

PSY230: Introduction to Statistics | Fall 2023 | Carson G Miller Rigoli

This course is a survey of concepts in statistics and data science for students in the psychological sciences. Ideas from descriptive and inferential statistics will be introduced with a modern approach that emphasizes conceptual understanding and interactive computational tools (though it is not a coding class, and you do not need a coding background!). You will learn foundations of quantitative and empirical approaches to psychology, see real tools that researchers use to apply statistical theory to data, and gain a sense of how the theory and practice of statistics (and data science and related fields and practices) interact with the world both inside and outside academic or knowledge industries.

This class will be interactive – Every week, you will be invited to participate in interactive activities completed as a class, group, or in partners. If you do not anticipate being able to participate regularly in person, it may be worthwhile to consider switching to the hybrid or online versions of this class that are also offered regularly!

Who is on the instructing team and how do I contact them?

Please use email to contact the instructing team! We will try to respond by the following business day, but please remember that the team also takes weekends and sleep at night, so may not be able to immediately reply!

- Instructor: Dr. Carson G. Miller Rigoli (carson.miller.rigoli@asu.edu)
 - Office Hours: Time TBD in SCOB 140
- Teaching Assistant: Felix Muniz
 - Office Hours: TBD
- Teaching Assistant: Amanda Ni
 - Office Hours: TBD

Who should enroll in this class?

- Psychology students who have taken PSY 101!
- Students who anticipate being able to participate regularly in class (there are online and hybrid versions of this class available as well – this is not a hybrid class, and we will make heavy use of in-class time!)
- You do not need any experience in statistics, data analysis, or university level mathematics to begin this course. This class will assume proficiency in high school mathematics including things that you may have learned in algebra or pre-calculus (calculus not needed!). Math skills are not going to make or break you in this statistics class!

What are goals for this course? What should I expect to be able to do by the end of the semester?

- Be able to explain to a layperson the basic concepts and tools in descriptive and inferential statistics
- Identify scenarios in which researchers may use statistical tools like estimation or hypothesis testing as well as cases where researchers or communicators misuse these tools
- Be able to interpret the results of statistical analyses such as descriptive statistics, terms in linear models, confidence intervals, p-values, and to interrogate the appropriateness of findings based on these results and the methods and data used to create the results
- Be *familiar* with the basic format and execution of real scientific computing tools (eg.: how to execute, make small manipulations to, and interpret the output of analyses conducted using the R programming language **but** not necessarily how to write code from scratch or explain how the underlying software works)

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What materials are required for this course?

We will use online readings and readings from a textbook:

- Spiegelhalter, D. (2019). *The art of statistics: Learning from data*. Penguin UK.
- Note: You can use a digital or physical copy of this book! Widely available used or new for <\$20.

A laptop computer running a standard operating system (Windows/macOS/common linux distribution) and able to access the campus wifi will be required. Typically, smartphones, iPads, and tablet computers will be insufficient. If this is an issue, please contact the instructor and we will work to find you the required tools either by finding you a machine to borrow or making sure you have access to the Psychology Computer Lab at suitable times for your homework! In some cases, tablet computers can be used with the course but may require configuration outside of class time.

What will this course cover in a little more detail?

Details are subject to some change! However, have a look at this schedule of topics and assignments to get an idea of what we will be covering! Check Canvas for updated reading lists!

Week Date	Week #	Tuesday No laptops required!	Thursday Bring laptops!	Reading	
	0		Phoenix Neighborhoods in Data		
8/22	1	The Big Picture of Data	Syllabus Quiz + The Statistical Process: Truths and Lies	AOS Intro; AOS1	
8/29	2	Describing Data	Summary Statistics	AOS2	
9/5	3	Who Gets Counted	Quiz + Debate: Who Gets Counted	AOS3; see site	
9/12	4	What Gets Measured	A Critical Examination of the US Census	see site	
9/19	5	Correlation/Causation	Quiz + Exploring Correlations	AOS4	
9/26	6	Statistical Models	Linear Regression	AOS5; see site	
10/3	7	Complex Models	Quiz + Multiple Regression	see site	
10/10	8	Fall Break	Introduction to Machine Learning	see site	
10/17	9	Uncertainty	Midterm Exam	AOS7	
10/24	10	Estimation	Bootstrapping and CIs	AOS8	
10/31	11	Confidence Intervals	Quiz + Probability & CIs	AOS9	
11/7	12	Hypothesis Testing I	Simulating Hypotheses & P-Values	AOS10	
11/14	13	Hypothesis Testing II	Quiz + Common Statistical Tests	see site	
11/21	14	Multiple Comparisons	Thanksgiving	AOS11	
11/28	15	Statistics in Practice	Quiz + Review	AOS12	
		Final Exam			

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How will the class be structured? This class will meet twice weekly. Components of the class include lectures, lab activities, readings, quizzes, & exams. Materials will be organized through the Canvas system and Google Drive.

- Tuesday meetings will approximate a typical lecture class (no laptops required).
- Thursday meetings will typically consist of group activities (**laptops are typically required!**) with accompanying followup reports submitted online either 1 week or 2 weeks later.
- There will be in-class assessments (quizzes and a midterm), typically every other week on Thursdays.
- Quizzes will be short (not an entire class period) and closed book.
- There will be a midterm on October 19th and a final exam in the official final exam time.

What will I be graded on?

Grades will be based on exams and quizzes as well as “activity reports”. Exams and quizzes are carried out in class and consist primarily of multiple choice and short answer questions. Activity reports are submitted online and follow-up on activities conducted in class. Activity reports typically involve answering some number of multiple choice and short answer questions tied to the class activity. Activity reports are *formative* assignments, designed to help you build your knowledge of the topics – you can ask questions in class or office hours to make sure you understand what’s going on! Most students should get good grades on these if they complete the activities in class. The exams and quizzes are designed to test your knowledge – your grades on activity reports will typically be higher than your grades on exams!

Item	# of submissions	Percent of Grade	Points per Assignment
Activity Reports	13	39%	3
Quizzes	6	30%	5
Midterm Exam	1	10%	10
Final Exam	1	20%	20
Syllabus Quiz	1	1%	1

What if I need to turn in an assignment late or miss one?

Quizzes and midterms are completed in class. Weekly in-class activities will be accompanied by an “activity report” that is to be completed on Canvas. The activity reports can be completed any time before 1pm the following quiz day (always on a Thursday). This means that you typically have one or two weeks to complete and submit them. If you forget to submit them prior to their due date, 1 point will be deducted from each activity report grade per day late (starting on the first day late). Additionally, the lowest scoring (including missing) activity report will be dropped from the grade calculation.

What if I miss a quiz or midterm?

Quizzes and midterms can only be “made-up” with a note from the Dean of Students. However, the single lowest quiz grade will be dropped from grade calculations for all students – if you miss a quiz, that quiz will be discounted; if you miss no quizzes, then the lowest grade that you received is dropped when calculating the portion of the grade for quizzes.

What if I am sick, have a family emergency, or other reasonably unforeseen circumstances mean I can’t attend class? What about if I have a university sporting, ROTC, or other event?

If you are feeling sick or test positive for covid or other contagious diseases, do not attend class! Please contact another student for notes if you miss a Tuesday lecture class. Thursday lab activities will be much more fulfilling to complete in person. However, materials will typically be supplied to allow you to complete equivalent activities individually. The same applies to university-sanctioned sporting and similar events!

What if I need accommodations for disabilities?

The university policy looks like this:

Students who feel they will need disability accommodations in this class but have not registered with the Student Accessibility and Inclusive Learning Services office should contact SAILS immediately. The SAILS Tempe office is located on the first floor of the Matthews Center Building. SAILS staff can also be reached at (480) 965-1234 (V) or (480) 965-9000 (TTY). For additional information, visit: www.asu.edu/studentaffairs/ed/drc.

SAILS ultimately is in charge of deciding what accommodations are possible and instructors can apply those accommodations as *reasonable*. Please be as prompt as possible in contacting SAILS whenever issues come up. Of course, sometimes SAILS accommodations take time to be processed – if you are having difficulty accessing the course, please feel free to share your concerns with the instructor as soon as possible, so we can start planning possible ways to implement accommodations and get them in action as soon as approvals come in from SAILS!

What if I need accommodation for religious practices?

The university has a policy that goes as follows:

The university community should, in all its activities, be sensitive to the religious practices of the various religious faiths represented in its student body and employees. Faculty are asked to recognize the obligations of their students who may be participating in the observance of religious holidays. Students should notify faculty at the beginning of the semester about the need to be absent from class due to religious observances. For more information, visit <http://www.asu.edu/aad/manuals/acd/acd304-04.html>

In practice, these accommodations will be treated as equivalent to those for illness, sporting events, etc.. Notify the instructor *as soon as possible* if you anticipate a need for accommodation on these grounds!

What if I need to miss class for a university-sanctioned activity?

The university policy on this looks like this:

Students who participate in university-sanctioned activities that require classes to be missed, shall be given opportunities to make up examinations and other graded in-class work. Normally, the made-up work will be due on the class day immediately after the absence. Absence from class or examinations due to university-sanctioned activities does not relieve students from responsibility for any part of the course work required during the period of the absence. For more information, visit <http://www.asu.edu/aad/manuals/acd/acd304-02.html>

In practice, these accommodations will be treated as equivalent to those for illness, religious accommodation, etc.. Notify the instructor *as soon as possible* if you anticipate a need for accommodation on these grounds!

How should I think about academic integrity, plagiarism, and copyright in this class?

Group work *will* be encouraged in this class! You *should* work on class activities in groups! However, **all submissions must be submitted independently by each student**. If you feel that students in the class are unfairly distributing labor within groups, please reach out. Quizzes and exams will be closed-book, solo tests!

You can always reference outside sources when studying, whether those are friends, additional textbooks, online articles, or algorithmically generated responses from language models accessed through interfaces like Bard or ChatGPT. **Note that these sources are not always precise in their use of statistical terminology and may rely on different definitions and approaches than used in class!** Keep in mind that the materials from the class assignments are protected by copyright. **You may not copy activity report questions or share activities or slides online.** Know that prompts that you write in tools like ChatGPT are used to train future versions of language models; course materials are not yours to give to organizations like OpenAI!

What happens if I or the instructional team suspect instances of discrimination, harassment, or retaliation?

As members of the ASU community, we *must not* tolerate discrimination, harassment, or retaliation based on race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information. If you have concerns that this is occurring in class or in the university community, please reach out to the Dean of Students Office and the Office of Student Rights and Responsibilities. Also know that ASU provides free, 24/7 counseling support (see here for contacts:

<https://eoss.asu.edu/counseling/services/open-call-and-open-chat>). This can be accessed whether or not you are in crisis, and is available in a number of languages!

Please note that both the instructor and the teaching assistant are *mandated reporters*. This means that we are obligated to report any information that we become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. If you need to talk to someone in a confidential manner, ASU Counseling Services (<https://eoss.asu.edu/counseling>) will help find someone you can speak to privately and confidentially.

Also, note the following policy on sexual discrimination:

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>.

What if I am unable to finish the class and want to have my grade listed as “incomplete”?

Incomplete grades are meant to indicate that you have finished the large majority of the class, and have been regularly keeping up with material throughout the semester, but are unable to complete the class due to unforeseen circumstances. At a minimum, to receive an “incomplete” grade for the class, you must have completed at least eight of the activity reports, three quizzes, and the midterm exam. This is not a guarantee that an incomplete grade is appropriate for your case, but an incomplete grade will not be possible with less of the course completed than this.

What if I read through this whole syllabus but still have questions?

Time for questions will be available in class! Also, please contact the instructor or teaching assistants at office hours or through email.