

**SOC 110: Multivariate Statistical Analysis**  
**Term: Spring 2019**

**Course schedule:** Tuesday and Thursday 11:10-12:30pm  
Humanities and Social Sciences, Room 1503

**Lab schedule:** Friday 11:10am-12:00pm, 12:10pm-1:00pm, 1:10pm-2:00pm  
Watkins Hall, Room 1147

**Instructor:** Professor Chioun Lee  
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Office: Watkins Hall, Room 1207  
Office hours: Thursday 9:30am-11:00am & by appointment

**Teaching Assistant:** Manjing Gao  
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Office: Watkins Hall, Room 1144  
Office hours: Tuesday and Thursday 9:00am-10:30am & by appointment

**Required text and other required materials:**

- 1) Knoke, David, George W. Bohrnstedt, and Alisia Potter Mee. (2002). *Statistics for Social Data Analysis, 4th edition*. Belmont: Cengage Publishing.  
ISBN – 10: 0-87581-448-4  
ISBN – 13: 978-0-87581-448-3  
\*\*\*PDF files of each chapter are also available on iLearn.
- 2) A basic, reliable, standalone calculator that can do arithmetic, square roots, and exponential functions (**e to the power of x**). Please be sure to bring your calculator to every class, section, and exam. Phones, laptops, and other devices cannot be used during exams and in-class exercises.

**Optional Texts:**

- 1) Acock, C. Alan. 2016. *A Gentle Introduction to STATA* (Fifth Edition). College Station, TX: STATA Press. \*\*\* If you are having trouble with STATA, this is an excellent resource.
- 2) Wheelan, Charles. 2013. *Naked Statistics: Stripping the Dread from the Data*. New York: WW Norton.
- 3) Alan Agresti, 2018. *Statistical Methods for the Social Sciences*. Fifth Edition.

I have placed all optional text books on reserve with a loan period of 2 hours in Tomás Rivera Library.

**Lecture Notes:**

Each week's lecture notes will be uploaded to iLearn on the previous Sunday night as PDFs. To encourage your active participation in class, some parts of lecture notes will be blanked out (you must fill in the information during lectures).

**Course Description:**

This course will introduce you to the logic and application of different multivariate statistical analyses, thus expanding on the knowledge of hypothesis testing you developed in your introduction to statistics class. This course stresses how to be intelligent and informed consumers and producers of quantitative social science research. Researchers have employed multivariate statistical technique to answer socially relevant questions such as these:

- How do opinions on abortion differ by one’s political party?
- Does getting a college degree have the same labor market benefits across racial/ethnic groups?
- How does discrimination affect health?
- Does early-life socioeconomic status (SES) matter for midlife health more or less than adult SES?

By the end of this quarter, you will be skilled enough in the art of statistics to address these types of questions. In addition, this course will stress hand calculations and the interpretation, and appropriate use, of statistics. While I do not expect you to memorize formulas, I do expect you to understand when and how to apply the formulas and methods that we will cover. You will also use software to run statistical operations and learn to interpret the output. We will use the statistical analysis program STATA to put into practice course concepts.

**Course Objectives:**

- 1) Become familiar with the statistics that are commonly used in the social sciences and be able to apply them appropriately to social science data
- 2) Understand the advantages and limitations of bivariate and multivariate analysis
- 3) Be able to use computer software (STATA) to conduct statistical analyses
- 4) Be able to interpret statistical results correctly and accurately and to clearly communicate statistical conclusions
- 5) Be able to calculate and interpret the effects and statistical significance of parameter estimates and model fit statistics
- 6) Become informed consumers and producers of social statistics

**Grading:**

**Exams 1 and 2 (50%):** There will one in-class midterm exam and one final exam that cover material from readings, lectures, and lab exercises. Information about the exam structure and format will be provided well before each exam date. The final exam is not cumulative. Exams are closed book, but you may bring one 8.5x11-inch page of notes (with writing on both sides) to exams. Using any additional materials constitutes academic dishonesty. The TA and I reserve the right to collect note sheets after exams. The TA and I also reserve the right to ask you to change your seat during exams. You must bring a regular calculator to each exam. You may not use a laptop, cell phone, or other electronic device during exams. You must bring your student ID to each exam. Each exam consists of 25% of your grade.

|                                       |  |
|---------------------------------------|--|
| Exam 1: Tuesday, May 14, during class | Exam 2: Monday, June 10, 8:00 -11:00am |
| Chapters 6 & 7                        | Chapters 8 & 9                         |

Make-up exams will not be given, so please check your personal and travel schedules and verify that you can attend all exams.

**Group Project (25%):** The group project is one of the most important aspects of this course. Each group will consist of 5 or 6 students. These projects will require a significant time commitment, so it's important to choose a topic that your team is excited about and to get started early!!!

At the end of the quarter, you will be asked to evaluate the contribution of your fellow group members to the project. These evaluations will be factored into your project grade.

There are **two group assignments** (5% each) that are related to a **group paper** (10%) and a **group presentation** (5%). Thus, the group project accounts for 25% of your final grade (for more details, see iLearn).

The final paper and presentation materials must be submitted to your TA (via iLearn) by the due date.

|   |  |
|---|--|
| Group project assignment 1 (5%) due May 5   | Group project assignment 2 (5%) due May 19 |
| See description on iLearn   | See description on iLearn                  |
| Final project paper (10%) & presentation (5%): June 2   |  |
| <ul style="list-style-type: none"> <li>Each student should submit a final report which includes an evaluation of his or her fellow group members to the project.</li> <li>For all groups, presentation slides are due on June 2.</li> </ul> |  |

**Lab Attendance (5%):** In lab sections, you and your group members will work with the TA on your group project. You may miss one session without any penalty to your grade. For each additional missed session, 0.625% will be subtracted from your final grade.

**Homework (10%):** There will be four homework assignments, with problems mostly from the textbook.

Homework will require completing and interpreting hand calculations. While covering material in lectures, we will collectively work on hand calculation problems.

To receive full credit on homework assignments and exams, you **must** show your work. If you write down the answer without showing how you got to that answer, **even if that answer is correct**, you will not receive full credit.

Homework assignments must be submitted to your TA (via iLearn) by the due date (see below).

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|--------------------------------|--|
| HW 1. Sunday, April 21         | HW 3. Wednesday, May 8                   |
| Chapter 6: Questions 1–3, 6–10 | Chapter 8: Questions 1–8                 |
| HW 2. Sunday, April 28         | HW 4. Sunday, May 26                     |
| Chapter 7: Questions 1–10      | Chapter 9: see iLearn for HW 4 questions |

Late homework will not be accepted under ANY conditions. Any homework not turned in by the deadline will be assigned a grade of 0.

**In-Class Exercises (10%):** During class, I will also provide exercises that will help you to understand statistical concepts, practice statistical calculations, and prepare for exams. Each of the 10 in-class exercise will account for 1% of your final grade.

**Extra credit (2 points for your final grade):**

**Participation in social psychology research (2 points):** Students who participate in a web-based survey and an in-person laboratory test with a researcher (Phoenicia Fares) will receive 2 points of extra credit. More information will be provided by Phoenicia.

**Summary of Final Grade Calculation:**

| Category                 | Points     |
|--------------------------|------------|
| Exam 1                   | 25         |
| Exam 2                   | 25         |
| Group assignment 1       | 5          |
| Group assignment 2       | 5          |
| Group paper              | 10         |
| Group presentation       | 5          |
| Homework (4 assignments) | 10         |
| Lab attendance           | 5          |
| In-class exercises       | 10         |
| <b>Total</b>             | <b>100</b> |

**Scale of Final Grades:**

A 92%-100%, A- 90%-91%, B+ 88%-89%, B 82%-87%, B- 80%-81%, C+ 78%-79%  
C 72%-77% C- 70%-71%, D+ 68%-69%, D 62%-67%, D- 60%-61%, F 0%-59%

If you disagree with a grade that you receive, you may submit a **written request for a review**. Written requests will be accepted during the 5-day period after you receive the graded exam or assignment. Written requests must include your argument for why you think you should have received a different grade.

### **Tips to Succeed:**

- 1) Keep up with the textbook readings and lecture notes. Reading a statistics textbook is not easy, but it is important to digest the course material fully as you go along. It takes much less effort to keep up than it does to fall behind and then try to catch up. For most people, statistics is not intuitive; therefore, you must put in the time to really understand it.
- 2) Come to lectures. My aim in lecture is to help you understand what is in the readings, and to provide examples that can help with this.
- 3) Concentrate on understanding statistical concepts. Do not worry about memorizing formulas, but focus on when and why you should use the formulas and on how to interpret the results of your calculations.
- 4) Take advantage of instructor and TA office hours. Do not wait until the day before an exam or an assignment is due for help. No questions will be answered past 5pm on the day before an exam or a homework assignment is due.
- 5) Be an active and consistent participant in lecture and lab. Ask questions when you have them. If you do not understand something, chances are at least one of your other classmates also does not understand it.
- 6) You are welcome to form study groups and homework groups. Working together can help you understand the material. *But be sure that all work you turn in is your own.*
- 7) I want you to do well in this class. If you become concerned about your progress, please see me immediately. Do not wait until the end of the quarter when there is no more work to complete that could raise your grade. This would be unfair to students who were not given the opportunity to do extra graded work.

### **Additional Policies:**

**Course changes:** Any changes to requirements, readings, or other aspects of the class will be announced in lecture. Changes will also be updated on the syllabus, which will be posted to the iLearn website. The version of the syllabus on iLearn will always be the most recent one and will take precedence over any previous version.

**Phone/tablet/laptop use during class:** During class, please do not make or receive phone calls, send or receive text messages, check your email, or use social media. If you bring a laptop or tablet to class, it should be because you are taking notes. Research has consistently shown that using devices for other purposes is very distracting to those around you. Use of laptops and other devices in class is a privilege and may be revoked if students are abusing this privilege.

**Classroom decorum:** I have an obligation to maintain a classroom environment that allows each student to learn. I encourage questions and discussion, but fully expect courteous, respectful, and professional conduct at all times. Behavior that is disruptive, distracting, or demeaning will not be tolerated—one warning, and then you will be asked to leave the class session.

**Academic honesty:** Students are expected to do their own work in this course. Persons found cheating or committing plagiarism (copying from or paraphrasing an un-cited source OR copying from another student) will receive a score of 0 on that assignment or exam and be referred to the academic dean for further disciplinary action. If you have any questions about whether a course of action might qualify as academic misconduct, do not hesitate to visit <http://conduct.ucr.edu/students/index.html>. If you are still unsure, please feel free to ask me.

**Students with documented disabilities:** If you have a disability that requires assistance for this course, please contact me as soon as possible so I can help with accommodations.

## Course Schedule and Readings

All readings and lecture notes will be posted on iLearn. You are responsible for completing the readings prior to the class in which they will be discussed.

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| <b>Week One: Introduction and Overview</b>  |
| April 2: Course syllabus and review of fundamentals (basic statistics)<br>April 4: Review of fundamentals (inferential statistics) & in-class exercise 1 <ul style="list-style-type: none"><li>• Relevant reading: textbook Chapters 1 through 5 and lecture notes</li></ul> Reminder: Most students learned fundamental statistics in SOC 005 (prerequisite).<br><br>Lab Exercise #1 (April 5): Group project and introduction to STATA<br>No Homework |
| <b>Week Two: Bivariate Analysis</b>   |
| April 9: Scatterplots, Regression Lines, Estimating a Linear Regression & in-class exercise 2<br>* Relevant reading: textbook Chapter 6 and lecture notes<br>April 11: Guest lecture by Phoenicia Fares: Tips on Group Project & in-class exercise 3<br><br>Lab Exercise #2 (April 12): Group project: finalize group members and project topic<br>No Homework  |
| <b>Week Three: Bivariate Analysis cont'd</b>  |
| April 16: No class but students should have a group meeting<br>April 18: R-square, Correlation, Significance Tests for Regression Parameters & in-class exercise 4<br>* Relevant reading: textbook Chapter 6 and lecture notes<br><br>Lab Exercise #3 (April 19): Group project: research question, hypothesis, and data<br>Homework #1 due on April 21 (Sunday)  |
| <b>Week Four: The Logic of Multivariate Analysis</b>  |
| April 23: Review HW1 & Introduction to Multivariate Relationships, Association and Causality<br>April 25: Types of Multivariate Relationships, Control for the Third Variable, Partial correlation & in-class exercise 5<br>* Relevant reading: textbook Chapter 7 and lecture notes<br><br>Lab Exercise #4 (April 26): Descriptive statistics<br>Homework #2 due on April 28 (Sunday)  |
| <b>Week Five: Multiple Regression Analysis</b>  |
| April 30: Review HW2 & Multiple Regression Model<br>May 2: Multiple regression model, standardized coefficient, R-squared<br>* Relevant reading: Chapter 8 and lecture notes<br><br>Lab Exercise #5 (May 3): Bivariate analysis (correlation, t-test, ANOVA, Chi-square test)<br>Group project assignment 1 due on May 5 (Sunday)   |

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| <p><b>Week Six: Multiple Regression Analysis cont'd</b></p> <p>May 7: Significance tests for parameters &amp; in-class exercise 7<br/> * Relevant reading: textbook Chapter 8 and lecture notes<br/> May 9: Review Exam 1 (Chapters 6 &amp; 7)</p> <p>Lab Exercise #6 (May 10): Bivariate analysis (correlation, t-test, ANOVA, Chi-square test)</p>   |
| <p><b>Week Seven: EXAM 1 and Multiple Regression Analysis cont'd</b></p> <p>May 14: MIDTERM EXAM<br/> May 16: Regression Modeling with Dummy Variables for categories, comparing nested models &amp; in-class exercise 8<br/> * Relevant reading: textbook Chapter 9 and lecture notes</p> <p>Lab Exercise #7 (May 17): Multivariate analysis (OLS and logistic regression)<br/> Group project assignment 2 due on May 19 (Sunday)<br/> Homework #3 due on May 20 (Monday)</p>   |
| <p><b>Week Eight: Logistic Regression</b></p> <p>May 21: Review Homework #3 &amp; Introduction to logistic regression, logged odds, estimation of logistic regression &amp; in-class exercise 9<br/> May 23: Logistic regression with a single predictor &amp; in-class exercise 9<br/> * Relevant reading: Chapter 9 and lecture notes</p> <p>Lab Exercise #8 (May 24): Multivariate analysis (OLS and logistic regression)</p>   |
| <p><b>Week Nine: Logistic Regression &amp; Review for EXAM 2</b></p> <p>May 28: Logistic regression with multiple predictors, Inferential statistics for logistic regression models &amp; in-class exercise 10<br/> May 30: Review HW4 &amp; Review for Exam 2 (Chapters 8 &amp; 9)<br/> * Relevant reading: Chapter 9 and lecture notes</p> <p>Lab Exercise #9 (May 31): Finalize the group project paper and presentation<br/> Homework #4 due on May 29 (Wednesday)<br/> Final group project paper due on June 2 (Sunday)</p> |
| <p><b>Week Ten: Group Presentations &amp; EXAM 2</b></p> <p>June 4: Group presentations<br/> June 6: Group presentations</p> <p>June 10 (8:00am–11:00 am): EXAM 2 (Chapters 8 &amp; 9)<br/> No Lab; extended TA office hours instead</p>   |