San José State University
Department of Psychology
PSYC120, Advanced Research Methods and Design
Sections 40, 41, 42 Spring 2022

Course and Contact Information

Instructor: Ryan Lundell-Creagh
Office Location: DMH232
Email: ryan.lundell-creagh@sjsu.edu; ryanlundellcreagh@berkeley.edu
Office Hours: in person: M/W 2:15-3:00pm; 4:15-4:30pm, online: by appointment
Class Days/Time, Location: Lecture: M/W 3:00-4:15pm, HGH116
Lab: M 4:30-6:30pm, DMH236 (section 41) OR
W 4:30-6:30pm, DMH236 (section 42)
Prerequisites: PSYC1, STAT95, PSYC100W

Course Description

From the course catalogue: Descriptive, correlational, quasi-experimental, and experimental approaches: design, methodology, and analysis. Experience designing, conducting, analyzing, and presenting research findings. Topics will include: hypothesis testing, validity, reliability, scales of measurement, questionnaire development, power, statistical significance, and effect size

This course provides an overview of experimental design and research in psychology. The course is split into three units. In the first unit we will focus on the fundamentals of research, covering topics such as formulating research questions, conducting literature reviews, and ethical considerations in research. The next unit focuses on research design, where we will learn about the different types of research that can be conducted, and how to select the best one to use. For the last unit of the course, we will delve deeper into the world of statistics, and take a closer look at what some of the most common statistical analyses run in psychology do, covering topics such as model selection, graphing, power, and effect size. Throughout the course, we will learn how to conduct these analyses in the R programming language.

The goal of this course is to provide students with a strong understanding of research methods and designs in psychology, and for them to be able to conduct their own research effectively, as well as critically evaluate the research being conducted by others. The course culminates with a final project, where students will work in groups to design a research study from scratch, including all data collection and analyses, and a final write-up in APA format.

Course Format

This course will be administered online until Feb 14th, and then switch to in person. Per California Public Health guidelines, both students and instructors will be required to wear masks in the classroom. Students will be advised if this policy changes throughout the semester.
Course Learning Outcomes (CLO)

CLO1: Conduct appropriate literature reviews and identify previously conducted research which is relevant to a particular psychological question (Course Unit: 1)

CLO2: Identify a research question and select the appropriate research design for testing this question (Course Unit: 1)

CLO3: Critically evaluate and critique various research designs, identifying strengths and limitations and suggesting improvements (Course Unit: 2)

CLO4: Identify and conduct appropriate statistical analyses for various research questions (Course Unit: 3)

CLO5: Conduct a study which tests a psychological question from start to finish, including write-up in APA format, and presentation of results (Course Units: 1, 2, 3)

Program Learning Outcomes (PLO)

1. Knowledge Base of Psychology
   Students will be able to demonstrate familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology.

2. Research Methods in Psychology
   Students will be able to design, implement, and communicate basic research methods in psychology, including research design, data analysis, and interpretations.

3. Critical Thinking Skills
   Students will be able to use critical and creative thinking, skeptical inquiry, and a scientific approach to address issues related to behavior and mental processes.

4. Applications of Psychology
   Students will be able to apply psychological principles to individual, interpersonal, group, and societal issues.

5. Values in Psychology
   Students will value empirical evidence, tolerate ambiguity, act ethically, and recognize their role and responsibility as a member of society.

Recommended Texts/Readings

Textbook


Note: this textbook is NOT required for the course but is recommended for those who learn well by reading and want some additional examples. All relevant parts of the textbook will be covered in the lecture notes.

Other Readings

Additional reading may be assigned as extra practice material, particularly in the section of the course on statistics. PDFs of these readings will be provided when this occurs.

Other technology requirements / equipment / material

Students will be required to conduct lab assignments using the R open-source programming software. It is strongly recommended to have access to a personal computer, with both R and R studio installed on it.
If you do not have access to your own personal computer, it is possible to borrow one from the IT department. Follow this link to learn more: https://www.sjsu.edu/learnanywhere/equipment/index.php

**Course Requirements and Assignments**

**Three Unit Tests (20%) (CLO1,2,3)**
- There will be a unit test after each unit. Each test is worth 10% of your grade. Your lowest of these three tests will not be counted. Test 3 is OPTIONAL!

**Final Paper (30%) (CLO5)**
- Throughout the lab component of this course, you will work with a group to design and conduct a research study from scratch. You will write up the results in APA format and turn them in as your final paper.

**Course Labs (20%) (CLO4)**
- There will be 10 labs worth 2% each. These labs are designed to teach you how to program in R

**Code Debugging Assignment (10%) (CLO4)**
- You will be provided with some lines of code that intentionally have errors and asked to fix the errors to make the code run. More details during the semester.

**Programming Final Exam (20%) (CLO4)**
- This course does not have a formal final exam. The final is replaced by a take home programming assignment (essentially Lab 11) which tests the programming knowledge that you have gained throughout the semester.

**Late Assignment Policy**

Late assignments will be penalized 10% per day late. Late labs will not be accepted after the answer key for that lab has been posted.

**Final Examination Time**

This course does not have a formal final exam. The take home programming final will be assigned on the last day of classes and is due ten days later.

**Grading Information**

Your final course grade will be rounded to the nearest whole number (ex: 89.5 rounds to 90, 89.49 rounds to 89) This course is graded using the following inclusive cut-offs:

A+: 97 and above
A: 93-96
A-: 90-92
B+: 87-89
B: 83-86
B-: 80-82
C+: 77-79
C: 73-76
C-: 70-72
D+: 67-68
D: 63-66
D-: 60-62
F: below 60
University Policies

Per University Policy S16-9, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (https://www.sjsu.edu/curriculum/courses/syllabus-info.php). Make sure to visit this page to review and be aware of these university policies and resources.

(COURSE SCHEDULE ON NEXT PAGE. This schedule may be subjected to change throughout the semester)
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Topic</th>
<th>Textbook Chapter</th>
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<tbody>
<tr>
<td>1</td>
<td>01/26</td>
<td>UNIT 1 (U1): Syllabus overview + What is research?</td>
<td>Chapter 1</td>
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<tr>
<td>2</td>
<td>01/31</td>
<td>U1: Selecting a research question, journal articles</td>
<td>Chapter 2</td>
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<tr>
<td></td>
<td>02/02</td>
<td>U1: Research ethics</td>
<td>Chapter 3</td>
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<tr>
<td>3</td>
<td>02/07</td>
<td>U1: Operational definitions</td>
<td>Chapter 4</td>
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<td></td>
<td>02/09</td>
<td>U1: Reliability and Validity</td>
<td>Chapter 5</td>
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<tr>
<td>4</td>
<td>02/14</td>
<td>Unit 1 Review</td>
<td>NA</td>
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<td></td>
<td>02/16</td>
<td>CODING DAY 1 (Labs 1,2,3)</td>
<td>NA</td>
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<tr>
<td>5</td>
<td>02/21</td>
<td>UNIT 1 EXAM</td>
<td>NA</td>
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<tr>
<td></td>
<td>02/23</td>
<td>UNIT 2: Observational Research + Special Designs</td>
<td>Chapter 6 + 11</td>
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<td>6</td>
<td>02/28</td>
<td>U2: Survey Research</td>
<td>Chapter 7</td>
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<td></td>
<td>03/02</td>
<td>U2: Designing an Experiment</td>
<td>Chapter 8</td>
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<tr>
<td>7</td>
<td>03/07</td>
<td>U2: Conducting an Experiment</td>
<td>Chapter 9</td>
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<tr>
<td></td>
<td>03/09</td>
<td>U2: Complex Experiments</td>
<td>Chapter 10</td>
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<tr>
<td>8</td>
<td>03/14</td>
<td>U3: Data Visualization*</td>
<td>NA</td>
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<td></td>
<td>03/16</td>
<td>Unit 2 Review</td>
<td>NA</td>
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<td>9</td>
<td>03/21</td>
<td>UNIT 2 EXAM</td>
<td>NA</td>
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<tr>
<td></td>
<td>03/23</td>
<td>CODING DAY 2 (Labs 4,5,6)</td>
<td>NA</td>
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<tr>
<td>10</td>
<td>03/28</td>
<td>NO CLASS: SPRING BREAK</td>
<td>NA</td>
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<tr>
<td></td>
<td>03/30</td>
<td>NO CLASS: SPRING BREAK</td>
<td>NA</td>
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<tr>
<td>11</td>
<td>04/04</td>
<td>UNIT 3: Evaluating Scientific Evidence</td>
<td>Chapter 14</td>
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<td></td>
<td>04/06</td>
<td>U3: Descriptive Statistics</td>
<td>Chapter 12</td>
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<tr>
<td>12</td>
<td>04/11</td>
<td>U3: Null Hypothesis Significance Testing</td>
<td>Chapter 13</td>
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<tr>
<td></td>
<td>04/13</td>
<td>U3: Selecting a Model</td>
<td>NA</td>
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<tr>
<td>13</td>
<td>04/18</td>
<td>U3: T and F Tests</td>
<td>NA</td>
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<td></td>
<td>04/20</td>
<td>U3: Simple Regression</td>
<td>NA</td>
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<tr>
<td>14</td>
<td>04/25</td>
<td>U3: Multiple Regression</td>
<td>NA</td>
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<tr>
<td></td>
<td>04/27</td>
<td>U3: Moderation</td>
<td>NA</td>
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<tr>
<td>15</td>
<td>05/02</td>
<td>U3: Mediation</td>
<td>NA</td>
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<tr>
<td></td>
<td>05/04</td>
<td>U3: Logistic Regression</td>
<td>NA</td>
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<tr>
<td>16</td>
<td>05/09</td>
<td>Unit 3 Review</td>
<td>NA</td>
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<tr>
<td></td>
<td>05/11</td>
<td>UNIT 3 EXAM</td>
<td>NA</td>
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<tr>
<td>17</td>
<td>05/16</td>
<td>CODING DAY (Lab 7,8,9)</td>
<td>NA</td>
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</tbody>
</table>

*This unit 3 chapter is presented before the unit 2 exam in order to line up with its associated lab
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lab Topics</th>
<th>Assignment Due</th>
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<tbody>
<tr>
<td>1</td>
<td>01/26</td>
<td><strong>NO LAB</strong></td>
<td>NA</td>
</tr>
</tbody>
</table>
| 2    | 01/31  | **Groups:** Group Creation; Class dataset generation  
Lab 1: Intro to R | NA                              |
| 3    | 02/07  | **Groups:** Class survey; Project Idea; CITI Training  
Lab 2: First dataset and Indexing | Lab 1,  Lab 2                 |
| 4    | 02/14  | **Groups:** Project Introduction  
Lab 3: Scale Construction | Lab 2                           |
| 5    | 02/21  | **Groups:** Project Introduction  
Lab 4: Types of Variables and Relevelling | Lab 3                           |
| 6    | 02/28  | **Groups:** Project Proposal  
Lab 5: Data Cleaning | Project Introduction  
Lab 4                          |
| 7    | 03/07  | **Groups:** IRB submission; Meeting with Prof;  
Introduction to Qualtrics | Project Proposal  
Lab 5                           |
| 8    | 03/14  | **Groups:** Data collection  
Lab 6: Data Visualization | NA                              |
| 9    | 03/21  | **NO LAB:** **Groups:** Data collection | IRB Submission                  |
| 10   | 03/28  | **NO LAB: SPRING BREAK** | NA                              |
| 11   | 04/04  | **Groups:** Data collection | Lab 6                           |
| 12   | 04/11  | **Groups:** Data collection; Analysis Plan | NA                              |
| 13   | 04/18  | **Groups:** Data collection, Meeting with Prof  
Lab 7: T-tests and F-tests | Analysis Plan                  |
| 14   | 04/25  | **Groups:** Data Analysis  
Lab 8: Regression Models | Lab 7                           |
| 15   | 05/02  | **Groups:** Final Write-Up; Code Debugging  
Lab 9: Mediation and Moderation | Lab 8                           |
| 16   | 05/09  | **Groups:** Final Write-Up | Code Debugging                  |
| 17   | 05/16  | NO LAB: Programming exam opens  
NO LAB, **Lab 10:** Final Programming Review | Lab 9                           |
| 18   | 05/22  | **Lab 10 due (NOTE: This is a Sunday!)** | Lab 10                          |
|      | 05/24  | **Programming exam due (NOTE: This is a Tuesday!)** |                                 |

All assignments are due at the START of your lab session for that week.  
Lab 9 and your final paper write-up are both due on 05/18.