ANLY630

Course Summary

Course : ANLY630 **Title :** Optimization and Simulation
Length of Course : 8
Prerequisites : BUSN662 **Credit Hours :** 3

Description

Course Description: This course primarily covers handling elements of the influence on a business performance that can be constraints for achieving certain results. The course discusses optimization methodologies to support management choices. Students will learn about applying linear programming principals to harness a precise objective considering a set of business constraints. Students will use spreadsheet software to implement and solve these linear programming problems. (Prerequisite: BUSN662)

Course Scope:

Upon successful completion of this course, the student will learn how to use various optimization and simulation methods within a managerial decision with spreadsheets. Describe the optimization and simulation methods that are often used by analysts in linear programming model, modeling and explaining the sensitivity of the analysis process. Apply optimization and simulation methods within the transportation, project management, inventory control, queuing modeling and forecasting and simulations. Explain how optimization and simulation decision analysis can be applied by using probability concepts and application in a Microsoft Excel spreadsheet format.

Objectives

Course Objectives:

1. Describe the various managerial decision modeling factors in optimization and simulation methods.
2. Discuss the different types of linear programming models, modelings, applications during the sensitive analysis of data analytical process.
3. Explain the transportation and network models in the optimization and simulation methods.
4. Describe how the data analytical process of the integer, goals within the nonlinear programming methods.
5. Explain how the forecasting models that are often used in the optimization and simulation process.
6. Discuss the project management analytical process when applying simulation modeling during data evaluation process.
7. Consider how queuing, and inventory models are used in optimization and simulation during the decision analysis of a project.

8. Encourage students to apply what they have learned in the probability concepts and application by using Microsoft Excel Spreadsheet modules and applications.

Outline

Week 1:

Topic

Managerial Decision Modeling

Learning Objectives

LO-1 Define decision model and describe the importance of such models; Understand the use of spreadsheets in developing decision models

Readings

Read: Chapter 1

<u>Introduction to Managerial Decision Modeling</u>

Assignment

Course Materials:

Lesson Plan:

Introduction and Read the Business Article:

http://www.opsrules.com/supply-chain-optimization-blog/bid/317630/Supply-Chain-Optimization-versus-Simulation

Supply Chain Optimization versus Simulation

Submit: Discussion Forum 1

Submit: Discussion Forum 1(a)

Submit: Quiz 1

Submit: Problem Set 1

Week 2:

Topic

Linear Programming Models: Graphical and Computer Methods

Learning Objectives

LO-2 Understand the basic assumptions and properties of linear programming (LP), problems and spreadsheet and solve in the Excel's Solver.

Readings

Read: <u>Linear Programming Models: Graphical and Computer Methods</u>

Chapter 2

Assignment

Course Materials:

Lesson Plan: Please read this week instructions in the course lesson

Chapter(s): PowerPoint Slides

Submit: Discussion Forum 2 (Due Day 3 for original response and Day 7 for responses to others posts.)

Submit: Quiz 2

Submit: Problem Set 2

Week 3:

Topic

Linear Programming Modeling Applications with Computer Analysis in Excel

Linear Programming Sensitivity Analysis

Learning Objectives

LO-3 Understand major business application areas for LP problems, in various industries for multi-period planning by using Excel's Solver.

LO-4. Generate Answer and Sensitivity Reports using Excel's Solver. Interpret all parameters of these reports for maximization and minimization problems. Analyze the impact of simultaneous.

Readings

Read: <u>Linear Programming Modeling Applications with Computer Analyses in Excel: Linear Programming Sensitivity Analysis</u>

Chapter 3-4

Assignment

Course Materials:

Lesson Plan: Please read this week instructions in the course lesson

Chapter(s): PowerPoint Slides

Submit: Discussion Forum 3

Submit: Quiz 3

Submit: Problem Set 3

Week 4:

Topic

Applying Transportation, Assignment, and Network Models

Learning Objectives

LO-4 Structure special LP network flow models. Set up and solve transportation models by using Excel's Solver.

Readings

Read: <u>Linear Programming Sensitivity Analysis: Transportation, Assignment, and Network Models;</u> Chapters 5

Assignment

Course Materials:

Lesson Plan: Please read this week instructions in the course lesson

Chapter(s): PowerPoint Slides

Submit: Discussion Forum 4

Submit: Quiz 4

Submit: Problem Set 4

Week 5:

Topic

Applying Integer, Goal, and Nonlinear Programming Models

Learning Objectives

LO-5 Understand the difference between general integer and binary integer variables and the usage in formulating problems involving fixed costs for formulating goal programming (GP) problems nonlinear programming (NLP) problems and solve by using Excel's Solver.

Readings

Read <u>Integer, Goal, and Nonlinear Programming Models</u> Chapters 6

Assignment

Course Materials:

Lesson Plan: Please read this week instructions in the course lesson

Chapter(s): PowerPoint Slides

Submit: Discussion Forum 5

Submit: Quiz 5

Submit: Problem Set 5

Week 6:

Topic

Project Management; Decision Analysis

Learning Objectives

LO-6 Understand project management plan and the use LP to find the least-cost solution to reduce total project time and solve these LP models using Excel's Solver. Understanding how decision analysis is used to determine uncertainties and risks by using Excel to set decision tables and trees and the Bayesian analysis.

Readings

Read: Project Management; Decision Analysis

Chapters 7-8

Assignment

Course Materials:

Lesson Plan: Please read this week instructions in the course lesson

Chapter(s): PowerPoint Slides

Submit: Discussion Forum 6

Submit: Writing Assignment 6

Week 7:

Topic

The Queuing Models; Simulation Modeling

Learning Objectives

LO-7 Discuss the three parts of a queuing system; queuing system configurations; understand the assumptions of conventional queuing models by using Excel to analyze various queuing systems. Learn the basic steps of conducting a simulation, and the advantages and disadvantages of simulation models by using Excel's standard functions, such as the Crystal Ball method.

Readings

Read: The Queuing Models; Simulation Modeling Chapters 9-10

Assignment

Course Materials:

Lesson Plan: Please read this week instructions in the course lesson

Chapter(s): PowerPoint Slides

Submit: Discussion Forum 7

Submit: Writing Assignments 7

Week 8:

Topic

Forecasting Models

Final Paper

Final Exam

Learning Objectives

LO-8 To help students understand how to apply the various types of forecasting models. The computing of multiple of forecasting models. Identifying and analyze the casual, simple and multiple linear regression models by using Excel.

Readings

Read Forecasting Models

Chapters 11

Review all the textbook concepts and researching an optimization and simulation methods for the Final Paper

Assignment

Course Materials:

Lesson Plan: Please read this week instructions in the course lesson

Chapter(s): PowerPoint Slides

Submit: Discussion Forum 8

Submit: Final Written Paper

Submit: Final Exam

Evaluation

LESSONS AND READING

Students are required to actively participate reading and studying of the chapter materials so that they can analyze meaningful data and information by using predictive analytics methods and applications.

FORUMS

There are eight Forum Topics, in which are designed to promote interaction amongst fellow participants and to motivate or provoke other thoughts on the matter. This discussion format allows you to post and respond to other students within the convenient time frame of the weekly schedule. The study subject is graded in accordance with the assigned paragraph length requirements and required responses to at least two of your colleagues' postings. These postings must add value and expand the conversion on the topic. Correspondent must interact with other participants throughout the Forum exercise to receive full participation credit.

1. The Main Response to the Discussion Question(s) must be written in a substantive manner with no less than 300 words that are relevant to the discussion topic(s). You must also include at least one scholarly source in your researched response.

2. Your interactive post should be at least 150-200 words that expand the conversation forward.

3. Please do not attach your responses, but make sure that you write within the body of the forum.

ASSIGNMENTS

There is one written assignment per week which is due at the end of the week. Your grades are based on the completion of the assigned assignment in accordance with the instructor's lesson task requirements, and the use of the APA style guidelines. All the assignments must be uploaded into the Assignment Folder with your Turnitin.com submission results for the grading purpose.

ASSESSMENTS

Tests/Quizzes – These assessments will challenge the understanding of the class textbook material by the students. The questions from Optimization and Simulation within the Microsoft Excel Applications. Assessments are configured as Problem Sets and Quizzes that will contain, multiple choice questions, fill in the blank or file upload answers, and true or false, and essay or short answer format.

Grading:

Name	Grade %

Materials

Book Title: Managerial Decision Modeling with Spreadsheets, 3rd ed.

Author: Nagraj Balakrishnan, Barry Render, Ralph M. Stair

Publication Info: Pearson

ISBN: 9780136115830

Book Title: Course materials will change for February registrations and beyond. Please email booklist@apus.edu for an updated booklist.

Author:

Publication Info: Open Web Sources

ISBN: APUPOTI4

Textbooks

Managerial Decision Modeling with Spreadsheets (2013-Edition 4) by Barry Render.

Ebook available through the APUS Online Library - http://ezproxy.apus.edu/login?url=https://ebookcentral.proquest.com/lib/apus/detail.action?docID=4947049

Print ISBN: 9781501515101

his e-textbook that is located inside of the Lessons section, which is set up as your weekly reading assignments. There are twelve chapters of this text material that is assigned as reading and posted on the Assignments and Forums sections. Additional reading materials will be allocated by the instructor, which includes but not limited to external periodical research Web sites that not are listed on the course syllabus.

Companion Website for Managerial Decision Modeling with Spreadsheets, 3/e.

Software Requirements

Microsoft Word (if you don't have MS Word, please save all files a Text file (.txt) or a Rich Text Format (.rtf) Adobe Reader -- Go to http://www.adobe.com/products/acrobat/readstep2.html to download the latest version. This download is free.

Course Guidelines

Writing Assignment Guidelines Grade Rubric Requirements

Content (60%)

- Response demonstrates a clear understanding of the key elements of assignment questions.
- Responses thoroughly cover the items in a substantive manner.
- Response demonstrates critical thinking and analysis.
- Content is complete and accurate.
- Introduction and conclusion provide adequate information on the given topic.

(50%)

This was good, but more information was needed for a couple of the questions.

Organization (20%)

- Paper structure is clear and easy to follow.
- Ideas flow in a logical sequence.
- The introduction provides a sound introduction to the topic and previews major points.
- Paragraph transitions are logical and support the flow of thought throughout the paper.
- The conclusion thoroughly reviews the major points.

(20%)

Very nice.

Writing Style, Grammar, APA Format (20%)

(10%)

- Sentences are well constructed, complete, clear, and concise.
- Words used are accurate and unambiguous.
- The tone is appropriate to the content and assignment.
- Grammar, spelling, and punctuation are correct.
- APA guidelines (6th edition) are followed, such as headers, citations, references, etc.
- Practical use of aids, such as sections, summaries, table of contents, indices, and appendices (if appropriate)

Please remember APA formatting is required for all assignments in this class. Proof your papers carefully for grammar, punctuation, and sentence structure.

Forums Discussion Grade Rubric Guidelines

Quality Guidelines (50%):

- All discussion questions are answered thoroughly.
- Responses are original in content with a minimum of one external reference.
- All posts demonstrated analysis of the topic.
- Responses to classmates are significant and advanced the discussion.

40%

All responses need to be significant and demonstrate analysis of the discussion.

Participation Guidelines (30%):

- The primary response is posted by Day 3.
- The primary response is no less than 300 words.
- Reply to at least one of their classmates by Day 7.
- Responses to classmates are at least 200 words.

25%

At least one of your responses needs to be 200 words in length.

Clarity, Organization & Professionalism Guidelines (20%):

- Responses were organized and logical.
- No spelling or grammatical errors.
- References were used and cited properly.
- Appropriate language, respect and consideration toward peers/instructor.

20%

Very nice.

WRITING EXPECTATIONS

All written submissions should be submitted in a font and page set-up that is readable and neat. It is recommended that students try to adhere to a consistent format, which is described below.

- Typewritten in a double-spaced format with a readable style and font and submitted inside the

electronic classroom (unless class access is not possible and the professor has approved other arrangements).
- Arial 12-point font or Times New Roman styles.
- Page margins Top, Bottom, Left Side and Right Side = 1 inch, with reasonable accommodation being made for special situations and online submission variances.

CITATION AND REFERENCE STYLE

Assignments completed in a narrative essay or composition format must follow APA format.

LATE ASSIGNMENTS

Late assignments are not automatically graded. Students having difficulties meeting class commitments must communicate with the instructor. Students are expected to complete assignments on time. A 10% penalty may be applied for each week assignments are late unless the student contacts the instructor ahead of time about an extenuating situation.

NETIQUETTE

Online universities promote the advance of knowledge through positive and constructive debate--both inside and outside the classroom. Discussions on the Internet, however, can occasionally degenerate into unnecessary insults and "flaming." Such activity and the loss of good manners are not acceptable in a university setting--basic academic rules of good behavior and proper "Netiquette" must persist. Remember that you are in a place for the fun and excitement of learning that does not include descent to personal attacks, or student attempts to stifle the discussion of others.

- **Technology Limitations:** While you should feel free to explore the full-range of creative composition in your formal papers, keep e-mail layouts simple. The Educator classroom may not fully support MIME or HTML encoded messages, which means that boldface, italics, underlining, and a variety of color-coding or other visual effects will not translate into your e-mail messages.
- **Humor Note:** Despite the best of intentions, jokes and--especially--satire can easily get lost or taken seriously. If you feel the need for humor, you may wish to add "emoticons" to help alert your readers: ;-), :), J

DISCLAIMER STATEMENT

Course content may vary from the outline to meet the needs of this group.

Academic Services

ONLINE LIBRARY RESEARCH CENTER & LEARNING RESOURCES

The Online Library Resource Center is available to enrolled students and faculty from inside the electronic campus. This is your starting point for access to online books, subscription periodicals, and Web resources that are designed to support your classes and not available through search engines on the open Web. Also, the Center provides access to unique learning resources, which the University has contracted to assist with your studies. Questions can be directed to orc@apus.edu.

- *Charles Town Library and Inter-Library Loan:* The University maintains a special library with a limited number of supporting volumes, a collection of our professors' publication, and services to search and borrow research books and articles from other libraries.
- *Electronic Books:* You can use the online library to uncover and download over 50,000 titles, which have been scanned and made available in electronic format.
- *Electronic Journals:* The University provides access to over 12,000 journals, which are available in electronic form and only through limited subscription services.
- *Turnitin.com:* **Turnitin.com** is a tool to improve student research skills that also detect plagiarism.

Turnitin.com provides resources on developing topics and assignments that encourage and guide students in producing papers that are intellectually honest, original in thought, and clear in expression. This tool helps ensure a culture of adherence to the University's standards of intellectual honesty. Turnitin.com also reviews students' papers for matches with Internet materials and with thousands of student papers in its database and returns an Originality Report to instructors and/or students.

- Also, it is an excellent resource to check the content and quality of writing assignments and to avoid plagiarism. Students are required to create an account and submit all writing assignments to www.turnitin.com. An Originality Report will be generated upon paper submission, which must be submitted with your assignment. Writing Assignments will not be graded if the Originality Report is not submitted to the assignment drop box with the assignment. Your instructor will provide you with a course ID and password to enroll in the class.
- ***Smarthinking:*** Students have access to 10 free hours of tutoring service per year through [Smarthinking](). Tutoring is available in the following subjects: math (basic math through advanced calculus), science (biology, chemistry, and physics), **accounting, statistics, economics, Spanish,** writing, grammar, and more. Additional information is in the Online Research Center. From the ORC home page, click on either the "Writing Center" or "Tutoring Center" and then click "Smarthinking." All login information is available.

Selected Bibliography

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University Policies

Student Handbook

- Drop/Withdrawal policy
- Extension Requests
- Academic Probation
- Appeals
- Disability Accommodations

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