

CRIM 6410: Statistical Applications in Criminology and Criminal Justice

Professor: Dr. Marisa Omori (she/her/hers)

Email: marisa.omori@umsl.edu

Class: Wednesdays 5:30pm-8:10pm Express Scripts Hall 003 or online on zoom

Course Description

This course is designed to introduce students to descriptive and inferential statistics used to answer questions in criminology and criminal justice. We will cover basic descriptive statistics, including measures of central tendency and variability, as well as inferential statistics, including point estimation, hypothesis testing, and an introduction to correlation and regression. We will take an applied approach to these techniques, learning about how to calculate and interpret these statistics. This will include using Excel or Stata software to learn about coding and syntax to calculate these statistics.

Learning Objectives

- Critically read and understand descriptive and inferential statistical concepts
- Build a solid foundation for more advanced statistical techniques
- Understand criminology, criminal justice, and social science applications for statistics
- Conduct the basics of data analysis in Excel or Stata

Course Logistics

- Because of COVID-19, we may need to meet live on zoom during our regular day/class time.
- To help foster class participation and collaboration, I'm strongly encouraging everyone to turn your cameras on for the class. You're welcome to use virtual backgrounds. If you cannot turn your camera on, include a photo.
- We will have a lab session every other week for half of class, starting on week 3 (6 lab sessions total). This will give you a hands-on opportunity to learn to use Excel and Stata and apply concepts learned in class to real-world examples.
- I will post the syllabus, slides, lab assignments, and lab dataset on Canvas, so make sure you check it regularly.
- Please let me know if you need any disability accommodations. I will happily make accommodations through the [office of disability services](#) (314.516.6554).
- Academic integrity: I encourage you to work together on the homeworks and labs, and give each other help and feedback on your final papers, although each of you must use your own words for interpretations (this is grad school!), and turn in your own homework and lab. I do take academic dishonesty seriously, including cheating, collusion, and plagiarism. Here are the UMSL [guidelines about academic dishonesty](#).

Texts

Required

Agresti, Alan (2018). *Statistical Methods for the Social Sciences* (5th Edition). Boston: Pearson Education Inc. ISBN 13: 978-0-13-450710-1 and ISBN 10: 0-13-450710-X.

-note: other versions of the book contain similar material!

Optional for those using Stata

Hamilton, L.C. (2013). *Statistics with Stata (Updated for version 13)*. Cengage Learning (for those new to Stata, this is a helpful resource)

Acock, A.C. (2012). *A Gentle Introduction to Stata*. (Revised Third Edition). College Station, TX: Stata Press (for those new to Stata, this is a helpful resource)

Software

We will use Excel and/or Stata throughout the course. **Masters students can choose which software to use (though Excel will probably be more useful), and doctoral students must use Stata.** Excel is a commonly used generalist data program that uses formulas as well as an Analysis Toolpak to calculate statistics. Stata is a statistical software, and although it has “point and click” functions, I will emphasize writing code. The computers in the classroom have Excel and Stata. If you do use the computers in the classroom or on campus for your work, you might consider getting a flash drive for saving work, or you can save work on any cloud storage, such as OneDrive, Google Drive, Dropbox, etc.

Excel: The computers in our classroom have Excel. If you need access to Excel outside of class, there are also [labs around campus](#) that are equipped with Excel. If you want to access Excel at home, you can get it as part of Microsoft Office. You can [buy a month subscription for \\$6.99/month \(or \\$69.99/year\)](#).

Stata: The computers in the classroom have Stata. If you need to access Stata outside of class, the PC labs around campus should also have Stata. If you want to purchase Stata to use on your own computer, Stata BE or IC should be sufficient. There are two options for getting Stata at home:

- You can buy a [student copy of Stata](#) for your computer (\$48 for a 6 month license).
- If you have a PC, it is also available for free through TritonApps, although some students have reported problems.

In addition to the books listed above, here are good websites for Excel and Stata support:

- Excel: Princeton’s website has some good tutorials on [descriptive statistics](#) and examples
- Stata: [UCLA website](#) Both the [data analysis examples](#) and [annotated output](#) are helpful.
- Stata: [UNC website](#) has some good Stata data management examples

Assignments and Grading

1. **Lab assignments (6 x 10% each=60% of total grade):** these will consist of Excel/Stata exercises from the lab with interpretations, as well as conceptual questions. No late work will be accepted unless for an excused absence.

- The labs should include two components: 1) The main body of the lab, including relevant cut-and pasted output from Excel or Stata into Word (for Stata, use Courier New, size 8 or 9 to format correctly in Word), as well as your interpretations/responses to questions, and 2) Your .xlsx (Excel) or .do file (for Stata), including the calculations/commands you used for that particular lab.
- Any conceptual questions requiring calculations, PLEASE SHOW YOUR WORK, or you will not receive credit for the problem.

2. **Final writing project (30% of total grade):** you will write an empirical paper applying and interpreting the techniques used in the class, where you can use your own dataset (pending my approval), or one provided in the class. You have two options for the paper:

- 1) An academic article, modeled after a short quantitative journal article, including an introduction/lit review, methods and results, and discussion section. This paper asks a theoretical research question and will pay much greater attention paid to the methods and results, and less attention to the introduction/lit review/discussion compared to a normal journal article. **Doctoral students should choose this option.**
- 2) A policy report/white paper, modeled after reports or papers generated by think tank or policy organization. Policy reports/white papers tend to be focused on summarizing literature and conducting statistical analyses around a more descriptive issue, problem, or policy. They contain a summary section where they highlight key findings/results, a short literature review and methods section, and longer results sections. They sometimes include policy recommendations.

Regardless of which option you choose, the final writing project should be at least 2500 words (about 10 pages double-spaced, excluding figures and bibliography), and is graded on the following rubric:

Section	Description	Points
Background research/literature review	An introduction to your topic/question, and a synthesis of prior research done on the question, organized into themes. You should include at least 5 outside sources, and 3 of these should be academic peer-reviewed. This can be shorter than a traditional academic article.	3
Methods	Includes 1) a description of your data and sample; 2) the variables section with information on how the variables are measured and coded, and 3) the analysis plan of the statistics you calculate in the results	7
Results	Where you are calculating and interpreting statistics. This should include: 1) Publishable-quality tables of all descriptive statistics, and 2) at least 5 figures plotted in Excel or Stata	15
Discussion and conclusion OR key findings summary	Either a brief discussion and conclusion if you are writing an academic article, or a key findings summary if you are writing a policy report/white paper. If you're writing the policy report/white paper, you can choose to include your key findings summary in the beginning.	5
Total		30

3. **Attendance and participation (10% of total grade):** Your attendance and participation in the course are key to being able to keep up with the material.

Schedule—we may make adjustments as we go along!

Week	Reading	Assignment (what you should work on this week)
Week 1: Jan 19 Introduction to class Software setup		
Week 2: Jan 26 Introduction to Statistical Methodology Software setup and intro to Excel and Stata	Ch. 1	
Week 3: Feb 2 Sampling and Measurement Lab 1: Intro to Statistics and Data	Ch. 2	Lab 1 due Feb 9
Week 4: Feb 9 Descriptive Statistics	Ch. 3	
Week 5: Feb 16 Descriptive Statistics (continued) Lab 2: Descriptive Statistics and Figures	Ch. 3	Lab 2 due Feb 23
Week 6: Feb 23 Probability Distributions Statistical Inference: Estimation	Ch. 4 Ch. 5 (excluding 5.5)	
Week 7: Mar 2 Statistical Inference: Estimation (continued) Lab 3: Probability distributions and estimation	Ch. 5 (excluding 5.5)	Lab 3 due Mar 9
Week 8: Mar 9 Statistical Inference: Significance Tests	Ch. 6	
Week 9: Mar 16 Statistical Inference: Significance Tests (continued) Lab 4: Statistical inference	Ch. 7 (excluding 7.6, 7.7)	Lab 4 due Mar 23
Week 10: Mar 23 Analyzing Associations Between Categorical Variables	Ch. 8 (excluding 8.5)	
Week 11: Apr 6 Analyzing Associations Between Categorical Variables (continued) Lab 5: Categorical variables	Ch. 8 (excluding 8.5)	Lab 5 due Apr 13
Week 12: Apr 13 Linear regression and correlation	Ch. 9	
Week 13: Apr 20 Linear regression and correlation (continued) Lab 6: Correlation and regression	Ch. 9	Lab 6 due Apr 27
Week 14: Apr 27 Multiple regression and correlation	Ch. 11 (except 11.7)	
Week 15: May 4 Multiple regression and correlation and wrap-up	Ch. 11 (except 11.7)	
Finals week: May 11		Final paper due May 11