COURSE NUMBER AND TITLE

MGV-403AV—Data Analysis for Managers

Course Description

Introduces statistics and data analysis for managerial decision-making. Topics include descriptive statistics, statistical inference, and application of data-analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

Course Materials

Levine, D. M., Stephan, D. F., & Szabat, K. A. *Statistics for Managers Using Microsoft Excel* (9th edition). Pearson. (with MyLab)

Computer Package

The course entails an extensive use of Microsoft Excel. Microsoft Excel will be required during the live sessions.

Course Assessments

Assignment/Assessment	**Weight on Final Grade**
Attendance and Participation	10%
MyLab Homeworks (Individual)	20%
MyLab Midterm Exam (Take-Home)	20%
Final Project Phase I (Group)	5%
Final Project Phase II (Group)	15%
Final Exam (In-Class)	30%

Grading Scale

Name:	Range:	
A+	100 %	to 97.0%
A	< 97.0 %	to 93.0%
A-	< 93.0 %	to 90.0%
B+	< 90.0 %	to 87.0%
B	< 87.0 %	to 83.0%
B-	< 83.0 %	to 80.0%
C+	< 80.0 %	to 77.0%
C	< 77.0 %	to 73.0%
C-	< 73.0 %	to 70.0%
D+	< 70.0 %	to 67.0%
D	< 67.0 %	to 63.0%
D-	< 63.0 %	to 60.0%
F	< 60.0 %	to 0.0%

Assignment and Assessment Information

Attendance and Participation (10% of the grade):

Attendance is attending the live sessions with video cameras on. Participation is contributing to the class in the form of comments, responses, and questions by having the video cameras on. Since the class is tailored toward working professionals who have work-related commitments, some flexibility is allowed. There will be allowance for one "excused" absence. Excused absence is defined as emailing the instructor to inform about your absence and attaining confirmation BEFORE your absence. Keeping videos off during the session should also go through prior approval from the instructor. Keeping videos off is not always prohibited, but occasionally you can seek approval to keep your videos off for that live session. Please note that it is acceptable to turn the video cameras off when you step away. No approval is necessary. Attending the live sessions with the videos off (without prior approval) will be considered as absent.

Homework Assignments (20% of the grade):

There will be eight homework assignments in MyLab. These assignments will contain a mix of conceptual questions and Excel-based data-analysis questions. These homework assignments will help you build and sharpen your data analysis and interpretation skills while solidifying your conceptual understanding of the topics covered during each week.

Note: **For Excel-based data-analysis questions, MyLab will indicate how many decimals your response should be rounded to. Usually, if you use the rounding option in Excel, MyLab will accept your responses without any point deductions. However, occasionally,**

MyLab will not forgive small rounding discrepancies. Please bring such cases to your live instructor's attention to assess the prospects of point-deduction reversal.

Midterm Exam (20% of the grade):

The midterm exam is take-home and will be due in Week 6 and will cover the content from Weeks 1 through 4 (inclusive). The exam will be opened at the end of the Week 5 live session, and you will have 1 entire week to complete it. The exam will close on the day of the Week 6 live session before the Week 6 live session starts. You will have 100 minutes to complete the exam once you start. You will have one attempt, and the exam should be completed in one sitting. You may start your exam on any day of the week and at any time. Before you start, make sure that you have the bandwidth to complete it in one sitting. You may refer to your notes during the exam.

Final (Group) Project (20% of the grade):

An important part of the experience of any data analysis course is applying the concepts to address business questions on a real-world dataset of your choice. To this end, this course will offer you an opportunity to analyze a real-world dataset using a guided process. The process is outlined in a separate document named ***Final Project Guidelines***, which is available on your learning platform. At the end of the project, you should gain confidence in performing exploratory data analysis and applying statistical inference concepts in your personal and professional settings. To avoid end-of-quarter crunch, you will start on your project early on and submit Phase 1 of the project before the Week 5 live session and submit Phase 2 within 24-48 hours after the last live session (prior to the final exam). Phase 2 of the project should be continuation of Phase 1. For information on group sizes and additional details, please see the Final Project Guidelines document.

Final Exam (30% of the grade):

The final exam will be in-class during the final exam live session during the date and time published on the school schedule. The exam dates and times are fixed and there are no makeups for the exam. No alternative dates and times for the final exam will be arranged due to any reason. The final exam will be comprehensive with more weight given to the topics after the midterm exam. Video cameras need to be on during the entire time during the final exam.

Ungraded Knowledge Checks:

Each week you will have several ungraded knowledge checks, which allow you to assess your understanding of the topic after you view the asynchronous recordings. The questions are primarily conceptual and decision-making–based. I highly recommend that you work on these questions and approach your live instructor if you have any questions to clarify your understanding of the concepts.

Optional Topics:

Many weeks include topics that are marked as optional. You won't be assessed on this content, but it is highly recommended that you view them, if you have the time. Viewing these may help

refine and deepen your understanding of mainstream topics. They may also enable you to have a better appreciation of the breadth of topics in applied statistics available for managerial decision-making.

Course Schedule

Week	Assignments Due	Topics Covered

1		**Introduction to Statistics and Descriptive Techniques, Part I**
		
		• Statistics Terminology
		  ○ Population Versus Sample
		  ○ Branches of Statistics
		  ○ Parameter Versus Statistic
		• Data Terminology
		• Levels of Measurement
		• Descriptive Statistics (Graphical Techniques)
		  ○ Introduction
		  ○ Bar Plot
		  ○ Histogram
		  ○ Line Chart
		  ○ Pareto Chart
		  ○ Scatterplot
		  ○ Crosstabulation

Week	Assignments Due	Topics Covered

2	Homework 1 on MyLab based on the topics covered in Week 1 (due before Live Session 2)	**Descriptive Techniques, Part II**
		
		REQUIRED
		• Measures of Center
		  ○ Arithmetic Mean
		  ○ Median
		  ○ Mode
		• Measures of Variation
		  ○ Range
		  ○ Variance and Standard Deviation
		  ○ The Empirical Rule
		  ○ Standardization
		• Measures of Relative Standing
		  ○ Quartiles
		• Boxplots and Outlier Identification
		  ○ Box Plots
		• Measures of Association
		  ○ Covariance
		  ○ Correlation
		  ○ Correlation and Causation
		
		OPTIONAL
		• Measures of Center
		  ○ Geometric Mean
		• Measures of Variation
		  ○ Coefficient of Variation
		• Measures of Relative Standing
		  ○ Percentiles

Week	Assignments Due	Topics Covered

3	Homework 2 on MyLab based on the required topics covered in Week 2 (due before live session 3)	**Probability and Probability Distribution Basics**
		
		REQUIRED
		• Basics
		  ○ Introduction
		  ○ Basic Terminology
		  ○ Properties of Probabilities
		  ○ Approaches to Assigning Probability
		  ○ Law of Large Numbers
		• Probability Rules, Part I
		  ○ Addition Rule
		  ○ Special Rule of Addition
		  ○ General Rule of Addition
		  ○ Rule of Complements
		• Probability Rules, Part II
		  ○ Multiplication Rule
		  ○ Special Rule of Multiplication
		  ○ General Rule of Multiplication
		  ○ General Rule of Multiplication Examples
		  ○ Independence
		  ○ Determining Probabilities Using Contingency
		• Probability Distributions
		  ○ Random Variables
		  ○ Types of Random Variables
		  ○ Discrete Probability Distribution
		  ○ Summary Measures
		
		OPTIONAL
		• Introduction to Bayes' Theorem
		• Bayes' Theorem Example

Week	Assignments Due	Topics Covered

4	Homework 3 on MyLab based on the required topics covered in Week 3 (due before live session 4)	**Probability and Sampling Distributions**
		
		REQUIRED
		• Discrete Probability Distributions
		  ○ Binomial Distribution
		  ○ Binomial Distribution Principle
		• Continuous Probability Distributions
		  ○ Normal Distribution
		  ○ Family of Normal Distributions
		  ○ The Standard Normal Distribution
		• Sampling Distribution for Mean and the Central Limit Theorem
		  ○ Statistical Inference and Sampling Distributions
		  ○ Introduction to Sampling Distributions
		  ○ Sample Distribution of Sample Means Example
		  ○ Key Points to Remember
		  ○ The Central Limit Theorem
		
		OPTIONAL
		• Poisson Distribution

Week	Assignments Due	Topics Covered

5	Homework 4 on MyLab based on the required topics covered in Week 4 and Project Phase 1 (due before live session 5)	**Confidence Interval Estimation**
		
		REQUIRED
		• Sampling Distribution of Sample Proportions
		• Statistical Inference: Estimation
		  ○ Concepts of Estimation
		• Confidence Interval for Mean: Sigma Known
		  ○ Estimating Mean: Sigma Known
		  ○ Concept of Critical Values
		• Confidence Interval for Mean: Sigma Unknown
		  ○ Estimating Mean: Sigma Unknown
		  ○ Student's t-distribution
		  ○ Summary of Interval Estimation Procedures
		• Confidence Interval for Proportion
		  ○ Estimating Proportions
		
		OPTIONAL
		• What Are Degrees of Freedom?
		• Sample Size Determination
		• Confidence Interval Estimation for Variation
		  ○ Estimating Population Variation
		  ○ Chi-Square Distribution

Week	Assignments Due	Topics Covered

6	Midterm Exam on MyLab (Topics: Weeks 1 through 4) (due before live session 6)	**Fundamentals of Hypothesis Testing**
		
		• Introduction to Hypothesis Testing
		  ○ Techniques of Statistical Inference
		  ○ What Is Hypothesis Testing?
		  ○ Types of Hypothesis Testing
		• Introduction to Hypothesis
		  ○ What Is Statistical Hypothesis?
		  ○ Types of Hypotheses
		  ○ Hypothesis Testing Process
		• Step 1: Formulate the Hypothesis
		  ○ What Is Hypothesis Formulation?
		  ○ Formulate Hypothesis Examples 1, 2, and 3
		• Step 2: Select a Level of Significance
		  ○ Decisions in Hypothesis Testing
		  ○ Types of Errors
		  ○ Level of Significance
		  ○ Relationship Between Type I and Type II Errors
		• Step 3: Identify the Test Statistic
		  ○ What Is a Test Statistic?
		  ○ Choosing a Test Statistic
		  ○ Standardized Test Statistic
		• Step 4: Formulate a Decision Rule
		  ○ What Is a Decision Rule?
		  ○ Nature of Tests, Critical Region, and Critical Values
		  ○ Right-Tailed Test, Left-Tailed Test, Two-Tailed Test
		  ○ What Is a p-Value?
		  ○ Finding p-Values
		• Step 5: Making a Decision
		  ○ Decision-Making Approaches
		  ○ Using the Critical Value Approach
		  ○ Using the p-Value Approach
		• Step 6: Conclude and Interpret the Results
		  ○ Wording the Final Conclusion

Week	Assignments Due	Topics Covered

7	Homework 5 on MyLab based on the required topics covered in Weeks 5 and 6 (due before live session 7)	**<u>Hypothesis Testing for One Sample</u>**
		
		REQUIRED
		• Hypothesis Test for Mean (Sigma Unknown)
		  ○ Introduction
		  ○ Test for Mean: Sigma Unknown (Left-Tailed Test)
		  ○ Test for Mean: Sigma Unknown (Right-Tailed Test)
		  ○ Test for Mean: Sigma Unknown (Two-Tailed Test)
		• Hypothesis Test for Proportion
		  ○ Introduction
		  ○ Test for Proportion (Left-Tailed Test)
		  ○ Test for Proportion (Right-Tailed Test)
		  ○ Test for Proportion (Two-Tailed Test)
		
		OPTIONAL
		• Hypothesis Test for Mean (Sigma Known)
		  ○ Introduction
		  ○ Test for Mean: Sigma Known (Left-Tailed Test)
		  ○ Test for Mean: Sigma Known (Right-Tailed Test)
		  ○ Test for Mean: Sigma Known (Two-Tailed Test)
		• Hypothesis Test for Variance
		  ○ Introduction
		  ○ Chi-Square Distribution
		  ○ Test for Variance (Left-Tailed Test)
		  ○ Test for Variance (Right-Tailed Test)
		  ○ Test for Variance (Two-Tailed Test)

Week	Assignments Due	Topics Covered

8	Homework 6 on MyLab based on the required topics covered in Week 7 (due before live session 8)	**Two-Sample Inference**
		
		REQUIRED
		• Inferences for Two Samples
		  ○ Introduction
		  ○ Types of Samples
		• Hypothesis Formulation for Two Samples
		  ○ Hypothesis Formulation
		  ○ Formulating Hypothesis for Independent Samples
		  ○ Formulation Hypothesis for Paired Samples
		  ○ Formulating Hypothesis for Two Proportions
		  ○ Formulating Hypothesis for Two Variances
		• Difference Between Two Means: Independent Samples
		  ○ Two-Sample Inference (Equal Variances)
		  ○ Two-Sample Inference (Unequal Variances)
		• Difference Between Two Means: Paired Samples
		  ○ Two-Sample Inference (Paired Samples)
		• Difference Between Two Proportions
		  ○ Two-Proportion Inference
		
		OPTIONAL
		• Inferences About Two Variances
		  ○ The F-Distribution
		  ○ Comparing Two Variances

Week	Assignments Due	Topics Covered

9	Homework 7 on MyLab based on the required topics covered in Week 8 (due before live session 9)	**Simple Linear Regression**
		• Introduction
		  ○ Deterministic Models
		  ○ Probabilistic Models
		• Simple Linear Regression
		  ○ First-Order (Straight-Line) Probabilistic Model
		  ○ Estimated Regression Equation
		  ○ Estimation Process
		  ○ Uses of Simple Regression
		  ○ Ordinary Least Squares (OLS) Method
		• Interpreting the Coefficients
		  ○ Interpreting the Slope
		  ○ Interpreting the Intercept
		  ○ Cautions in Interpreting
		• Assessing Model Fit
		  ○ Model Assessment
		  ○ Descriptive Assessment—Standard Error
		  ○ Descriptive Assessment—R-square
		  ○ Inferential Assessment—Test of Slope
		• Best Practices and Pitfalls
		  ○ Best Practices
		  ○ Pitfalls
		• Simple Linear Regression Demo

10	Homework 8 on MyLab based on the required topics covered in Weeks 9 and 10 **(due 24–48 hours after the last live session before the final exam)**	**Introduction to Multiple Regression**
		• Introduction
		  ○ Simple Versus Multiple Regression
		  ○ Multiple Regression Model
		• Estimating Regression Model
		  ○ Estimating the Coefficients
		  ○ Interpreting the Coefficients
		• Inferences
		  ○ Testing for Significance
		  ○ Global F-Test
		  ○ Individual t-Test
		• Goodness of Fit
		  ○ R-Square
		  ○ Adjusted R-Square
		• Multiple Regression Demo

Week	Assignments Due	Topics Covered
	Final Project—both phases (Group) **(due 24–48 hours after the last live session before the final exam)**	

Attendance Policy

Although there is no formal attendance policy, I highly recommend that you attend all live synchronous sessions for discussion/Q&A and to get some hands-on practice with exercises. You might see some questions identical to those discussed in the live synchronous sessions on the exams.

Program Mission

The mission of the UC Davis Graduate School of Management is to be a global leader in management research and education. As part of the world's premier public university system, we pursue significance, excellence, and scholarly rigor in our research, teaching, and service to the people of California. We emphasize curiosity, creativity, and high standards in the generation and transmission of theoretical and practical knowledge relevant for business.

Honor Code and Academic Integrity

Academic integrity exists when students and faculty seek knowledge honestly, fairly, with mutual respect and trust, and accept responsibility for their actions and the consequences of those actions. Without academic integrity, there can be no trust or reliance on the effectiveness, accuracy, or value of a University's teaching, learning, research, or public service activities. It is, therefore, key that we understand what academic integrity is, why it is important, and how to help it flourish on college campuses.

1. It is expected that all class members treat each other with respect and dignity.

2. It is not acceptable behavior to insult, harass, or demean any member of the class.

3. Professional business behavior should be modeled in the classroom, including the use of appropriate language, jokes, or stories.

In general, students should adhere to the UC Davis Principles of Community, copied below.

The University of California, Davis, is first and foremost an institution of learning and teaching, committed to serving the needs of society. Our campus community reflects and is a part of a society comprising all races, creeds, and social circumstances. The successful conduct of the university's affairs requires that every member of the university community acknowledge and practice the following basic principles:

We affirm the inherent dignity in all of us, and we strive to maintain a climate of justice marked by respect for each other. We acknowledge that our society carries within it historical and deep-rooted misunderstandings and biases, and, therefore, we will endeavor to foster mutual understanding among the many parts of our whole.

We affirm the right of freedom of expression within our community and affirm our commitment to the highest standards of civility and decency toward all. We recognize the right of every individual to think and speak as dictated by personal belief, to express any idea, and to disagree with or counter another's point of view, limited only by university regulations governing time, place, and manner. We promote open expression of our individuality and our diversity within the bounds of courtesy, sensitivity, and respect.

We confront and reject all manifestations of discrimination, including those based on race, ethnicity, gender, age, disability, sexual orientation, religious or political beliefs, status within or outside the university, or any of the other differences among people that have been excuses for misunderstanding, dissension, or hatred. We recognize and cherish the richness contributed to our lives by our diversity. We take pride in our various achievements, and we celebrate our differences.

We recognize that each of us has an obligation to the community of which we have chosen to be a part. We will strive to build a true community of spirit and purpose based on mutual respect and caring.

For more information, please review the Academic Conduct Booklet:
https://gsm.ucdavis.edu/sites/default/files/2020-10/code_of_conduct_booklet_2020.pdf