



Lincoln University

SPRING 2022

ONLINE

COURSE	BA 460 Quantitative Methods for Business and Finance Management (Fridays 12:30—3:15 PM)
CREDITS	4 units (3 units / 45 lecture hours + 1-unit individual research project)
LEVEL	Mastery 2/Research (M2R)
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). <i>Data mining for business analytics: concepts, techniques, and applications in R</i> . John Wiley & Sons. ISBN-10: 1118879368

CATALOG DESCRIPTION

While solving a problem, managers must consider both qualitative and quantitative factors. This course covers quantitative methods which help to solve different business problems. The quantitative techniques taught in class include decision analysis, regression models, forecasting, transportation, and assignment models, Markov analysis, stochastic equations, statistical quality control and others. A one-unit written research project and its oral presentation are required for the course. (4 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 OUTCOMES¹

	Course LO	Program LO	Institutional LO	Assessment Activity
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 4	ILO 1c, ILO 5c.	Homework: problems and, cases
2.	Model realistic phenomena while paying attention to model's assumptions and borders.	PLO 1	ILO 1c, ILO 5c.	
3.	Formally and precisely express ideas with the aid of notations, symbols and formulae as they apply to structured set-ups and solutions.	PLO 2 PLO 4 PLO 6	ILO 1c, ILO 2c, ILO 6c. ILO 1c, ILO 5c. ILO 4c, ILO 5c.	
4.	Solve complex problems by their breakdown to several ordered sub problems in a hierarchical manner.			
5.	Demonstrate his/her comprehension of the necessary in problem setups and in the structure of algorithms for problem solutions.			
6.	Interpret results of quantitative models.			
7.	Demonstrate working knowledge of sensitivity analysis.			
8.	Use linear programming as a flexible optimization tool and apply the EXCEL software for its application.			
9.	Learn to formulate and operate variety Transportation, Assignment, and Transshipment problems.			
10.	Become familiar with a variety of concepts, criteria and techniques used in Decision Making and apply them.	PLO 1 PLO 4 PLO 6	ILO 1c, ILO 5c. ILO 1c, ILO 5c. ILO 4c, ILO	

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/>

			5c.	
11.	Conduct an Operations Research based project which may be of applied nature or a theoretical contribution.	PLO 1 PLO 2 PLO 4 PLO 6	ILO 1c, ILO 5c. ILO 1c, ILO 2c, ILO 6c. ILO 1c, ILO 5c. ILO 4c, ILO 5c.	Homework: problems and, cases. Project assignments, written report and presentation

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	15%
Class participation	10%
Project	25%
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-24	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
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

INDIVIDUAL RESEARCH PROJECT (1 unit)

Each student registered for a 400-level course must complete a one-unit research project in addition to the coursework described in this syllabus. The specific topic will be assigned by the instructor.

The project requires 45 hours of independent study with regular consultations in accordance with the schedule determined by the instructor. The project work results in a written report (not less than 15 pages; APA style) and an oral presentation during the class session.

Evaluation of the student's work on the Individual Research Project will be done using the following rubric:

WRITTEN REPORT				
	<i>Exceeds Standards</i>	<i>Meets Standards</i>	<i>Does Not Meet Standards</i>	<i>Not Present</i>
<i>Research Problem Statement</i>	The statement of a research problem is crystal clear, novel and thought provoking	Clearly and concisely identifies a research problem	The statement of a research problem is incomplete, lacking precision.	The statement of a research problem is absent.
<i>Organization</i>	The report is logically organized; ideas are exceptionally well-developed and support a thoughtful and engaging conclusion.	The development of ideas is present; the conclusion is effective and directly addresses the original thesis.	Organization is confusing, disjointed, and inconsistent; ideas, if present, are not developed; the conclusion is vague and/or does not address the original thesis.	The report lacks organization
<i>Sources and formatting</i>	A variety of high-quality sources is used; all factual claims are supported with citations. The report follows the APA style guidelines.	A few high-quality sources are used; majority of factual claims are supported with citations The report mostly follows the APA style guidelines.	Sources used are of a questionable quality; factual claims are not supported. Use of APA style is inconsistent.	Sources are not identified or of a poor quality; factual claims are unsubstantiated. The report is poorly formatted
PRESENTATION				
	<i>Exceeds Standards</i>	<i>Meets Standards</i>	<i>Does Not Meet Standards</i>	
<i>Style and Organization</i>	Presentation is clear, confident, and fully engaging; the use of visual aids enhances its effectiveness; the presentation is well timed and structured.	Presentation is clear; the use of visual aids is not detrimental to audience engagement; all necessary components are given appropriate time.	Presentation lacks clarity, no attempt is made to engage the audience; visual aids are haphazard and distracting; lack of structure results in an inefficient use of time.	
<i>Questions and Answers</i>	Student demonstrates extensive knowledge of the topic by providing confident, precise, and appropriate responses to all audience questions.	Student demonstrates knowledge of the topic by responding adequately to questions of the audience.	Student demonstrates lack of knowledge of the topic by responding inaccurately and inappropriately to audience questions.	