PSYC 520: Research Design and Inference I, Fall 2022
Syllabus

Lecture: Tuesdays, 4:00 pm to 5:20 pm, AH 3401
Lab: Thursdays, 4:00 pm to 5:20 pm, Engineering 1145
Instructor: Dr. Jonathan Pettibone  Email: jpettib@siue.edu  Phone: 650-3346
Office: AH 0127
Office Hours: TTH 2 to 3 pm, in person and virtual in Teams

T.A.: Madelyn Jenkins  Email: madjenk@siue.edu
Office: AH 0320
Office Hours: 4:30 to 5:30 W; 11 to Noon F

Required Textbook:

Required Statistical Software:
SPSS is available on lab computers and can be downloaded from https://www.siue.edu/its/labsclassrooms/vlab/spss.shtml

JAMOVI (Ver. 2.2.5) is available on lab computers and can be downloaded from https://www.jamovi.org/download.html

Recommended Textbook:

Useful Websites:
Purdue APA style Online Writing Lab: https://owl.english.purdue.edu/owl/section/2/10/
APA Style Blog: http://blog.apastyle.org/
UCLA’s SPSS FAQ: http://www.ats.ucla.edu/stat/SPSS/faq/default.htm

General Course Sequence Overview & Teaching Philosophy: Psychology is equal parts theory and practice, with both elements built upon a strong empirical philosophy. Before we implement a new therapy, develop a new program to reduce delinquency in young children, determine the best way to evaluate employees, or develop a new theory of cognitive functioning, we test it. If we do not do the actual research ourselves, we read about what others have done. No matter what type of psychology you will pursue, the understanding of this empirical basis will be of great use, as it is the core that lies at the heart of our discipline.

The intent of this sequence of courses is to teach you this empirical philosophy, and to give you the tools you need in order to explore human behavior. What this sequence is not intended to do is to force you to do all of the statistical procedures we will cover by hand, nor make you memorize a large amount of complex and befuddling formulas (insert big sigh of relief here!). There is never a moment in which, as a psychologist, you will not have access to a textbook containing instruction or a computer program to assist your calculations. Instead, I wish to focus on teaching theory and understanding of science and inferential statistics. Armed with this, you should be able to tackle most problems, and quickly learn those that are new to you.

Semester Breakdown: Empirical research in psychology has traditionally taken one of two forms: observational/correlational and experimental. Observational methods are those that seek to understand
behavior by observing the relationships between variables in their natural environment. Experimental methods are those that directly manipulate a feature of the environment or organism and measure the results in search of causality. Likewise, statistics have also traditionally been broken down by this division. Unfortunately, this approach often leads to an incomplete understanding of the interrelated nature of most of the statistical tests that we commonly use. They also lead to overspecialization, such that a clinical psychologist may only know multiple regression and a cognitive psychologist may only know experiments. Instead, we are going to try to teach a more integrated approach. Analysis of Variance based procedures are most often associated with an experimental approach, and regression/correlation procedures are associated with observational, despite the fact that they are based on the same underlying model (The GLM). In the first semester, we are going to focus on the most common statistical procedures for analyzing experimental designs- the z-test, t-tests, and the ANOVA family of tests. In the second semester, we will explore analyses for observational designs (correlation & multiple regression) and more advanced techniques in both families of tests (MANOVA, ANCOVA, Mediation, Moderation, ect.) With what time we have left, we will also try to explore more general topics such as factor analysis, the replication crisis and open science.

Lab/Lecture: Tuesday will be lecture based, covering the statistical and methodological concepts for the week’s topic. Thursday will be lab based, covering use of computer based statistical tools (SPSS & JAMOVI) and how to write up the results of your analyses. Lectures may bleed over into Lab sections from time to time, especially at the start of the semesters. Attendance is required at both sessions. Most standard techniques will be taught in SPSS, supplementing with JAMOVI when useful or necessary. We will do limited hand calculations, focused on teaching concepts rather than computations. The majority of our work will be in statistical analysis applications.

Learning Objectives:

1. Visualize and understand relationships in small n data sets.
2. Learn the strengths and weaknesses of different quantitative research designs.
3. Learn how to choose the appropriate descriptive and inferential statistics to analyze your data
4. Learn how to run (on a computer) the appropriate descriptive and inferential statistics to analyze your data
5. Learn how to interpret and draw conclusions from the results of your analyses.
6. Learn how to communicate your results in APA format results sections.
7. Develop the ability to critique the research produced by yourself and others.
8. Learn about open science and the growing replication movement in research psychology
10. Optional: Gain exposure to R code for statistics using JAMOVI. We won’t be writing R code directly, but teaching SPSS alone is becoming less and less sufficient for admission at the Ph.D. level of study and I would like to get you some exposure. JAMOVI is a good middle ground.
Grading

<table>
<thead>
<tr>
<th>Type</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Quizzes (10 @ 5 pts. each)</td>
<td>50</td>
</tr>
<tr>
<td>Exams (3 @ 50 pts. each)</td>
<td>150</td>
</tr>
<tr>
<td>Lab Homework (10 @ 10 pts. each)</td>
<td>100</td>
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<tr>
<td>Fake Data Project Proposal (5 pts.)</td>
<td>5</td>
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<tr>
<td>Fake Data Project (20 pts.)</td>
<td>20</td>
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<tr>
<td>Total</td>
<td>325</td>
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Your final grade will be determined on a percentage basis - >= 90% is an A, >= 80% is a B, less than 80% is a C or lower. Keep in mind that a C in graduate school will put you on probation. I do not round your final grade. You must make it to a whole number. There are lots of places across the semester where your grade gets rounded up- Rounding again at the end only compounds error. The best curve is your own effort.

**Quizzes:** Online, multiple choice quizzes will be made available for each week (Total of 11 quizzes are planned). Quizzes can be taken three times each but must be completed by Sunday of the week assigned. **Your score will be your average grade across all three attempts.** Your lowest quiz grade will count as EC (or will be dropped if the score is 0- thus, you can miss one quiz without penalty). These quizzes serve to focus you on the concepts we are covering each week. These must be taken independently. Any evidence of collaborative work will be considered academic misconduct for all parties involved.

**Exams:** All exams will be equally weighted and will cover material introduced since the prior exam. Exams will have two sections- a multiple choice section reviewing the material from the quizzes and an interpretative section focused on analyzing data using both descriptive and inferential statistics computed using SPSS & JAMOVI. The multiple-choice section will be completed in lab on Thursday and will be closed note/closed book.

The interpretative section will be completed online- you will have from 4 pm on the day of lab until 11:59 pm of the following Friday to complete the exam. Students will be given output from a selection of procedures based on research designs that were covered in lab. You will be expected to interpret it them and present the results in APA format. This section will be open note/open book but is expected to be an individual assignment. Any evidence of collaborative work will be considered academic misconduct for all parties involved, resulting in all parties failing the exam and being eligible for additional remediation.

**Lab Homework:** Homework will be assigned to go along with most lab sessions. It will focus on demonstrating that you can run the statistical procedures taught in lab independently, understand the results, and explain them to us. You will be expected to use APA format to present data and results. You will also be expected to work independently on these- they are not group projects. Sharing any verbatim work with other students, no matter what your intentions, will be considered academic misconduct.
**Fake Data Project:** Each student will propose a research project using a correlational research design utilizing multiple regression. This design needs to include one criterion variable and at least three continuous predictor variables. It should be based upon the topics you are covering in the classes for your program and could be considered to be a “warm up” for your thesis. Once approved, I will generate data for you that you will analyze independently and write up in a complete APA format paper (introduction, methods, results, discussion, tables/figures, references). We will do a second project focusing on experimental methods in the 2nd semester.
### Expected Schedule (Subject to Change)

<table>
<thead>
<tr>
<th>Week #</th>
<th>Lecture Date</th>
<th>Lab Date</th>
<th>Class Topic</th>
<th>Lab Topic</th>
<th>Reading</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/23</td>
<td>8/25</td>
<td>Intro, Basic Concepts, Orientation</td>
<td>Basic SPSS/More lecture</td>
<td>Ch. 1 &amp; 2</td>
<td>HW 1</td>
</tr>
<tr>
<td>2</td>
<td>8/30</td>
<td>9/1</td>
<td>Visualizing Data, Measures of Central Tendency, Variability, Skewness, and Kurtosis</td>
<td>Descriptive statistics</td>
<td>Ch. 3, 4, &amp; 5</td>
<td>HW 2 Quiz 1</td>
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<tr>
<td>3</td>
<td>9/6</td>
<td>9/8</td>
<td>Normal Distribution, Sampling Distributions, &amp; Hypothesis Testing (z-test)</td>
<td>Data Manipulation &amp; Cleaning</td>
<td>Ch. 6, 7, &amp; 8</td>
<td>HW 3 Quiz 2</td>
</tr>
<tr>
<td>4</td>
<td>9/13</td>
<td>9/15</td>
<td>Independent and Related Samples t-tests</td>
<td>t-tests</td>
<td>Ch. 13 &amp; 14</td>
<td>HW 4 Quiz 3</td>
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<tr>
<td>5</td>
<td>9/20</td>
<td>9/22</td>
<td>Effect size &amp; Statistical Power</td>
<td>More t-tests &amp; Power</td>
<td>Ch. 15</td>
<td>HW 5 Quiz 4</td>
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<tr>
<td>6</td>
<td>9/27</td>
<td>9/29</td>
<td>Review &amp; Exam #1</td>
<td>One-Way ANOVA</td>
<td>More Lecture One-Way ANOVA</td>
<td>Ch. 16 Quiz 5</td>
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<tr>
<td>7</td>
<td>10/4</td>
<td>10/6</td>
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<tr>
<td>8</td>
<td>10/11</td>
<td>10/13</td>
<td>One-Way ANOVA: Post Hoc and aPriori tests</td>
<td>More One-Way ANOVA</td>
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<td>HW 6 Quiz 6</td>
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<tr>
<td>9</td>
<td>10/18</td>
<td>10/20</td>
<td>One-Way Repeated Measures ANOVA</td>
<td>RM One-way ANOVA</td>
<td>Ch. 18</td>
<td>HW 7 Quiz 7</td>
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<td>10</td>
<td>10/25</td>
<td>10/27</td>
<td>More One-way ANOVA Time</td>
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<td></td>
<td>HW 8 Quiz 8 FDP Proposal Due: Oct 29th</td>
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<td>11</td>
<td>11/1</td>
<td>11/3</td>
<td>Review &amp; Exam #2</td>
<td></td>
<td>More Lecture</td>
<td>Ch. 19 Quiz 9</td>
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<td>12</td>
<td>11/8</td>
<td>11/10</td>
<td>Factorial ANOVA- Main Effects</td>
<td></td>
<td></td>
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<tr>
<td>13</td>
<td>11/15</td>
<td>11/17</td>
<td>Factorial ANOVA-Interactions</td>
<td></td>
<td>Factorial ANOVA</td>
<td>HW 9 Quiz 10 FDP data available</td>
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<tr>
<td>14</td>
<td>Week of 11/22</td>
<td></td>
<td>Thanksgiving Break</td>
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<tr>
<td>15</td>
<td>11/29</td>
<td>12/1</td>
<td>More Interactions/Power for Factorial Designs</td>
<td>Factorial ANOVA 2</td>
<td></td>
<td>HW 10 Quiz 11</td>
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<tr>
<td>16</td>
<td>12/6</td>
<td>12/8</td>
<td>Flex Time/Review</td>
<td></td>
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<td>17</td>
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<td>Final Exam: TBD</td>
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**Notes:** Quizzes will be due by 3 pm on the day of lab and will be posted by Monday of the same week. Homework will be due by the next Tuesday after assignment @ 3 pm. *Exceptions to these policies will be listed in the schedule.*
Anticipated Spring Semester Schedule (Advanced Stats for Graduate Students)-

Week 1: Review/Recap/Bivariate Correlation

Week 2: Intro to Multiple Regression

Week 3: More Multiple Regression

Week 4: Model Selection Methods in Multiple Regression

Week 5: Exam #1

Week 6: Advanced MR: Moderation

Week 7: Advanced MR: Mediation

Week 8: Logistic Regression (Regression w/ categorical predictor)

Week 9: Spring Break (No Class)

Week 10: ANCOVA (ANOVA w/ continuous predictor)

Week 11: Exam #2

Week 12: Mixed ANOVA (Factorial w/ Between & Within IVs)

Week 13: MANOVA

Week 14: Basic Bayesian Alternatives to ANOVA

Week 15: Exploratory Factorial Analysis

Week 16: Confirmatory FA/Structural Equation Modeling

Week 17: Flex Time/Review
Class Policies

Attendance Policy: As this class moves at a fast pace by necessity, missed lab sessions will be very damaging to your success in learning the material. I consider your attendance in lab to be mandatory - however, I will not take attendance. You are all adults, and I do not need to know when you miss class. If you need to miss class, go ahead, but take responsibility for your actions. Do not expect your professor or the GTA to teach you everything you missed.

Late Work/Make up Exams: If any part of an assignment is turned in after the due date (beginning of class) without a pre-approved excuse, the grade for the entire assignment will be reduced by 25% for each solar day that it is late. To get preapproval for turning in an assignment late, tell your professor before the due date if, for example, you have surgery scheduled. You are responsible for computer failures, just as you would be if you were a working professional. It is your responsibility to back up all of your work so that none of it is lost, to store your files in safe places, to print things well before they are due, and turn things in on time. Computers and printers let everyone down at inconvenient times, so if you want to be successful, anticipate and prepare for these problems so you’re not caught off guard.

Missed exams can be made up during the final exam period, where you will take both the third exam and the one that you missed. There are no exceptions to this policy.

Academic Courtesy: Be courteous during class. Be quiet when your classmates or I am speaking, and we will be quiet when you are speaking. Please do not engage in any behaviors during class that you would not want to see if you were teaching. The nature of a class like this entails that all students will be board at times and frustrated at times. Please do not let that interfere with your classmates. When you are board, others will be frustrated, so please show them the respect you would expect if you were the one who was frustrated. If you have any issues with the class, please come to my office to speak to me. I often do not know there is a problem unless you tell me.

Academic Honesty: Although I encourage students to talk to one another about your assignments, your final product must be written alone. Please get together to hash out concepts and to aid one another but do the actual work yourself. You may not share any verbatim product or computer file with other students. It is never appropriate to turn in a photocopy of another students work as your own, nor is it appropriate for multiple students to turn in identical assignments, even if you worked “together”. Minor changes attributed to paraphrasing may still be considered academic misconduct. While you will often have the same data, the way each of you describe that data should be unique to you within the guidelines provided in the assignment.

Plagiarism: Plagiarism includes either presenting someone else’s words without quotation marks (even if you cite the source) or presenting someone else’s ideas without citing that source. Sources may include published research articles, but they also include other students in the class. If you plagiarize, your instructor cannot evaluate your understanding of the topic. When paraphrasing from another source, at the very least the student should change the wording, sentence syntax, and order of ideas presented in the paper. Ideally, the student will integrate ideas from multiple sources while providing critical commentary on the topic in a way that clearly identifies whether words and ideas are those of the student or are from another source. University policy states that "Normally a student who plagiarizes shall receive a grade of F in the course in which the act occurs. The offense shall also be reported to the Provost." (http://www.siue.edu/POLICIES/1i6.html). The University policy discusses additional academic sanctions including suspension and expulsion from the University. To ensure that you understand how to avoid plagiarism, we encourage you to review the information on plagiarism provided on the Department of Psychology web page at http://www.siue.edu/PSYCHOLOGY/plagiarism.htm.

Cell Phone Policy: Cell phones are not allowed in class because of the distractions that they cause, as well as the potential for cheating. Please note that this includes texting as well as all other uses. Texting implies that you have something else more important to do, or somewhere else that you would rather be. This may very well be the case - this is a statistics class after all. If this is true, please leave the class to use your phone, and accept that you are responsible for any material missed. Otherwise, please turn all cell phones off at the beginning of class. Even
phones on “vibrate” can disturb other students. If you must have your phone on for emergency reasons, no problem, but please notify me before class. **If your cell phone rings or vibrates during an exam you will fail it, no questions asked.**

**General Note:** There are exceptions to every rule (see COVID polices at the end of this syllabus), but they are far more likely to be made if you notify me in advance (a priori) rather than after the fact (post hoc).

**DEPARTMENT OF PSYCHOLOGY POLICY ON INCOMPLETE GRADES AND WITHDRAWAL:** All withdrawals must be completed by the end of the 13th week of classes during fall and spring, and by a similarly late date (i.e., before 82% of class meetings have occurred) in any summer term. Grades that apply to students who initiate a withdrawal and grades that apply when a student fails to officially withdraw within established deadlines are determined by university policy (see [http://www.siue.edu/policies/1j1.shtml](http://www.siue.edu/policies/1j1.shtml)). The granting of a grade of I (Incomplete) is not automatic. It is available only in cases when a student has completed most of the work required for a class but is prevented by a medical or similar emergency from completing a small portion of the coursework before the deadline for grade submission. An I must be approved by the instructor with appropriate documentation provided by the student. If an instructor agrees to give a student an I, the instructor will fill out a Memorandum of Incomplete Grade to be kept with the student’s records. If the work is not completed by the time specified on the Memorandum, the student’s grade will be changed from I to F.

**Statement on Disabilities:** SIUE offers a range of resources to support students with disabilities. At SIUE every effort has been made to eliminate barriers to learning and help you reach your educational goals. If you are a student with a disability and wish to request accommodations, please contact Disability Support Services located in Rendleman Hall, Room 1218 (phone: 650-3726).

**SIUE Statement on Diversity:** All societies and peoples have contributed to the rich mix of contemporary humanity. In order to achieve domestic and international peace, social justice, and the development of full human potential, we must build on this diversity. SIUE nurtures an open, harmonious, and hospitable climate that facilitates learning and work. Each member of the University is responsible for contributing to such a campus environment.

**SIUE Nondiscrimination policy:** Southern Illinois University Edwardsville (SIUE) is a public comprehensive University committed to creating and maintaining a diverse community in which students, faculty, and staff can learn and work together in an environment free of discrimination and free from any form of illegal harassment. Such actions violate the dignity of the individual and the integrity of the University as an institution of learning. SIUE prohibits discrimination against employees, applicants for employment and students on the basis of age, color, disability, marital status, national origin, race, religion, sex, sexual orientation, or veteran’s status. Discrimination in any form will not be tolerated; management and supervisory personnel, at all levels, are responsible for taking reasonable and necessary action to prevent discrimination.

**COVID-19 Pandemic Policies Related to Classroom Instruction (Fall 2022)**

**Health and Safety**

The measures outlined below are **required** and any student who does not comply may be in violation of the COVID-19 *People-Focused Health and Safety Policy*, as well as the University’s *Student Code of Conduct*.

The full text of the COVID-19 *People-Focused Health and Safety Policy* can be found here: [https://www.siue.edu/policies/Covid.shtml](https://www.siue.edu/policies/Covid.shtml)

**Classrooms, Labs, Studios, and Other Academic Spaces**


Individual faculty of record may determine that masking will be required in their classrooms and are asked to communicate accordingly with students. Face masks may be required in other campus sites following guidance from governing regulatory agencies.
- Students who forget to wear a face covering when masking is required will be reminded of their obligation to comply with SIUE’s COVID-19 People-Focused Health and Safety Policy and temporarily asked to leave the class until they are able to conform to the policy. Students who forget or lose their face coverings when masking is required may be able to obtain replacements from a friend, a faculty member, or a nearby departmental office. Face coverings are also available for purchase in the Cougar Store (MUC).
- Students who refuse to wear a face covering when masking is required will be asked to leave the classroom and referred to the Dean of Students for non-compliance with community health and safety protocols. Repeated non-compliance may result in disciplinary actions, including the student being administratively dropped from an on-ground/face-to-face course or courses without refund if no alternative course format is available.
- If a student has a documented health condition which makes wearing a face covering medically intolerable, that student should contact ACCESS to explore options with the understanding that ACCESS will not grant accommodations which excuse the need for a face covering while on campus or in the classroom. ACCESS will work with qualifying individuals to find reasonable alternatives, whenever such solutions are available. Please call or contact the ACCESS Office via email to schedule an online appointment to discuss potential alternatives. ACCESS office (Student Success Center, Room 1203, 618-650-3726, and myaccess@siue.edu).

**General Health Measures**

Students and employees are expected to review the siue.edu/coronavirus website (https://www.siue.edu/about/announcements/coronavirus/) to better understand prevention strategies and safety expectations.
- Students and employees are expected to maintain healthy hygiene practices.
- Students and employees are expected to follow COVID-related guidelines and directions.
- Students and employees are expected to conduct a daily health self-assessment and isolate themselves if COVID-related symptoms are present. COVID-related symptoms include:
  - Fever (100.4 degrees or above) or chills
  - Cough
  - Shortness of breath or difficulty breathing
  - Fatigue
  - Muscle or body aches
  - Headache
  - New loss of taste or smell
  - Sore throat
  - Congestion or runny nose
  - Nausea or vomiting
  - Diarrhea

**Academic Integrity**

Students are reminded that the expectations and academic standards outlined in the Student Academic Code (3C2) apply to all courses, field experiences and educational experiences at the University, regardless of modality or location. The full text of the policy can be found here: https://www.siue.edu/policies/3c2.shtml.

**Recordings of Class Content**
Faculty recordings of lectures and/or other course materials are meant to facilitate student learning and to help facilitate a student catching up who has missed class due to illness or quarantine. As such, students are reminded that the recording, as well as replicating or sharing of any course content and/or course materials without the express permission of the instructor of record, is not permitted, and may be considered a violation of the University’s Student Conduct Code (3C1), linked here: https://www.siue.edu/policies/3c1.shtml.

Potential for Changes in Course Schedule or Modality

As the COVID-19 pandemic continues, there remains a possibility that planned classroom activities will need to be adjusted. Depending on circumstances and following state-issued recommendations, potential changes include alterations to distancing requirements, course modality (e.g., transition from face-to-face to online, hybrid, or hy-flex, mask wearing, in-course activities, etc). These changes would be implemented to ensure the successful completion of the course while preserving health and safety. In these cases, students may be provided with an addendum to the class syllabus that will supersede the original version. If the course schedule or modifications significantly alter expectations, a new syllabus will be issued.