you should be able to:
- Solve problems for decisions under uncertainty using maximax, maximin, and minimax regret techniques.
  - Solve problems for decisions under risk using expected value.
  - Apply decision trees to graphically illustrate and solve decision analysis problems.
  - Apply utility to determine decisions that result in the best outcomes.

**Assignments:**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read the assigned materials	
Post an 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
Complete practice problems	
Submit Application Assignment 2	Sunday 11:59 PM EST/EDT
Complete Quiz 1	Sunday 11:59 PM EST/EDT
Submit Group Project membership and topic	Sunday 11:59 PM EST/EDT
Begin working on Group Project research proposal	Sunday 11:59 PM EST/EDT of Module 4

**Module 3****Regression and Forecasting Models****Objectives:**

When you complete this module, you should be able to:

- Develop and solve simple linear regression equations from sample data and interpret the slope and intercept.
- Use correlation and coefficient of determination to determine the quality of fit for the regression line.
- Test the regression model for significance using the F distribution to determine if a relationship between x and y exists.
- Solve problems with several independent variables using multiple regression analysis.
- Apply appropriate types of forecasts and qualitative models to solve business problems.
- Use seasonal adjustment in forecasting.
- Use the Analysis Add-In for Excel to solve a variety of regression and forecasting problems.

**Assignments:**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read the assigned materials	
Post an 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
Complete practice problems	
Submit Application Assignment 3	Sunday 11:59 PM EST/EDT
Complete Quiz 2	Sunday 11:59 PM EST/EDT

**Module 4****Inventory Control Models****Objectives:**

When you complete this module, you should be able to:

- Apply economic order quantity (EOQ) and related parameters to make decisions about how much stock to order.
- Determine the reorder point (ROP) to decide when to order stock.
- Apply the production run model to build up stock levels as they are depleted.
- Determine the appropriate level of safety stock to prevent stocking out of product.
- Solve problems using Excel QM

**Assignments:**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read the assigned materials	
Post an 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
Complete practice problems	
Submit Application Assignment 4	Sunday 11:59 PM EST/EDT
Complete Midterm Exam	Sunday 11:59 PM EST/EDT
Submit Group Project research proposal	Sunday 11:59 PM EST/EDT

**Module 5**                      **Project Management**

**Objectives:**

When you complete this module, you should be able to:

- Apply PERT and CPM to plan, monitor, and control projects.
- Determine critical path and project lengths.
- Reduce the project time using project crashing.

**Assignments:**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read the assigned materials	
Post an 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
Complete practice problems	
Submit Application Assignment 5	Sunday 11:59 PM EST/EDT
Complete Quiz 3	Sunday 11:59 PM EST/EDT

**Module 6**                      **Network Theory, Waiting Lines, and Queuing Theory Models**

**Objectives:**

When you complete this module, you should be able to:

- Apply network theory to find the shortest route through a network, solve maximum flow problems, and find the shortest span to connect a network.
- Solve network problems both by hand and using POM QM.
- Apply queuing system theory to solve business problems.
- Solve queuing theory problems using Excel.

**Assignments:**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read the assigned materials	
Post an 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
Complete practice problems	
Submit Application Assignment 6	Sunday 11:59 PM EST/EDT
Complete Quiz 4	Sunday 11:59 PM EST/EDT

**Module 7**                      **Linear Programming**

**Objectives:**

When you complete this module, you should be able to:

- Apply the linear programming (LP) models to solve business problems.
- Perform sensitivity analysis for LP problems.
- Solve transportation, assignment, and facility location specific problems.
- Solve linear programming problems using Excel.

**Assignments:**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read the assigned materials	
Post an 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
Complete practice problems	
Submit Application Assignment 7	Sunday 11:59 PM EST/EDT
Submit Group Project final report	Sunday 11:59 PM EST/EDT

**Module 8**                      **Statistical Process Control**

**Objectives:**

When you complete this module, you should be able to:

- Define the quality of a product or service.
- Develop four types of control charts:  $\bar{x}$ -bar,  $\bar{R}$ -bar,  $p$ , and  $c$ .
- Understand the basic theory behind statistical quality control, including the central limit theorem.
- Determine whether or not a process is in control.

**Assignments:**

<b>Items to be Completed:</b>	<b>Due No Later Than:</b>
Read the assigned materials	
Post an 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
Complete practice problems	
Submit Application Assignment 8	Sunday 11:59 PM EST/EDT
Complete Final Exam	Sunday 11:59 PM EST/EDT