Syllabus: Introduction to Statistics
Spring 2023
Econ 206 Online

Instructor: Dr. J.S. Leguizamón
Email: j.sebastian.leguizamon@wku.edu
Office Hours: T/TH 11:00 am - 12:00 Noon or by Appointment (via Zoom)

Required Materials:

This course requires the use of *MindTap* for the textbook **Modern Business Statistics with Microsoft Excel** (by Anderson, Sweeney, Williams, Camm, Cochran, Fry, and Ohlmann) Edition no. 7^{th}; Cengage Publishing. The subscription to Mindtap includes a digital version of the textbook and is a required component of the course. All homework will be on Mindtap and you will be able to access it through blackboard directly.

Day one access is included in this course so you will automatically have access to Mindtap and will be billed for the materials through your student account. To avoid this, you must drop the course before the drop date.

Course Description

Description: An introduction to basic probability and statistics for business and economics. Topics include the collection and presentation of data, descriptive statistics, an introduction to probability and probability distributions and statistical inference. *Prerequisite: ECON 202 or 203 and MATH 116 or higher.*

In this course, you will learn the basis for and use of statistics. Statistics deals with analysis of data: drawing out information from data, collecting and organizing data so that we can answer questions, and reaching conclusions from data analysis. While "statistics" intimidates many people, in reality it saves much time and energy (and headaches) once you learn how to use it properly. You can think of statistics like a code or a television signal descrambler – it unscrambles information that would otherwise be incomprehensible.

Statistics runs from the very simple to the very complex. It would take many semesters to cover statistics comprehensively. Relatively few people need to know it all, however, or even most of it. In this first course, we will start with the basics and cover the most commonly used components of statistics. You will use many of these components in upper-level course work or jobs. Undoubtedly, many of you will learn additional statistical methods in later courses. What you learn in this course should provide a good basis for understanding these additional methods.

Course Objectives

After successful completion of the course, students should be able to:

1. Demonstrate knowledge of fundamental statistical concepts and some of their basic applications
2. Know how to organize, manage and present data
3. Use and apply a wide variety of statistical methods
4. Understand probability distributions and their applications
5. Understand sampling theory and corresponding sampling distributions
6. Understand statistical inference, including confidence intervals and hypothesis testing

Course Structure and Resources:

All instructional material is provided on Blackboard. In there, there will be a detailed breakdown of the topics, readings, assignments, and all other supplemental materials by week. Many of the supplemental materials can also be accessed directly through the Mindtap website. Although you can access readings and assignments on Mindtap by clicking on the individual links provided for each chapter/unit, you may also log into the main Mindtap course website by clicking on the link provided in the content folder on the Blackboard course site. Mindtap offers several helpful features. Please allow yourself time to explore these additional resources by clicking through the tabs on the course site (note taking aids, summary flash cards, chapter review (which includes the answers to supplemental questions)).

I recommend that you start with the chapter readings assigned for each topic. As you read the corresponding chapter, you should be taking notes. Reading through without taking notes is a good way to get familiar with the topic, but not enough to help you understand the material. In any event, **you should not move on to the Mindtap assignments before reading the chapter.**

If needed, there are also supplemental instructional videos that can help you understand the material better, before moving on to the Mindtap assignments. These videos are very helpful and are recommended. However, similar to reading the textbook chapters, you should not rely on simply watching the videos. Note taking is essential to the understanding of the material, as it is easier to remember what you write (even if you can rewind the video).

Tips for taking notes from a recorded lecture video:

- The recorded lectures much faster than a typical class lecture. A lecture that takes 50 minutes to present in person may only take 15 minutes to present in a recorded lecture.
- The fast paced presentation is done with the assumption that you will pause the lecture frequently to write down the notes.

- I recommend pausing the video every time you see new material on the screen, writing down the material, *then* resume watching the video. There is no way that you can write down the material fast enough to also listen to the lecture.
- Given this, it is likely that a 5-7 minute video will require 30 minutes to view and properly take notes on the material. Consequently, if you choose to rely on these instructional videos, you should plan to spend approximately 150 minutes per week viewing the videos and taking notes.
- Again, and most importantly, this is not designed to be a passive viewing experience. It will be difficult to retain the material and study for the exams if you have simply watched the videos without taking notes.

Grading

Grading Weights	
Chapter and Excel Assignments	25%
Exam 1	25%
Exam 2	25%
Exam 3	25%

There will be 27 graded assignments worth 25% of your grade and 3 exams worth 25% each (75% total). In addition, there are several ungraded assignments, which are optional, and many work-through problems provided throughout the text that will help you understand the material. These optional assignments are a very useful tool to receive feedback on your understanding and I will occasionally use these questions on exams.

Excel and Chapter Assignments

The 26 assignments are divided between individual chapter assignments (9) and excel assignments (18), all equally weighted. I will be dropping your two lowest excel assignments (although I will not be dropping any of the chapter assignments). Many of the statistical procedures you will learn will be much easier and faster to complete in excel. This is not intended to be an excel course so all excel concepts have an accompanying video tutorial and step-by-step questions which will take you through the procedure. You are encouraged to use excel for any of the concepts covered in these tutorials. Mastering the procedures in excel will not only allow you to solve the quiz and exam problems much more quickly, but is also a relevant skill for solving real world problems. You are welcome, but not required, to use any additional excel functions available for the assignments and exams.

Although there is one chapter assignment per chapter, the excel assignments vary by chapter (since some topics lend themselves more naturally to using excel). The best course of action is to complete any excel assignment after you have watched the video and/or read the chapter but before completing the chapter assignment for that chapter. If you attempt the excel assignment

before watching the lecture videos, the concepts may be quite confusing and the material may be difficult to retain. If you wait until after you complete the chapter assignment to do the excel assignment, you may find yourself manually computing a tedious calculation that could have been done quickly in excel.

Note on Assignment Performance: The assignments allow for multiple attempts and will provide textbook references and, occasionally, hints. This is done so that you can work through problems that you are struggling with. Although it can be beneficial to have multiple attempts, I regularly see students do well on the assignments but struggle on the exam. This occurs primarily because students do not realize how much assistance they are using in answering the questions (reading the textbook for the explanation/answer, etc).
Note that I do not mind if you use google and other internet, including Artificial Intelligence tools such as ChatGPT to find your answers and/or to tell you how to solve the assignments. However, keep in mind that these should be used as tools for you to understand the material better. I cannot stop you from using these tools and it may indeed result in a good grade for your assignments, but it may not help you in the exams, which is the majority of your grade. As you will see below, exams are monitored at a testing center without access to the internet. In addition, you will have limited time and fewer resources. At this point it may become clear that you do not know how to do the problem. The best way to avoid this is to do it on your own by first attempting it like you would an exam question. Try to solve it just using the formulas/excel functions. If you cannot, this clues you in that you need to further review this topic.

Exams

Although only 3 exams will count towards your grade, there is a total of 4 exams. There are 3 non-cumulative exams, and a final exam. The final exam will take place during the exams week and it is a comprehensive, cumulative exam. **Please note that the lowest of the 4 exams will be dropped.** This means that if you are happy with your grade after the first 3 exams, you may not take the final exam and it will be dropped (being your lowest exam grade). However, this also means that if you miss one of the first 3 exams, that becomes your lowest grade and you will be required to take the final exam.

There are NO MAKE-UP exams. If something (e.g. anything) prevents you from taking any of the first three exams, the policy above applies. As such, you may only miss 1 of the first three exams. If you miss a second exam, for any reason, that will be recorded as a zero (0) and will hurt your grade. Note that I do not recommend you missing any of the first three exams. A comprehensive final, by default, is always harder since it tests you over all materials covered throughout the semester. In addition, this gives you more flexibility. If none of the first three exams are missed, you can either not take the final, or take it without worrying that it may lower your grade (if your final exam ends up being lower than any of the first three exams, it is simply dropped).

All exams will take place at the WKU DELO Testing Center by appointment. You will receive an email to schedule your exam and will have the option to schedule it on the Thursday,

Friday or Saturday of the testing week. The exams will be a mix of work-through problems and conceptual questions. As you will learn throughout the course, most statistics can be solved using mathematical formulas or using excel. Excel has created simple functions that make such calculations easier and faster. You will have the option to solve many of the questions, including open ended questions using excel. Any open ended question will require you to show your work. In order to get full credit, you should write what formula or excel function was used, and how it was used.

I will be providing a formula sheet which you will receive at the testing center. It will have a list of all the formulas needed, using the notation provided in the textbook and/or instructional videos (they will not be labeled with words, only symbols). You are responsible for knowing which one to use and when. This allows you to focus on applications and not memorization of specific formulas.

WKU DELO Testing Center does not charge a fee; however, the WKU Remote Proctoring Network includes proctor locations who charge for the proctoring services as well as those who do not charge. Students are responsible for payment of any proctoring fees if they choose to use a proctor who charges a fee for this service. Students are also responsible for any additional fees that might be associated with the use of a particular proctoring site, such as parking fees.

The tentative schedule of topics and any due dates for the assignments and exams are below.
**NOTE THAT THE EXCEL ASSIGNMENTS ARE ACCOMPANIED BY A VIDEO TUTORIAL ON MINDTAP

WEEK 1: January 16 - January 20

Reading Assignment	Chapter 1: Data and Statistics Sections 1.1-1.5 **Excel #1: Basic Excel Functions (Tutorial): Due Friday, Jan 20**
Topics/Instructional Videos	"Scales of Measurement" "Types of Data" "Frequency Distribution Table (Qualitative Data)" "Quantitative Data Frequency Distribution Table"

WEEK 2: January 23 - January 27

Reading Assignment	Chapter 2: Descriptive Statistics Tabular and Graphs Sections 2.1-2.4 **Chapter 1 Assignment: Due Friday, Jan 27**
Topics/Instructional Videos	"Pivot Table with Qualitative Data" "Pivot Table with Quantitative Data in Excel" "Classifying Histograms" "Classifying Data Skewness with Histogram and Numerically in Excel" "Two Variable Graphs and Relationship Classifications"

WEEK 3: January 30 - February 3

Reading Assignment	Chapter 2: Descriptive Statistics Tabular and Graphs Sections 2.1-2.4 **Excel (Tutorials) #2 and #3: Due Friday, Feb 3** **Chapter 2 Assignment: Due Friday, Feb 3**
Topics/Instructional Videos	"Two Variable Graphs, Scatterplots and Correlation Coefficients in Excel" "Simpson's Paradox"

WEEK 4: February 6 - February 10

Reading Assignment Assignment	Chapter 3: Descriptive Statistics Numerical Measures Sections 3.1-3.5 **Excel (Tutorial) #4: Measures of Location and Quartiles: Due Friday, Feb 10** **Excel (Tutorial) #5: Mean, Standard Deviation, Range and Interquartile Range: Due Friday, Feb 10**
Topics/Instructional Videos	"Mean, Median and Mode" "Weighted Mean" "Mean from a Frequency Distribution" "Geometric Mean" "Variance and Standard Deviation (Manual Computation)" "Variance and Standard Deviation (Excel")

WEEK 5: February 13 - February 17

Reading Assignment Assignment Assignment	Chapter 3: Descriptive Statistics Numerical Measures Sections 3.1-3.5 **Excel (Tutorial) #6: 5 Number Summary, Box and Whisker Chart: Due Date: Friday, Feb 17** **Excel (Tutorial) #7: Z-Scores and Outliers: Due Date: Friday, Feb 17** **Chapter 3 Assignment: Due Date: Friday, Feb 17**
Topics/Instructional Videos	"Coefficient of Variation" "Z-score" "Chebyshev's Theorem" "The Normal Distribution and the Empirical Rule" "Introduction to 5 Number Summary and Outliers" "5 Number Summary and Finding Outliers" "Correlation Coefficient" "Probability: Definitions and Multi-step experiments" "Probability: Combination" "Probability: Permutation"

WEEK 6: February 20 - February 24

Reading Assignment	Chapter 4: Introduction to Probability Sections 4.1-4.5 **None**
Topics/Instructional Videos	"Relative Frequency Probability" "Probability: Notation and Classical Probability" "Probability: Event Complement" "Probability: Addition for Union" "Probability: Multiplication for Intersection"
EXAM 1	**Chapters 1, 2, and 3: Available Thurs. Feb 23 - Sat. Feb 25 by appt at DELO**

WEEK 7: February 27 - March 3

Reading Assignment Assignment	Chapter 4: Introduction to Probability Sections 4.1-4.5 **Excel (Tutorial) #8: Joint Probability Table: Due Friday, March 3** **Chapter 4 Assignment: Due Date: Friday, March 3**
Topics/Instructional Videos	"Conditional Probability" "Conditional Probability: Bayes Theorem" "Conditional Probability: Bayes Theorem Part 2"

WEEK 8: March 6 - March 10

Reading Assignment Assignment	Chapter 5: Discrete Probability Distributions Sections 5.1-5.7 **Watch Instructional videos to learn all Excel functions for this Chapter. No Mindtap Tutorials** **Chapter 5 Assignment: Due Friday, March 10**
Topics/Instructional Videos	"Empirical Discrete Probability Distribution" "Binomial Probability" "Poisson Probability" "Hypergeometric Distribution" "Uniform Distribution"

WEEK 9: March 13 - March 17

textbfSpring Break	**No Classes/ Assignments**

WEEK 10: March 20 - March 24

Reading	Chapter 6: Continuous Probability Distributions Sections 6.1 and 6.2
Assignment	**Excel (Tutorial) #9: Normal Distribution: Due Friday, March 24**
Assignment	**Chapter 6 Assignment: Due Friday, March 24**
Topics/Instructional Videos	"Introduction to Normal Distribution" "Normal Distribution: Excel Formulas" "Normal Distribution: Excel Practice"

WEEK 11: March 27 - March 31

Reading	Chapter 7: Sampling and Sampling Distribution Sections 7.2-7.6
Assignment	**Excel (Tutorial) #10: Finding Point Estimates: Due Friday Mar 31**
Assignment	**Excel (Tutorial) #11: Point Estimates for a Proportion: Due Friday Mar 31**
Assignment	**Chapter 7 Assignment: Due Friday Mar 31**
Topics/Instructional Videos	"Population, Samples and Distribution of Sample Means" "Sampling Techniques"
Note	**Point Estimates are statistics from a sample. No Instructional Video for this. Rely on Excel Tutorials**

WEEK 12: April 3 - April 7

Reading	Start Chapter 8: Interval Estimation Sections 8.1-8.4
Assignment	**None**
Topics/Instructional Videos	"Confidence Intervals for Sample Mean" "Confidence Interval for Sample Mean Examples"
EXAM 2	**Chapters 5-7: Available Thurs. Apr 6 - Sat. Apr 8 by appt at DELO**

WEEK 13: April 10 - April 14

Reading	Finish Chapter 8: Interval Estimation Sections 8.1-8.4
Assignment	**Excel (Tutorial) #12: Constructing Confidence Intervals: Due Friday, Apr 14**
Assignment	**Excel (Tutorial) #13: Constructing Confidence Intervals II: Due Friday, Apr 14**
Assignment	**Excel (Tutorial) #14: Constructing Confidence Intervals III: Friday, Apr 14**
Assignment	**Excel (Tutorial) #15: Finding Required Sample Size: Due Friday, Apr 14**
Topics/Instructional Videos	"Confidence Interval, Population Standard Deviation Unknown" "Confidence Internal Estimation for a Proportion" "Minimum Sample Size Necessary"

WEEK 14: April 17 - April 21

Reading	Chapter 14: Linear Regression Sections 14.1, 14.2
Assignment	**Chapter 8 Assignment: Due Tuesday, Apr. 18**
Assignment	**Excel (Tutorial) #16: Regression in Excel 1: Due Friday, Apr. 21**
Topics/Instructional Videos	"Brief Introduction to Linear Regression: Part I"

	“Brief Introduction to Linear Regression: Part II”

WEEK 15: April 24 - April 28

Reading	Chapter 14: Linear Regression Sections 14.1, 14.2
Assignment	**Excel #17: Regression in Excel 2: Due Wed, Apr 26**
Assignment	**Excel #18: Regression in Excel 3:XLMiner Due Wed, Apr 26** (this tutorial has questions on "Leverage" but you will not be tested on that. Focus on the XLMiner method)
Assignment	**Assignment 9 Chapter 14: Due Wed, Apr 26**
Topics/Instructional Videos	"Regression in Excel Part I"
EXAM 3	**Chapters 8 and 14: Available Thurs. Apr 27 - Sat. Apr 29 by appt at DELO**

WEEK 15: Finals Week

FINAL EXAM	**All Topics: Available Monday - Wednesday by appt**

WKU's Disability Accommodation Statement

In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, Room 1074. The SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at $sarc.connect@wku.edu$. Please do not request accommodations directly from the professor or instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

Title IX Discrimination and Harrassment

Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's Sex and Gender-Based Discrimination, Harassment, and Retaliation (0.070) and Discrimination and Harassment Policy (0.2040). Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Executive Director, Office of Institutional Equity/Title IX Coordinator, Ena Demir, 270-745-6867 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121. Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's Counseling and Testing Center at

270-745-315.

COVID-19

All students are strongly encouraged to get the COVID-19 vaccine. In accordance with WKU policy, all students must call the WKU COVID-19 Assistance Line at 270-745-2019 within 4 hours of testing positive for COVID-19 or being identified as a close contact to someone who has tested positive. The COVID Assistance Line is available to answer questions regarding any COVID-19 related issue. This guidance is subject to change based on requirements set forth by federal, state, and local public health entities. Please refer to the Healthy on the Hill website for the most current information. $www.wku.edu/healthyonthehill$

WKU Counseling and Testing Center

The university experience should be challenging, but not overwhelming. To this end, the WKU Counseling Center provides a variety of services to help strengthen students' capacity to tolerate distress, form healthy relationships, and seek healthy expressions of their ideals and values. If you would like to speak with someone, you may contact WKU's Counseling and Testing Center at 270-745-3159 or use their Here To Help service at $https://www.wku.edu/heretohelp/heretohelpemail.php$. If you need immediate help, please visit the Counseling Center in 409 Potter Hall or call the 24-hour emergency help line at 270-745-2548.

Big Red Backpack

The Big Red Backpack program is the title of WKU's partnership with Barnes and Noble College for their First Day Complete initiative. Big Red Backpack is a course materials delivery program that ensures students have their required course materials on the first day of class and may reduce the costs of materials for many of their courses. Enrollment in the program occurs automatically when students register for classes. Students may opt out of the program each semester, as long as they choose to opt out for all of their classes.
Students MUST carefully and completely follow all instructions regarding the Big Red Backpack Program. Those instructions will be provided by:

1. An email to all Topper email addresses from the Big Red Backpack Program one month prior to the start of classes.

2. The Big Red Backpack Program site: https://www.wku.edu/bigredbackpack/.

Students should refer to the Big Red Backpack Program site referenced above for opt-out deadlines and any additional details.