

MBA 4160: Statistical Learning

<u>Term and Credits:</u> Autumn 2023 4 Credit Hours CRN: 4698	<u>Time and Location:</u> M/W 10:00-11:50am DCB 140 You will be required to review some material outside of class which will be delivered through Canvas. Make sure you have a good internet connection during class time for access to Canvas.
<u>Instructor:</u> Name: Kellie Keeling Department: Business Information & Analytics Office Hours: M/W 9:10a-9:50a T/W 1:30p-3:00p Virtual Office Location: https://udenver.zoom.us/my/kkeeling Make an appointment: https://bit.ly/KeelingBooking Email: kkeeling@du.edu Office Phone: 303-871-2296 (forwards to my cell)	<u>Communication Conduct:</u> Feel free to refer to me as Dr. Keeling, Professor, or Kellie as you feel comfortable. Email is usually the best way to contact me. If I haven't responded in 36 hours, feel free to resend your message. I will send class level communications via Canvas announcements. I will typically initiate communication with individual students directly through your DU email or through Canvas email.

COURSE DESCRIPTION:

This course will allow the student to develop an understanding of more complex concepts of probability and statistics and how they relate to managerial type problems and decision making. These will include differentiating different data types and determining their appropriate analyses (descriptive, visual, and statistical including comparing means/proportions and regression.) In addition, the student will experience performing, interpreting, and presenting these probability and statistics methodologies.

PREREQUISITES/CO-REQUISITES:

Enrollment in the Full time Denver MBA program.

LEARNING OUTCOMES and MODULES

MODULE 1: Understanding Data

MODULE 2: What do I need to know to get started? Inferential Statistics Foundations

MODULE 3: Making predictions using regression models

MODULE 4: Is there a Meaningful Difference? Comparing means and comparing proportions

Students should

- ... be able to critically evaluate statistical presentations of information that they encounter in their jobs and personal life
- ... be able to present statistical information in a way that conveys the story they are trying to tell to their audience
- ... be able to use statistical information from themselves or others to make business decisions
- ... have an understanding of the basic concepts of probability and statistics, and how they relate to managerial type problems and decision making
- ... recognize the types of data (quantitative vs qualitative) and know that there are different ways to explore (histograms vs bar graphs) and analyze (t tests vs ANOVA vs regression vs optimization) these data.
- ... be able to relate statistical methodologies to other quantitative reasoning in future courses and future personal and work life
- ... be confident in their ability to critique and perform these methodologies and/or find resources to help
- ... be deliberate in not presenting information in a misleading or unethical way

The overall takeaway goal is that students are familiar enough with the concepts of standard data analysis methodologies (confidence intervals, two-sample tests (A/B Testing), regression analyses, analysis of variance) to be able to seek out resources to help perform and present these and/or critique others' presentations of these methodologies.

REQUIRED MATERIALS:

- Software:
 - **Excel with Analysis ToolPak:** Get latest version from Office365.du.edu if needed.
 - **JMP Pro 15.2**
- Textbook
 - "OpenIntro Statistics" 4th Edition. (<https://leanpub.com/openintro-statistics>) David Diez, Mine Cetinkaya-Rundel, Christopher Barr

GRADING STRUCTURE, SCALE, AND POLICIES:

Communication. If you are having difficulty with the course material, please reach out at your earliest convenience. If you are having an emergency situation, please let me know so we can plan accordingly. If you contact me with questions, I plan on responding within 24-36 hours. If your question may benefit others, I request that it is posted to the course discussion board on Piazza.

Reading Quizzes. There are optional reading quizzes.

In Class Work. These in-class assignments provide supported practice opportunities. You may collaborate with peers. Class tasks will be submitted before the next class period, at which time, the solution will be released. The student is responsible for checking the accuracy of procedures used and answers obtained.

Project. There will be an individual project using the concepts from the course. More details will be posted in Canvas.

Attendance Policy. If you need to miss class, you should watch the recording of the class to see what you might have missed.

Class Preparation and Participation Policies. Being able to work with data, analyze it, and come up with business decisions is a "hands on" activity. We will be putting what you read in the textbook to use during class time so you need to be prepared to "dig in and work" during class. That means having your equipment ready (computer and software and text and internet) and being prepared to practice the materials for the day by having read the material beforehand. There are **optional reading quizzes** that you can use to test your understanding of the reading.

Getting Help: If you are having difficulty with the course material, please contact me at your earliest convenience – particularly if you feel you are getting behind - That's OK! It happens! Don't delay because you feel embarrassed. I get behind and overwhelmed myself! My calendar is tied to my **Bookings appointment page** (<https://bit.ly/KeelingBooking>) and I have availability on most Saturday mornings and Sunday afternoons. If you are having an emergency situation, please let me know so we can plan accordingly. If you contact me with questions, I plan to respond within 36 hours.

Extra Credit. The syllabus reflects a fair and accurate assessment of your skills in the class. Under no circumstances will you be given the option to complete extra credit to make up for missing assignments and/or to raise your grade.

Mathematical Rounding

Rounding is a part of statistics. Correct rounding is required.

Rounding Criteria	Example
Fewer decimals are easier to understand, ensure you round with statistical precision.	Round up if value is ≥ 5
Use a leading zero if the value can exceed 1.0. Do not use a leading zero if the value cannot exceed 1.0.	$m = 0.89$ or 95% CI [0.72, 1.39] $r = .98$ or $p = .004$
Report correlations, proportions, and inferential statistics to two decimals. Note – correlation is not reported as percentage	$t = 3.45$ $r = .67$
Report p values to three decimal places. No zero before the decimal.	$p = .023$
p values less than .001, report to three decimal places. No zero before the decimal.	$p < .001$

Responsible Use of ChatGPT as a Learning Tool

In this course, we recognize the potential value of ChatGPT as an educational tool to enhance the learning experience. It can be a valuable resource for generating ideas, seeking clarification, and fostering creativity. However, it is imperative to clarify its role in this learning environment: ChatGPT is intended to be used as a supplement to your learning journey and not as a means to engage in academic dishonesty, such as cheating or plagiarism.

ChatGPT as a Learning Aid:

- ChatGPT can assist you in understanding complex concepts, brainstorming ideas, and providing explanations.
- It can help you generate content and structure your thoughts more effectively.

Ethical Use:

- While ChatGPT can be a powerful tool, it is essential to maintain academic integrity and adhere to the principles of honesty and fairness.
- Using ChatGPT to produce work that is not your own, such as copying answers from it, is considered cheating and is strictly prohibited.

Guidelines for Responsible Use:

- Utilize ChatGPT as a reference or tool to aid your understanding and creativity, but always contribute your own insights and ideas.
- Attribute any information or ideas obtained from ChatGPT appropriately if you use them in your assignments or projects.

Consequences of Misuse:

- Any form of academic dishonesty, including cheating with ChatGPT, will result in appropriate disciplinary action as outlined in the course's academic integrity policy.

Our primary goal is to foster a learning environment where you can develop critical thinking skills, creativity, and problem-solving abilities. The responsible use of ChatGPT as a learning tool aligns with these objectives and helps maintain the integrity of your education.

If you have any questions or concerns about the proper use of ChatGPT in this course, please do not hesitate to reach out to the instructor for clarification. We encourage you to embrace ChatGPT as a tool that can enhance your learning experience when used ethically and responsibly.

Educational Assessment

The Daniels College of Business may use assessment tools in this course and other courses for evaluation. Educational Assessment is defined as the systematic collection, interpretation, and use of information about student characteristics, educational environments, learning outcomes and client satisfaction to improve program effectiveness, student performance and professional success.

GRADING STRUCTURE, SCALE, AND POLICIES:

A: 93-100%; A-: 90-92.9%; B+: 87-89.9%, B: 83-86.9%; B-: 80-82.9%; etc.

Student performance will be evaluated and calculated on the items below:

Course Requirements	Percentage	Due Date
In-class activities/participation	40%	Multiple dates, see syllabus schedule
Project analysis and write-up	60%	Multiple dates, see syllabus schedule
Class Presentation		By Nov. 20
Total	100%	

Class Schedule

TENTATIVE CLASS SCHEDULE: M/W DCB 140 10:00-11:50		
	MON	WED
Oct 19 & 21		
Oct 23 & 25		C4: Intro & Getting to Know your Data Ch 1.1-1.3; 2.1-2.2; 3.1, 3.2
Oct 30 & Nov 1	C5: Using the Normal Distribution Ch 3.5; 4.1; 5.2; 7.1	C6: Hypothesis Testing and Simple Linear Regression Ch 7.1, 8.1, 8.4
Nov 6 & 8	C7: Multiple Linear Regression Ch 8.2-8.4, 9.1-9.2	C8: Comparing Means Ch 7.2-7.3, 7.5
Nov 13 & 15	C9: Comparing Proportions Ch 6.1-6.3	C10: Performing Analysis and Presenting Results Posted Handouts
Nov 20	Presentations submitted online by 10am. Peer Reviews completed online by midnight.	

UNIVERSITY EXPECTATIONS, POLICIES, AND RESOURCES:

Students with Disabilities. A student who qualifies for academic accommodations because of a disability must submit a Faculty Letter to the instructor from the DU Disability Services Program (DSP) in a timely manner, so that the needs of the student can be addressed. Accommodations will not be provided retroactively, e.g., following an exam or after the due date of a project. DSP determines eligibility for accommodations based on documented disabilities. DSP is located in Driscoll Center South, Garden Level, Suite 22 (303-871-3241).

Inclusive Learning Environments.

- In this class, we will work together to develop a learning community that is inclusive and respectful. Our diversity may be reflected by differences in race, culture, age, religion, sexual orientation, socioeconomic background, and myriad other social identities and life experiences.
- The goal of inclusiveness, in a diverse community, encourages and appreciates expressions of different ideas, opinions, and beliefs, so that conversations and interactions that could potentially be divisive turn instead into opportunities for intellectual and personal enrichment.
- A dedication to inclusiveness requires respecting what others say, their right to say it, and the thoughtful consideration of others' communication.
- Both speaking up and listening are valuable tools for furthering thoughtful, enlightening dialogue. Respecting one another's individual differences is critical in transforming a collection of diverse individuals into an inclusive, collaborative and excellent learning community.
- Our core commitment shapes our core expectation for behavior inside and outside of the classroom. Office of Diversity, Equity, and Inclusion website (<https://www.du.edu/diversity-inclusion/index.html>).

University Expectations. Please review the University Expectations on the Daniels College of Business syllabus webpage (<http://daniels.du.edu/university-expectations/>)

- University of Denver Honor Code
- Policy Concerning Official Communication
- Students with Disabilities
- Policy Concerning Religious Accommodations
- Policy Concerning Emergency Procedures
- Policy Concerning Conflicts of Interest, Including Gifts from Students