ITT Technical Institute

BU3315

Quantitative Analysis

Onsite and Online Course

SYLLABUS

Credit hours: 4.5

Contact/Instructional hours: 45 (45 Theory Hours)

Prerequisite(s) and/or Corequisite(s):

Prerequisite: MA3110 Statistics or equivalent

Course Description:

This course focuses on mathematical methods used in decision-making. Topics include linear programming, queuing theory, transportation method and working under conditions of uncertainty to make choices that improve business outcomes. Students will use software to practice solving business problems.

COURSE SUMMARY

COURSE DESCRIPTION

The course focuses on mathematical methods used in decision making. Topics include linear programming, queuing theory, transportation method and working under conditions of uncertainty to make choices that improve business outcomes. Students will use software to practice solving business problems.

MAJOR INSTRUCTIONAL AREAS

1. Achieve a productive comfort level with problems involving risk.
2. Using modeling and analysis software to solve business problems.
3. Define possible solution options and select the best from among the options.
4. Maximize resource benefits and/or minimize waste.
5. Distinguish between select mathematical analysis tools and techniques.

COURSE LEARNING OBJECTIVES

By the end of this course, you should be able to:
1. Solve complex business problems using software based on mathematical models.
2. Optimize the use of resources and maximize utility for the business using quantitative analysis techniques.
3. Apply linear programming technique to achieve optimal business outcomes.
4. Apply queuing theory to reduce waiting time in queue.
5. Solve business problems having elements of uncertainty using probability techniques.
6. Analyze and solve business problems using statistical models.

COURSE OUTLINE

MODULE 1: MANAGEMENT SCIENCE AND LINEAR PROGRAMMING
COURSE LEARNING OBJECTIVES COVERED
- Solve complex business problems using software based on mathematical models.

- Optimize the use of resources and maximize utility for the business using quantitative analysis techniques.

TOPICS COVERED

- Model Building: Break-Even Analysis
- Management Science Techniques
- Linear Programming Model Formulation
- Linear Programming Graphical Solution

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Taylor III, B.W., Chapters 1 and 2.	No	5 hr
Lesson: Study the lesson for this module.	No	1.5 hr
Discussion: Participate in the discussion titled "Using Quantitative Analysis."	Yes	NA
Exercise: Submit the exercise titled "The Retread Tire Company."	Yes	2 hr
Project: Read and begin the project.	No	1 hr

Total Out-Of-Class Activities: 9.5 Hours

MODULE 2: LINEAR PROGRAMMING USING COMPUTERS SOLUTIONS

COURSE LEARNING OBJECTIVES COVERED

- Solve complex business problems using software based on mathematical models.
- Optimize the use of resources and maximize utility for the business using quantitative analysis techniques.
- Apply linear programming technique to achieve optimal business outcomes.

TOPICS COVERED

- Computer Solutions
- Sensitivity Analysis
- Forms of Sensitivity Analysis

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Taylor III, B.W., Chapters 3 and 4.	No	7 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled "Linear Programming Modeling."	Yes	NA
Exercise: Submit the exercise titled "Lakeside Boatworks."	Yes	2.5 hr
Quiz: Prepare for Quiz 1.	No	2 hr
Quiz: Take Quiz 1.	Yes	NA
Quiz: Prepare for Quiz 2.	No	2 hr
Project: Submit Project Part 1.	Yes	4 hr

Total Out-Of-Class Activities: 19.5 Hours

MODULE 3: INTEGER PROGRAMMING AND TRANSPORTATION PROBLEMS

COURSE LEARNING OBJECTIVES COVERED

- Solve complex business problems using software based on mathematical models.
- Optimize the use of resources and maximize utility for the business using quantitative analysis techniques.
- Apply linear programming technique to achieve optimal business outcomes.

TOPICS COVERED

- Integer Programming Models
- Integer Programming Graphical Solution
- The Transportation Model
- The Assignment Model
- The Transshipment Model

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Taylor III, B.W., Chapters 5 and 6.	No	5.5 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled "Transportation versus Assignment Models."	Yes	1 hr
Exercise: Submit the exercise titled "Cost-Minimization Models."	Yes	2.5 hr
Quiz: Take Quiz 2.	Yes	NA
Quiz: Prepare for Quiz 3.	No	2 hr
Project: Continue work on Project Part 2.	No	4 hr

Total Out-Of-Class Activities: 17 Hours

MODULE 4: PROBABILITY AND STATISTICS

COURSE LEARNING OBJECTIVES COVERED

- Solve complex business problems using software based on mathematical models.

- Optimize the use of resources and maximize utility for the business using quantitative analysis techniques.

- Solve business problems having elements of uncertainty using probability techniques.

- Analyze and solve business problems using statistical models.

TOPICS COVERED

- Types of Probability

- Fundamentals of Probability

- Statistical Independence and Dependence

- Expected Value

- Normal Distribution

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Taylor III, B.W., Chapter 11.	No	2 hr
Reading: ITT Tech Virtual Library>Basic Search> • de Mast, J., & Kemper, B. H. (2009). Principles of Exploratory Data Analysis in Problem Solving: What Can We Learn from a Well-Known Case?. *Quality Engineering, 21(4), 366-375.* • BEDEIAN, A. G. (2014). "More Than Meets the Eye": A Guide to Interpreting the Descriptive Statistics and Correlation Matrices Reported in Management Research. Academy Of Management Learning & Education, 13(1), 121-135. doi:10.5465/amle.2013.0001	No	3.5 hr
Lesson: Study the lesson for this module.	No	2.5 hr
Discussion: Participate in the discussion titled "Types of Probability Techniques."	Yes	1 hr
Exercise: Submit the exercise titled "Probability and Statistical Techniques."	Yes	2.5 hr
Quiz: Take Quiz 3.	Yes	NA
Quiz: Prepare for Quiz 4.	No	2 hr

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Project: Continue work on Project Part 2.	No	4 hr

Total Out-Of-Class Activities: 17.5 Hours

MODULE 5: DECISION ANALYSIS AND QUEUING MODELS

COURSE LEARNING OBJECTIVES COVERED

- Solve complex business problems using software based on mathematical models.
- Optimize the use of resources and maximize utility for the business using quantitative analysis techniques.
- Apply queuing theory to reduce waiting time in queue.

TOPICS COVERED

- Components of Decision Making
- Decision Making with or without Probability
- Elements of Waiting Line Analysis
- Finite Queue Length

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Taylor III, B.W., Chapters 12 and 13.	No	5.5 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled "Queuing Systems."	Yes	NA
Exercise: Submit the exercise titled "Decision Analysis and Queuing Model Techniques."	Yes	3 hr
Quiz: Take Quiz 4.	Yes	NA
Final Exam: Prepare for the final exam.	No	5 hr
Project: Submit Project Part 2.	Yes	2 hr

Total Out-Of-Class Activities: 17.5 Hours

MODULE 6: FORECASTING AND INVENTORY MANAGEMENT

COURSE LEARNING OBJECTIVES COVERED

- Solve complex business problems using software based on mathematical models.
- Optimize the use of resources and maximize utility for the business using quantitative analysis techniques.
- Apply linear programming technique to achieve optimal business outcomes.
- Apply queuing theory to reduce waiting time in queue.
- Solve business problems having elements of uncertainty using probability techniques.
- Analyze and solve business problems using statistical models.

TOPICS COVERED

- Components of Forecasting
- Elements of Inventory Management
- Economic Order Quantity Models

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Taylor III, B.W., Chapters 15 and 16.	No	7 hr
Lesson: Study the lesson for this module.	No	1 hr
Exercise: Submit the exercise titled "Forecasting and Inventory Management Techniques."	Yes	2 hr
Final Exam: Take the final exam.	Yes	NA

Total Out-Of-Class Activities: 10 Hours

EVALUATION AND GRADING

EVALUATION CRITERIA

The graded assignments will be evaluated using the following weighted categories:

CATEGORY	WEIGHT
Exercise	25%
Quiz	20%
Project	25%
Discussion	10%
Final Exam	20%
TOTAL	100%

GRADE CONVERSION

The final grades will be calculated from the percentages earned in the course, as follows:

GRADE		PERCENTAGE
A	(4.0)	90–100%
B+	(3.5)	85–89%
B	(3.0)	80–84%
C+	(2.5)	75–79%
C	(2.0)	70–74%
D+	(1.5)	65–69%
D	(1.0	60–64%

	)	
F	(0.0)	<60%

LEARNING MATERIALS AND   REFERENCES

REQUIRED RESOURCES

COMPLETE TEXTBOOK PACKAGE

- Taylor III, B.W. (2013). *Introduction to Management Science (11th ed.). Pearson* Education, Inc.

RECOMMENDED RESOURCES

- ITT Tech Virtual Library (accessed via Student Portal | https://studentportal.itt-tech.edu)
  - BEDEIAN, A. G. (2014). "More Than Meets the Eye": A Guide to Interpreting the Descriptive Statistics and Correlation Matrices Reported in Management Research. *Academy Of Management Learning & Education, 13*(1), 121-135. doi:10.5465/amle.2013.0001
  - de Mast, J., & Kemper, B. H. (2009). Principles of Exploratory Data Analysis in Problem Solving: What Can We Learn from a Well-Known Case? *Quality Engineering, 21(4), 366-375.*
  - School of Study>General Education Information>Tutorial links>Khan Academy>Learn>Math> Probability and statistics>
    - Descriptive statistics
    - Inferential statistics
    - Regression
    - Statistical studies

INSTRUCTIONAL METHODS AND TEACHING STRATEGIES

The curriculum employs a variety of instructional methods that support the course objectives while fostering higher cognitive skills. These methods are designed to encourage and engage you in the learning process in order to maximize learning opportunities. The instructional methods include but are not limited to lectures, collaborative learning options, use of technology, and hands-on activities.

To implement the above-mentioned instructional methods, this course uses several teaching strategies, such as lessons, review questions and examples. Your progress will be regularly assessed through a variety of assessment tools including discussion, exercise, quizzes, project, and a final exam.

OUT-OF-CLASS WORK

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a "time-based option" for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the "Course Outline" section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

ACADEMIC INTEGRITY

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct. For more information on the academic honesty policies, refer to the Student Handbook and the School Catalog.

INSTRUCTOR DETAILS

Instructor Name	
Office Hours	
Contact Details	

(End of Syllabus)