Lincoln University

SPRING 2022
ONLINE

COURSE	**BA 241 QUANTITATIVE ANALYSIS**
	(Fridays 12:30—3:15 PM)
CREDITS	3 units (45 lecture hours)
LEVEL	Advanced (A)
INSTRUCTOR	Igor Himelfarb, Ph.D. 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 three, 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[1]

	Course LO	Program LO	Institutional LO	Assessment Activities
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

[1] Detailed description of learning outcomes and information about the assessment procedure are available at the Center for Teaching and Learning website: http://ctl.lincolnuca.edu/

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

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.

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.

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.***

PROJECT

Each student will have to complete a project. The project will require to analyze a dataset searching for answers to business problems and to write a technical report stating the business problems, providing statistical methodology used and stating the results. The project will be discussed in details during the course. The deliverable for this project is project report submitted through Canvas.

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%
Project	20%
Midterm	20%
Final exam	30%

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
Jan-28	Introduction to Quantitative Methods: Definitions and History	Assignment 1: Download KNIME
Feb-4	Basic Statistical Concepts: Descriptive Statistics	Assignment 2: Descriptive Statistics in SPSS and KNIME
Feb-11	Data Mining Process	Assignment 3: Inferential Statistics in KNIME
Feb-18	Correlation	Assignment 4: Correlation Analysis in SPSS
Feb-25	RFM Analysis	Assignment 5: RFM in KNIME
Mar-4	Decision Trees	Assignment 6: Decision Trees in KNIME
Mar-11	Midterm	
Mar-18	No Class-Spring Break	
Mar-25	Regression	Assignment 7: Regression in SPSS
Apr-1	Logistic Regression	Assignment 8: Logistic Regression in KNIME
Apr-8	Neural Networks	Assignment 9: Neural Networks in KNIME
Apr-15	Model Evaluation and Comparison	Assignment 10: Modeling in KNIME
Apr-22	Cluster Analysis	Assignment 11: Cluster Analysis in KNIME

SESSION	CONTENT	ASSIGNMENT
Apr-29	Factor Analysis	Assignment 12: Factor Analysis in SPSS
May-6	Forecasting	
May-13	Final Exam	

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

GOOD LUCK!

Syllabus Reviewed: 1/4/2022