



# Lincoln University

## FALL 2024

### ONLINE

**COURSE** BA 241 QUANTITATIVE ANALYSIS

(Wednesdays 3:30 – 6:15 PM)

Level: Advanced (A)

**INSTRUCTOR** Igor Himelfarb, Ph.D. [ihimelfarb@lincolnuca.edu](mailto:ihimelfarb@lincolnuca.edu)

**OFFICE HOURS** Before and after class and by appointment

**TEXT** Shmueli, G., Bruce, P. C., Yahav, I., Patel, N. R., & Lichtendahl Jr, K. C. (2017). *Data mining for business analytics: concepts, techniques, and applications in R*. John Wiley & Sons. ISBN-10: 1118879368

#### CATALOG DESCRIPTION

This course covers quantitative techniques for solving business problems and making management decisions. Techniques include production or output planning, capital investment and project analysis, linear and non-linear programming, probability theory, inventory control, scheduling, and waiting line models, as well as mathematical decision techniques. (3 units)

*Prerequisite: BA 115*

#### COURSE OVERVIEW

Welcome to Quantitative Methods for Business and Finance Management! This course introduces non-mathematical business professionals to data science principles used in today's corporations. In this course you will be able to learn about linear programming, distribution problems, decision theory, and data mining. Data mining refers to methodical preparation and analysis using statistical models such as decision tree, logistic regression, and neural networks. This course will focus on concepts in data mining, methodologies, models as they apply to business and finance. Special emphasis will be given to prediction, classification, and forecasting models.

This course will give students an understanding of basic concepts in quantitative methods that include application in business. Case study topics include understanding customer demand, marketing, new market forecasting, revenue projections, and data mining to improve decisions.

**COURSE LEARNING OUTCOMES<sup>1</sup>**

	<b>Course LO</b>	<b>Program LO</b>	<b>Institutional LO</b>	<b>Assessment Activities</b>
1	Solidify the student's prerequisites in algebra, geometry, statistics and elements of computer science as applied to Quantitative Methods in Business and Financial Management.	PLO 2 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework
2	Model realistic phenomena while paying attention to model's assumptions and borders.	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework, midterm and final exams
3	Formally and precisely express ideas with the aid of notations, symbols and formulae as they apply to structured set-ups and solutions	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework, midterm and final exams
4	Solve complex problems by their breakdown to several ordered sub problems in a hierarchical manner.	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework, in-class activities, midterm and final exams
5	Demonstrate his/her comprehension of the necessary in problem setups and in the structure of algorithms for problem solutions.	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework, in-class activities, midterm and final exams
6	Interpret results of quantitative models.	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework, midterm and final exams
7	Demonstrate working knowledge of sensitivity analysis.	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework, exams
8	Use linear programming as a flexible optimization tool and apply the EXCEL software for its application.	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework, in-class activities, midterm and final exams
9	Compare Inventory models	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework
10	Set up project activity network and determine the critical path and optimal scheduling.	PLO 1 - 4	ILO 1a, ILO 2a, ILO 6a, ILO 7a	Homework, in-class activities

<sup>1</sup> Detailed description of learning outcomes and information about the assessment procedure are available at the [Learning Outcomes Assessment](#) section of LU website.

KNIME Analytic Platform (<https://www.knime.com/knime-analytics-platform>) will be used as the main analytic tool in this class. You will be required to download KNIME (free) and use it for class assignments. Additionally, we may use SPSS, R, and Excel.

## **INSTRUCTIONAL METHODS**

The emphasis will be on learning by solving problems. Every student is welcome to participate in classroom activities. Reading and problem-solving assignments will be given throughout the course. During lectures, students will learn principles and concepts covered in the text as well as in various sources on relevant topics. There will be weekly “hands-on” assignments.

Assignments and projects require students to actively use resources of the library. Detailed guide to business *resources of the library* as well as the description of Lincoln University approach to *information literacy* are available at the [LU Library](http://lincolnuca.libguides.com) website (lincolnuca.libguides.com).

## **INSTRUCTIONAL TECHNOLOGY**

The class is taught 100% online using Zoom. Zoom link will be shared with enrolled students prior to scheduled beginning of the class. Canvas will be used as a web-based learning management system. Via Canvas, students will be able to access and manage online course learning materials and communicate about skill development and learning achievement. Exams will be administered via Canvas.

## **CLASS ATTENDANCE**

Students are expected to attend class on a regular basis. Attendance is crucial to performing well in this course, as some of the material presented may not be found in the textbook. Further, the lecture and classroom demonstrations will emphasize and expand upon important topics found in the textbook. Thus, it is vital that you take thorough notes in class.

## **ZOOM LINK:**

<https://lincolnuca-edu.zoom.us/j/81199719822?pwd=dhjnyA75cwZWtcj7WMSGV5p4qOP40x.1>

**Meeting ID: 811 9971 9822**

**Passcode: 444334**

## **ASSIGNMENTS**

For each statistical/mining technique covered in the course, students will be required to complete a “hands-on” assignment to practice this technique. The assignments will include the technical part (to prepare datasets and run appropriate analyses) and a reporting part (interpret the results and explain them to a non-statistical/business audience).

## **EXAMS**

There will be two exams — a midterm and a final. To assess your learning in this course, exam questions will be derived from the lecture and textbook. Topics covered in lecture will be of major emphasis on the exam, and should be the focus of your textbook readings, though there will be some test questions found in the assigned readings but not covered in the lecture. Exams may include conceptual or theoretical questions, and questions with applied scenarios. ***All exams are open books and open notes.***

### GRADING PLAN

Percentage	Grade
90-100%	A
80-89%	B
70-79%	C
60-69%	D
below 60%	F

Weights	Percentage
Homework	20%
Class participation	10%
Midterm	30%
Final exam	40%

### CLASSROOM POLICY AND NETIQUETTE

When communicating via Canvas, online forums or email or in any other digital communication, always:

- Treat instructors, staff, and other students with respect.
- Address instructors' and staff members by their titles, such as Dr. or Professor. When in doubt, use Mr. or Ms. Unless specifically invited, don't refer to instructors by their first name.
- Use clear and concise language.
- Keep all communications professional. Remember that all college-level communication should have correct spelling and grammar. Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you" — do not write an email to a college instructor or staff member the way you would send a casual text.
- Use standard fonts such as Times New Roman. Use a size 12 or 14 pt. font.
- Avoid writing in all caps. This can be interpreted as yelling.
- Limit or avoid the use of emoticons such as smiles.
- Be cautious when using humor or sarcasm. Tone is sometimes lost in an email or discussion post — your message might be taken seriously or as offensive.
- Be careful with personal information (both yours and others').

Be careful about the messages you send or post — remember that once information has been transmitted digitally, it can be easily passed on to others for whom the message was not intended and difficult to fully delete, even if you think the message is private or removed.

**TENTATIVE CLASS SCHEDULE**

SESSION	CONTENT	ASSIGNMENT
<b>Week 1</b>	Introduction to Quantitative Methods: Definitions and History	Assignment 1: Download KNIME
<b>Week 2</b>	Basic Statistical Concepts: Descriptive Statistics	Assignment 2: Descriptive Statistics in SPSS and KNIME
<b>Week 3</b>	Data Mining Process	Assignment 3: Inferential Statistics in KNIME
<b>Week 4</b>	Correlation	Assignment 4: Correlation Analysis in SPSS
<b>Week 5</b>	RFM Analysis	Assignment 5: RFM in KNIME
<b>Week 6</b>	Decision Trees	Assignment 6: Decision Trees in KNIME
<b>Week 7</b>	Regression	Assignment 7: Regression in SPSS
<b>Week 8</b>	No Class-Spring Break	
<b>Week 9</b>	Midterm	
<b>Week 10</b>	Logistic Regression	Assignment 8: Logistic Regression in KNIME
<b>Week 11</b>	Neural Networks	Assignment 9: Neural Networks in KNIME
<b>Week 12</b>	Model Evaluation and Comparison	Assignment 10: Modeling in KNIME
<b>Week 13</b>	Factor Analysis	Assignment 12: Factor Analysis in SPSS
<b>Week 14</b>	Forecasting	
<b>Week 15</b>	Final Exam	

Note: Instructor reserves the right to modify the content of this syllabus.

**GOOD LUCK!**

**8/19/2024**