PSYC 520: Research Design and Inference I, Fall 2025
Syllabus

Lecture: Tuesdays, 4:00 pm to 5:20 pm, AH 0401
Lab: Thursdays, 4:00 pm to 5:20 pm, FH 3207
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.: Kiya Rainey Email: kiraine@siue.edu
Office:
Office Hours: 3 to 4 pm Tuesday and TBD

Required Textbook:
Field, A. (2025). *Discovering statistics using IBM SPSS statistics* (6th ed.). SAGE Publications. ISBN: 978-1-5296-3000-8

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

JAMOVI (https://www.jamovi.org) is a free alternative to SPSS that provides a SPSS like interface but actually uses R. I prefer JAMOVI and we may use it from time to time. You are required to use SPSS for the majority of the class, but you may find JAMOVI useful as a supplement. There may also be times when I will ask you to use JAMOVI instead of SPSS, but we will always be clear with which program to use.

Useful Websites:
Purdue APA style Online Writing Lab: https://owl.english.purdue.edu/owl/section/2/10/
APA Style Blog: https://apastyle.apa.org/blog
APA Paper Format: https://apastyle.apa.org/style-grammar-guidelines/paper-format

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). We will cover tests and methods from both approaches, often focusing on their similarities rather than their differences. The second semester will continue this approach while transitioning into analyses for more complex designs as well as for categorical outcome variables.

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 or after an exam. Attendance is required at both sessions. Most standard techniques will be taught in SPSS. 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
9. Become proficient in the use of SPSS for the computer aided calculation of descriptive and inferential statistics.
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

Type	Points
Nearly Weekly Quizzes (12 @ 5 pts. each)	60
Exams (3 @ 50 pts. each)	150
Lab Homework (10 @ 10 pts. each)	100
Fake Data Project (35 pts.)	40
Total	350

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 12 quizzes are planned). Quizzes can be taken three times each but must be completed prior to the start of lab on Thursday. **Your score will be your average grade across all three attempts.** 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. The exams will focus upon using SPSS to compute inferential and descriptive statistics, interpret them, and report them and will use the lab day (Thursday). This exam will be open note/open book, but not open internet, and AI use of any kind will not be permitted. 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 Replication Project: In this project, you will be tasked with do a virtual "replication" of an existing study. You will need to read the article that describes the study, analyze a data set that I have generated based on that study, and write up your results as an APA format paper. Your results may differ from the prior study, so it is up to you to interpret them in the context of the prior study. A rubric will be provided on BB. In 520 this project will be based on multiple regression. In 521 it will be based on an ANOVA.

Expected Schedule (Subject to Change)

Week #	Lecture Date	Lab Date	Class Topic	Lab Topic	Reading	Notes
1	8/19	8/21	Intro, Basic Concepts, Orientation	More lecture	Ch. 1 & 2	Quiz 1
2	8/26	8/28	NHST	Intro to SPSS	Ch. 3 & 4	HW 1 Quiz 2
3	9/2	9/4	Descriptive Statistics & Graphing	Descriptive Stats & Graphing	Ch. 5 & 6	HW 2 Quiz 3
4	9/9	9/11	Correlation	Correlation	Ch. 8	HW 3 Quiz 4
5	9/16	9/18	Regression	Regression	Ch. 9	HW 4 Quiz 5
6	9/23	9/25	**Review & Exam #1**			
7	9/30	10/2	Multiple Regression pt. 1	More Lecture	Ch. 9	Quiz 6
8	10/7	10/9	Multiple Regression pt. 2	Multiple Regression		HW 5 Quiz 7
9	10/14	10/16	Moderation Models in MR	Multiple Regression	Ch. 11	HW 6 Quiz 8
10	10/21	10/23	Mediation Models in MR	Multiple Regression		HW 7 Quiz 9
11	10/28	10/30	**Review & Exam #2**			
12	11/4	11/6	Comparing Two Means	t-tests	Ch. 10	HW 8 Quiz 10
13	11/11	11/13	Comparing Multiple Means	One-way ANOVA	Ch. 12	HW 9 Quiz 11 **FDP data available**
14	11/18	11/21	aPriori and Post-Hoc Testing	More One-Way ANOVA		HW 10 Quiz 12
15	Week of 11/24		**Thanksgiving Break**			
16	12/2	12/4	Flex Time/Review			**FDP Project Due: 12/5**
17	Week of 12/8	**Final Exam: TBD**				

Notes: Quizzes will be due by 11:59 pm on Sunday of the week they are assigned 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: Analysis of Covariance (ANCOVA), Ch. 13

Week 3: Factorial ANOVA, Ch. 14

Week 4: More Factorial ANOVA, Ch. 14

Week 5: **Exam #1**

Week 6: One-Way Repeated-Measures ANOVA (Ch. 15)

Week 7: More RM ANOVA

Week 8: Factorial RM ANOVA

Week 9: Spring Break (No Class)

Week 10: : Mixed ANOVA (Ch. 16)

Week 11: **Exam #2**

Week 12: Multivariate ANOVA (Ch. 17)

Week 13: Categorical Outcomes: Chi-Square (Ch. 19)

Week 14: Categorical Outcomes: Logistic Regression (Ch. 20)

Week 15: Factor Analysis (Ch. 18)

Week 16: Confirmatory FA/Structural Equation Modeling

Week 17: Flex Time/Review

Class Policies

Use of AI and AI Based Writing Tools: AI and large language models are transformational technologies based upon theories of human cognition developed in part by cognitive psychologists. Their use in an educational environment, however, must be restricted due to their ability to offload the work of the assignments the class. Teachers use these assignments to help you engage in the material and learn new information. This is especially true in an online class where you and I have very limited interaction. If you let the AI do the work, you won't learn the material. Also, you can't judge the quality of AI output until you are an expert in a field. Illinois state has defined 7 levels of how AI can be used in learning environments ranging from no use at all to full, unrestricted use (https://prodev.illinoisstate.edu/ai/usage/). **This class follows their level 2 guidelines**. Thus, the following uses of AI are permissible:

> **Level 1: Organizational use of genAI**. Students will create their own, original work without the use of GenAI; however, the use of GenAI for personal efficiency (i.e., summarizing notes/readings, clarifying content) is acceptable.
>
> **Level 2: Use of genAI for brainstorming or idea generation.** Students can consult GenAI as a tool for brainstorming or idea generation, but are expected to create their own, original work without the use of GenAI.

Generative AI use beyond these levels is considered plagiarism and is subject to the same sanctions. **If you are found to be using generative AI to create any writing in this course you will be reported for academic misconduct.** AI use detection is currently messy and unavoidably subjective. Often our best indicator is a sudden change or improvement in your writing and the inclusion of information that you are unlikely to have knowledge of as a student. This is an understandably frustrating process for students as well as for faculty. Should I suspect AI usage beyond level 2 I will schedule a meeting with you to discuss it with you and determine a further course of action that may include: a 0 on the assignment, future oral exams and assignments, and reporting the behavior to the University. **I want to trust that you are here to learn- not just to get by. You have my trust until you lose it.**

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). 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.

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.