### Intermediate Statistics

Sociology 3100, Fall 2019

Section 11, Class #93851

Mon. and Wed., 10:00am to 10:50am, King Hall B3007

Fri. Online

This syllabus is subject to change during the semester.

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## Course Overview

Sociology 3100 is the second course in the core statistics program for undergraduate sociology students. In general, statistics is the science of collecting, analyzing, interpreting, and presenting data. In this course, you will learn the discipline of inferential statistics; collecting a sample of data from the social world, making inferences about that world from the sample data, and, using a theoretical perspective to explain why the social world appears as it does.

## Student Learning Outcomes

After successfully completing this course you will be able to:

* Use the R programming language to do basic data analysis to create, clean, and analyze social science datasets.
* Describe the concept and process of modeling populations using sample statistical analyses using the R programming language.
* Explain the concepts of variance and residual variance.
* Perform basic descriptive and inferential statistical analyses using the R language.
* Represent univariate and bivariate data using tabular and graphical tool in R.
* Describe the different levels of measurement and provide examples of each.
* Describe the General Linear Model and how it is used in statistical analysis.
* Describe the Central Limits Theorem and explain its relation to sampling and statistical inference.
* Describe and conduct the 5-step process for hypothesis testing.
* Describe the notion of proportional reduction of error and apply the concept to statistical reasoning and analysis
* Using the R language, perform Pearson correlation analysis and describe the results.
* Using the R language, perform bivariate and multivariate OLS regression analysis to determine non-spurious associations among multiple independent variables.
* Read and interpret quantitative statistical reports that use tabular or graphical visualization.
* Report the findings of statistical analyses and describe the results to a lay audience, while utilizing various data visualization techniques such as cluster bar charts.

#### Required Text

*Introduction to Statistics: A Modeling Approach*, Version 1.5 - July 2019. This is an online interactive book written by Professor Son at CSULA and Professor Stigler at UCLA.

This interactive textbook is integrated into the course Canvas page. It includes all text, reading questions, R-language programming exercises, quizzes and homework assignments.

## Course Components

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| **Component** | **Description** | **Percent of Grade** |
| Homework Assignments | There are eleven online homework assignments. Read each chapter and answer all chapter questions and coding exercises. | 15 |
| Attendance and  Participation | Attendance is taken for each classroom session. It is expected that you will complete homework assignments by 11:59pm each Friday. | 10 |
| In-class exams | There will be five cumulative exams. | 45 |
| Final Exam | The final exam will be cumulative of the entire course. | 30 |

## Attendance and Participation (10% of your grade)

Statistics is a highly incremental science. That is, as you progress through the class, your understanding of prior material affects your understanding of new material. If you fail to attend class and work through the textbook exercises, you will find that you may become more and more lost as the semester progresses. Therefore, I will take attendance most class periods at the beginning of class. There are no excused absences for attendance: You are either present or not present.

## Homework Assignments (30% of your grade)

All homework assignments are to be completed online through Canvas. They are due by 11:59pm on the day indicated in the schedule below. You should expect the homework to take a total of about six to eight hours per week.

For each Module, read each page carefully, do all of the embedded R exercises, answer all of the embedded questions, and answer the practice quiz questions at the end of each chapter.

Homework will be graded for completion, not correctness. However, you will not get credit for gibberish responses that make no sense. Homework questions are designed to help you learn, and for you to check your understanding as you go.

As you work through the homework, use a dedicated notebook to write down the R code for each topic/function . You will be able to use this notebook for in-class exams. If you have questions or problems with homework, please be sure to write down those questions and things you don’t understand. Bring these questions to class or office hours, or send me an email.

It is best if you complete the homework reading and assignments before coming to class. That way, lecture and demonstration in class will make more sense.

**IMPORTANT NOTE:** The only way to learn statistics or to understand social science research is by doing the assigned online modules. You cannot learn statistics passively by reading or listening to lectures.

## In-class Exams (45% of your grade)

There will be five exams cumulative exams for a total of 45% of your grade. The exam questions will be online and must completed using the classroom computer. The questions will be very similar to end of Module/chapter practice quizzes. Therefore, it is critical that you complete the practice quizzes prior to each exam.

You will have 50 minutes to complete each exam. You will receive a zero on the exam unless you provide acceptable documentation of the necessity to miss the exam (legal or medical documentation is required). If I accept your documented excuse, you must schedule a make-up exam within one week of the scheduled exam. If you know you will be absent for a given exam, please notify me well in advance so that we can make alternate arrangements.

## Final Exam (30% of your grade)

The final exam will consist of a comprehensive social science statistical research problem. Using R, you will analyze and report descriptive statistics, present a graphical representation of the data, and use various R functions that you learned during the semester. You may use your notebook for the final exam.

**Grading**

Plus-minus grading will be used in this course. All grades are final. I will review final grades for calculation errors and adjust your grade if I made a calculation error. The weighted grade distribution will be as follows:

>= 93% A 90-92.9% A-

87-89.9% B+ 83-86.9% B 80-82.9% B-

77-79.9% C+ 73-76.9% C 70-72.9% C-

67-69.9% D+ 63-66.9% D 60-62.9% D-

<60% F

## Classroom Protocol

Please be respectful of your professor and other students. Text messaging or internet surfing during class is prohibited. Turn off your cell phone prior to class. You may use your laptop computer or tablet to review PowerPoint slides as applicable.

## Reasonable Accommodations

Reasonable accommodations will be provided to any student who is registered with the Office of Students with Disabilities and requests needed accommodation.

## Academic Honesty

The CSULA Honor Code will be in effect through all papers and exams. Please read carefully the provisions of the Honor Code (<http://www.calstatela.edu/usu/csdp/StudentRights15.html>), make certain that you understand and adhere to them, and ask me to clarify any questions you have regarding the Code. Any violation of the Code (such as plagiarism or cheating) will result in an “F” grade on the assignment and possibly in the course.

**Class Schedule – SOC3100: Revision A**

*This schedule is not a contract.   
It is subject to change during the semester depending on class progress.*

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| **Date** | **Topic** | **Assignments Due by 11:59pm** |
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| **Week 1** | | |
| Wed  8/21 | * Course Overview * Module 1: Introduction to Statistics: A Modeling Approach |  |
| Fri  8/23 | online | * Complete the Student Survey (required) |
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| **Week 2** | | |
| Mon  8/26 | Module 1: Fundamentals of the R programming language | * Finish Chapter 1. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 1 Practice Quiz. |
| Wed  8/28 | Module 2: Understanding Data  Sections 2.1 through 2.3 |  |
| Fri  8/30 | online | * Work on Chapter 2, sections 2.1 through 2.3. * Answer the in-line questions. * Complete the R programming exercises. |
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| **Week 3** | | |
| Mon  9/2 | ***NO CLASS*** |  |
| Wed  9/4 | Module 2: Understanding Data  2.4 through 2.9 | * Work on Chapter 2, sections 2.4 through 2.9. * Answer the in-line questions. * Complete the R programming exercises. |
| Fri  9/6 | online | * Finish Chapter 2. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 1 Practice Quiz. |
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| **Week 4** | | |
| Mon  9/9 | Module 3:  3.x through-3.x: | * Work on Chapter 3, sections 3.x through 3.x. * Answer the in-line questions. * Complete the R programming exercises. |
| Wed  9/11 | Module 3:  3.x through-3.x: | * Work on Chapter 3, sections 3.x through 3.x. * Answer the in-line questions.   Complete the R programming exercises. |
| Fri  9/13 | online | * Finish Chapter 3. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 1 Practice Quiz. |
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| **Week 5** | | |
| Mon  9/16 | Module 4:  4.x through 4.x | * Work on Chapter 4, sections 4.x through 4.x. * Answer the in-line questions. * Complete the R programming exercises. |
| Wed  9/18 | Module 4:  4.x through 4.x | * Work on Chapter 4, sections 4.x through 4.x. * Answer the in-line questions. * Complete the R programming exercises. |
| Fri  9/20 | online | * Finish Chapter 4. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 4 Practice Quiz. |
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| **Week 6** | | |
| Mon  9/23 | **In-class Exam** on Modules 1 through 4 |  |
| Wed  9/25 | Module 5:  5.x through 5.x |  |
| Fri  9/27 | online | * Work on Chapter 5, sections 5.x through 5.x. * Answer in-line questions. * Complete R programming exercises. |
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| **Week 7** | | |
| Mon  9/30 | Module 5:  4.x through 4.x | * Finish Chapter 5. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 5 Practice Quiz. |
| Wed  10/2 | Module 6:  6.x through 6.x |  |
| Fri  10/4 | online | * Work on Chapter 6, sections 6.x through 6.x. * Answer in-line questions. * Complete R programming exercises. |
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| **Week 8** | | |
| Mon  10/7 | Module 6:  6.x through 6.x | * Finish Chapter 6. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 6 Practice Quiz. |
| Wed  10/9 | Module 7:  7.x through 7.x |  |
| Fri  10/11 | online | * Work on Chapter 7, sections 7.x through 7.x. * Answer in-line questions. * Complete R programming exercises. |
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| **Week 9** | | |
| Mon  10/14 | **In-class Quiz** on Modules 1 through 6 |  |
| Wed  10/16 | Module 7:  7.x through 7.x | * Work on Chapter 7, sections 7.x through 7.x. * Answer in-line questions. * Complete R programming exercises. |
| Fri  10/18 | online | * Finish Chapter 7. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 7 Practice Quiz. |
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| **Week 10** | | |
| Mon  10/21 | Module 8:  8.x through 8.x | * Work on Chapter 8, sections 8.x through 8.x. * Answer in-line questions. * Complete R programming exercises. |
| Wed  10/23 | Module 8:  8.x through 8.x | * Work on Chapter 8, sections 8.x through 8.x. * Answer in-line questions. * Complete R programming exercises. |
| Fri  10/25 | online | * Finish Chapter 8. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 8 Practice Quiz. |
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| **Week 11** | | |
| Mon  10/28 | **In-class Quiz** on Modules 1 through 8 |  |
| Wed  10/30 | Module 9:  9.x through 9.x |  |
| Fri  11/1 | online | * Work on Chapter 9, sections 9.x through 9.x. * Answer in-line questions. * Complete R programming exercises. |
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| **Week 12** | | |
| Mon  11/4 | Module 9:  9.x through 9.x | * Finish Chapter 9. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 9 Practice Quiz. |
| Wed  11/6 | Module 10:  10.x through 10.x |  |
| Fri  11/8 | online | * Work on Chapter 10, sections 10.x through 10.x. * Answer in-line questions. * Complete R programming exercises. |
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| **Week 13** | | |
| Mon  11/11 | ***NO CLASS*** |  |
| Wed  11/13 | Module10:  10.x through 10.x |  |
| 11/15 | online | * Finish Chapter 10. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 10 Practice Quiz. |
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| **Week 14** | | |
| Mon  11/18 | **In-class Quiz** on Modules 1 through 10 |  |
| Wed  11/20 | Module11:  11.x through 11.x |  |
| Fri  11/22 | online | * Work on Chapter 11, sections 11.x through 11.x. * Answer in-line questions. * Complete R programming exercises. |
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| **Week 15** | | |
| Mon  11/25 | ***NO CLASS*** |  |
| Wed  11/27 | ***NO CLASS*** |  |
| Fri  11/29 | ***NO CLASS*** |  |
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| **Week 16** | | |
| Mon  12/2 | Module 11:  11.x through 11.x | * Finish Chapter 11. Answer in-line questions. * Complete all R programming exercises. * Complete Chapter 11 Practice Quiz. |
| Wed  12/4 | Module 12:  12.x through 12.x |  |
| Fri  12/6 |  | * Finish Chapter 12. Answer in-line questions. * Complete all R programming exercises.   Complete Chapter 12 Practice Quiz. |
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| **Week 17** | | |
| Mon  12/9 | **In-class Quiz** on Modules 1 through 11 |  |

**FINAL EXAM:**