Course and Contact Information

Instructor(s): Emily Willroth, PhD, she/her (please call me Dr. Willroth)
Office Location: http://sjsu.instructure.com
Email: emily.willroth@sjsu.edu
Office Hours: Tuesdays 11:45-12:45 or by appointment
Class Days/Time: Tuesdays 10:30-11:45 (optional)
               Thursdays 10:30-11:45 (required)
Classroom: http://sjsu.instructure.com

Course Description

This course will prepare you to select, use, interpret, and communicate the results of statistical analysis in social science research. These skills will allow you to develop a better understanding of social science research and prepare you to begin contributing to the production of social science research in a variety of settings. Topics we will cover include: data analysis in R, fundamental principles of statistical inference, hypothesis testing, descriptive statistics, analysis of categorical and continuous variables.

From the catalog: Statistical analysis at the intermediate level; chi-square, analysis of variance, correlation and regression, and topics in experimental design; use of microcomputers for statistical calculations.

Course Format

This course adopts a “flipped classroom” delivery format. This means some activities typically done in class (e.g., listening to lectures) will take place outside of scheduled class meetings and some activities typically completed on your own time (e.g., working on assignments) will take place during scheduled class meetings. With the exception of exam weeks, each week will follow this schedule:

**Saturdays:** The weekly module will become available on Canvas. You can begin watching the weekly lecture videos and working on the optional and required exercises. You should complete all required readings and watch all required lecture videos prior to coming to class each week.

**Tuesdays 10:30-11:45:** During optional Tuesday class meetings, students will be assigned to small groups to work on assignments together in break out rooms. If you choose not to attend these Tuesday class meetings, you should complete assignments on your own time outside of class.

**Tuesdays 11:45-12:45:** I will host virtual office hours, which you can attend if you have questions about course content, assignments, exams, or if there is anything else you would like to discuss (e.g., personal circumstances, career goals, time management, feedback for me). When you arrive, you will first enter a waiting room. Once I am finished meeting with the previous student, I will admit you into the main room.

**Thursdays 10:30-11:45:** During scheduled Thursday class meetings, we will review key concepts, ask and answer questions, and complete activities designed to reinforce learning objectives.

**Sundays:** Weekly required exercises are due on Canvas by midnight.
**Required Materials**

**Internet Access**
Because this class will be delivered entirely online, reliable internet access is needed to watch video lectures, attend class, and complete assignments. If you do not have reliable internet access, please let me know ASAP.

**Canvas, E-mail, and Zoom**
All graded assignments will be accepted in electronic form using the Canvas learning management system. Communication regarding the course will be sent via the e-mail address linked to your MySJSU account or posted to Canvas. Scheduled class sessions will take place using Zoom.

**Software**
We will primarily use R and RStudio statistical software. Instructions for downloading and installing R and R studio can be found in textbook chapter 3.1 “Installing R.” R is a programming language and free software environment for statistical computing and graphics. R is widely used for data analysis in the field of psychology, in both academic and industry settings.

**Textbook**
The textbook for this course is open source and freely available online in accessible pdf and bookdown formats.
PDF: [https://learningstatisticswithr.com/lsr-0.6.pdf](https://learningstatisticswithr.com/lsr-0.6.pdf)

**MYSJSU Messaging**
Course materials such as syllabus, lecture videos, assignment instructions, etc. can be found on Canvas Learning Management System course login website at http://sjsu.instructure.com. You are responsible for regularly checking with the messaging system through MYSJSU on Spartan App Portal to learn of any updates. For help with using Canvas see [Canvas Student Resources page](https://learningstatisticswithr.com/book/).

**Course Goals**
The goals of this course are to: build a solid conceptual understanding of how statistics are used in social science research, develop the practical skills necessary to apply statistics to data, and interpret the statistical results reported in others’ research.

**Course Learning Outcomes (CLO)**
Upon successful completion of this course, students will be able to:
1. Define statistical procedures, including those associated with: descriptive statistics, chi-square, t-tests, ANOVA, and regression.
2. Describe which statistical procedures are appropriate for a given research situation.
3. Discuss the underlying requirements and assumptions of statistical procedures.
Ungraded Assignments

- Weekly Class Prep
  - To prepare for class each week, you should complete the weekly readings and watch the weekly lecture videos before coming to class. Each video lecture will cover a single topic or idea and will be 2-15 minutes in length. Because of this modular approach, you may be assigned multiple video lectures to complete before each scheduled class meeting, but they will not exceed 75 minutes total per week.

- Weekly Optional Exercises
  - Each week, an additional set of optional exercises will be provided in case you would like extra opportunities to practice applying course concepts.

Graded Assignments

- Eleven Weekly Exercises (30% of final grade, 3 points per weekly exercise)
  - Each week you will complete a set of required exercises that will assess that week’s learning objectives. These exercises will be a combination of exercises in R, multiple choice questions, and short essays. The grading rubric for these weekly exercises is available on Canvas. There are 11 weekly exercises worth 3 points each, for a total of 33 possible points. These weekly exercises are worth 30 points total, meaning that you can miss up to three points on these weekly exercises across the semester and still receive full credit.

- Three Exams (45% of final grade, 15 points per exam)
  - Each exam will be two parts: a timed in-class portion and a take-home portion. The timed in-class portion will be a combination of multiple-choice questions and exercises in R. The take-home portion will consist of two short essay questions (i.e., 5-7 sentences each). Each exam is worth 15 points. An exam curve applied to the whole class may be considered in exceptional circumstances.

- Final Project (25% of final grade)
  - The final project is designed to be the most practical application of the concepts you learn in this course. You will choose one of three final project assignments: the consumer assignment, the producer assignment, or the contributor assignment. Additional details, example assignments, and rubrics will be provided on Canvas. Brief descriptions of each option are provided below.

  - **Consumer option:** Demonstrate your ability to apply course concepts as a consumer of scientific research. Choose two peer-reviewed scientific articles that used one or more of the statistical tests that we learned about in class. Summarize the statistical approach that was used and why, the key findings, and evaluate several aspects of the research design and analysis plan (e.g., reliability and validity, statistical power, appropriateness of conclusions).

  - **Producer option:** Demonstrate your ability to apply course concepts as a producer of scientific research. Complete a pre-registration for a hypothetical research study. The pre-registration will be a detailed plan of what type of data you would collect, how you would collect it, and what types of descriptive and inferential statistics you would use to test your research question.

  - **Contributor option:** Demonstrate your ability to apply course concepts as a contributor to scientific research (e.g., a statistical consultant). For the contributor option, you will team up with another classmate. Each partner will come up with a
research question and an initial data collection plan that is lacking in detail. Then, you will take terms serving as the “statistical consultant” for your partner. The final project will consist of (1) a discussion board conversation in which you and your partner discuss the research question and data collection strategy and (2) a formal written analysis plan that you present to your partner for how to collect and analyze their data.

**Final Examination or Evaluation**

In lieu of a final exam, you will complete the final project described above, due on the same day that the final exam would typically take place.

**Grading Information**

Grades will be available to you on Canvas throughout the semester. Grades are assigned based on your final point total out of 100 points for the course:

- A+ > 96.5 points
- A 91.6 to 96.5 points
- A- 89.6 to 91.5 points
- B+ 86.6 to 89.5 points
- B 81.6 to 86.5 points
- B- 79.6 to 81.5 points
- C+ 76.6 to 79.5 points
- C 71.6 to 76.5 points
- C- 69.6 to 71.5 points
- D+ 66.6 to 69.5 points
- D 61.6 to 66.5 points
- D- 59.5 to 61.5 points
- F < 59.5 points

The point totals reflect rounding up to the nearest percentage. For example, an A- would normally require 90.0 points (or 90% of 100 points). With rounding, it only requires 89.6 points (or 89.6% of 100 points). Because rounding is built in to the grading scale, your grade will be based on your final point total, rounded to the nearest whole point (so, 89.56 points is an A-, but 89.54 points is a B+).

**Classroom Protocol**

The scheduled class meetings will work best if the majority of students have their cameras turned on. However, I respect that some students may have concerns about internet quality, privacy, or comfort, and prefer to leave their cameras off most or all of the time. If you choose to leave both your microphone and camera off, please use the chat function to introduce yourself and ask and answer questions.

Respectful behavior and active class engagement is an expectation. This includes the usual: come prepared to class, arrive on time, silence your electronics, be respectful to everyone in the room, and speak up when you are confused, have questions, or need help. Disrespectful or disruptive behavior is a violation of the Student Code of Conduct. Such behavior may result in being asked to leave the class and/or referrals to the Office of Student Conduct and Ethical Development.
University Policies

Per University Policy S16-9 (http://www.sjsu.edu/senate/docs/S16-9.pdf), university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/. Make sure to visit this page, review and be familiar with these university policies and resources. You must obtain the instructor’s permission to make any audio or video recordings in this class. Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities.

Academic Integrity
All assignments may be completed with the help of classmates, with the exception of the timed, in-class portion of exams. However, you should make a unique intellectual contribution to any assignments completed as part of a team. This will prepare you for the exams and will ensure that you leave this class with the confidence and practical skills necessary to continue your statistical education and practice. The in-class, timed portion of exams must be completed without help from others. However, any non-human resources (e.g., course materials, the Internet, etc.) may be referenced. You can expect me to follow all University policies and protocols regarding the handling of suspected academic dishonesty.

Diversity and Inclusion
Consistent with the mission of San José State University, I welcome persons of differing backgrounds and experiences including, but not limited to, age, disability and health status, ethnicity and race, family structure, geographic region, language, religious/spiritual and secular beliefs, resident status, sex, sexual orientation, gender identity/expression, and socioeconomic status. It is my goal to foster an environment in which diversity is recognized and embraced, and every person is treated with dignity, respect, and justice. I hope that your academic experience in this course and at San José State University will provide the opportunity to gain knowledge and experiences necessary to thrive in a diverse, global environment.

Course Schedule
The course schedule is tentative and subject to change; modifications will be posted to Canvas. Depending on the pace of the course, some subsections may be omitted from each chapter. When this happens, the required subsections will be communicated via Canvas in the weekly module. Weekly readings and lecture videos are intended to be completed prior to coming to class on the listed dates. All assignments are due by midnight on the date listed.

<table>
<thead>
<tr>
<th>Week</th>
<th>Optional Class Meeting</th>
<th>Required Class Meeting</th>
<th>Topic</th>
<th>Reading</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>0</td>
<td></td>
<td>TH Jan 28</td>
<td>Class Overview</td>
<td>Download and Install R and R Studio (Ch 3.1)</td>
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<tr>
<td>1</td>
<td>T Feb 2</td>
<td>TH Feb 4</td>
<td>Introduction to Statistics and Research Design</td>
<td>Ch 1 and 2</td>
<td>Required Exercise 1 Due 2/7</td>
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<tr>
<td>2</td>
<td>T Feb 9</td>
<td>TH Feb 11</td>
<td>Introduction to R and Statistical Programming</td>
<td>Ch 3 and 4</td>
<td>Required Exercise 2 Due 2/14</td>
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<td>Section and Topic</td>
<td>Chapter(s)</td>
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<td>3</td>
<td>Feb 16</td>
<td>Feb 18</td>
<td>Descriptive Statistics and Visualizing Data</td>
<td>Ch 5 and 6</td>
<td>Due 2/21</td>
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<td>Feb 23</td>
<td>Feb 25</td>
<td>Exam Week</td>
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<td>Exam 1 in class 2/25, take-home portion due 2/28</td>
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<td>March 4</td>
<td>Probability</td>
<td>Ch 9</td>
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<td>Estimation</td>
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<td>March 18</td>
<td>Hypothesis Testing</td>
<td>Ch 11</td>
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<td>March 25</td>
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<td>Exam 2 in class 3/25, take-home portion due 3/28</td>
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<td>SPRING BREAK</td>
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<td>9</td>
<td>Apr 6</td>
<td>Apr 8</td>
<td>Chi square</td>
<td>Ch 12</td>
<td>Required Exercise 7 Due 4/11</td>
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<td>Apr 13</td>
<td>Apr 15</td>
<td>t-tests</td>
<td>Ch 13</td>
<td>Required Exercise 8 Due 4/18</td>
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<td>Apr 20</td>
<td>Apr 22</td>
<td>ANOVA</td>
<td>Ch 14</td>
<td>Required Exercise 9 Due 4/25</td>
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<td>Apr 27</td>
<td>Apr 29</td>
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<td>Exam 3 in class 4/29, take-home portion due 5/2</td>
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<td>May 6</td>
<td>Linear Regression</td>
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<td>May 13</td>
<td>Factorial ANOVA</td>
<td>Ch 16</td>
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<td>N/A</td>
<td>Final Project</td>
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<td>Final Project due 5/25</td>
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Intermediate Statistics, STATS 115, Spring, 2021
Reviewed and approved in December, 2019.