PSY217: Statistical Analysis
Course Syllabus

Section X Summer 2 2024

Instructor Information

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Phone (call or text): (812) 307-5509
Online "office hours" (Teams): M-F 10:00am-12:30pm or by appointment
Note: I will try to respond to all messages (email or phone) by 5pm each business day.

Course Description

This course is an introduction to the theory and application of statistical analyses commonly used in the social and natural sciences. Based in probability theory, this course covers descriptive and inferential statistics, including multiple regression, ANOVA, and non-parametric statistics. Emphasis is placed on the practical application of these methods to real-world behavioral and biomedical data. Upon successful completion of this course, you should be able to:

- Understand the core tenets of probability theory and how they impact our interpretation of statistical analyses.
- Articulate the similarities and differences between various statistical tests, including their usage and limitations.
- Select appropriate descriptive and inferential tests based on characteristics of the data.
- Recognize and apply the mathematical formulas for descriptive and inferential tests.
- Perform thorough descriptive analysis of provided data, including measures of central tendency, variability, and normality.
- Perform and interpret inferential tests, including correlation, multiple linear regression, t-test, ANOVA, and chi-square, among others.
- Extract relevant information from published research in order to effectively interpret the statistical findings and evaluate the researchers' conclusions.

Course Design

This course is designed to be fully online and asynchronous, which means you can complete the work on your own schedule **to an extent**. In addition to not wanting you to fall behind, I also don't want you to run straight through all of the material in order to finish the course quickly. The research on massed versus distributed learning indicates that spreading the material out leads to much better retention after the course has finished. This course is therefore set up similar to a standard synchronous course. Each day will have a designated topic, materials, and assignments, but instead of having daily deadlines, assignments will be due on Wednesdays and Saturdays each week. This should allow you to work around your other commitments while still maintaining the integrity of the general course schedule. I will try to have all materials for a given week posted by the preceding Sunday.

It is also important to remember that the summer sessions condense an entire 13-week semester's worth of content into a 25-day course. This means you should expect to spend at least 2-3 hours *per day* working on this course, including reading the textbook, watching videos, and completing assignments.

Technology Requirements

Because it is fully-online and asynchronous, this course will rely heavily on technology, including Moodle, email, and Microsoft Teams.

- **Moodle** – All course materials, including exams, assignments, videos, and any other materials will be available in Moodle
- **Email** – You should check your *Hanover email account* on a daily basis during this course, as that will be my primary means of communicating any changes to the course or other important information.
- **Microsoft Teams** – I will be holding daily "office hours" on Teams. Attendance is NOT required. These are strictly there in case you have any questions or would like additional clarification on any assignments or concepts.

Course Materials

- Peszka, J., Kennedy, L., Sestir, M., & Spatz, C. (2023) Exploring Statistics: Tales of Distributions (13th ed.)
- Microsoft Excel (NOT Google Sheets!)
  - You have a subscription through your Hanover login: https://www.microsoft365.com/launch/excel?auth=2
- Jamovi (desktop or cloud version): https://www.jamovi.org/download.html

Evaluation Criteria

Exams (30%)

This course includes three exams that build upon one another, meaning that concepts from previous exams may appear on future exams. All exams will be open-book and open-notes, but use of any unauthorized resources, including but not limited to Google, a friend, or any sort of generative AI (e.g. ChatGPT, etc.) constitutes cheating and will result in a 0 for the entire exam.

Reading Guides (15%)

This course covers a lot of content that may be difficult to learn from a book. I am providing some supplemental videos, but it is important for you to not only read the textbook but to actually *absorb* the information. Because many students struggle with that last bit, especially when it comes to math-based courses, I have provided guides for each of the assigned readings to help you with active reading. Reading guides will be graded for completion only, but I will be checking to make sure you didn't copy someone else's answers.

You should upload a photo of your completed reading guide or a digital copy if you type your responses. They are due by 11:59pm on Wednesday (M-T readings) and Saturday (W-F readings) night of the assigned week. You are required to complete 20 of the 25 reading guides, but completing additional reading guides will earn you extra credit points!

Homework Assignments (40%)

You will have homework assignments for most class days/lessons. These are designed to help you to better understand and to apply the concepts from the course. Some of these assignments will need to be completed by hand with paper and pencil (you will upload a picture of your submission), some will use Excel (NOT Google Sheets), and others will require Jamovi. Instructions will include details about how the assignment should be completed. All assignments should be submitted in Moodle.

Application/Interpretation Assignments (15%)

One of the goals of this course is for you to be able to read and understand the statistics in published research papers. So in addition to calculating statistics yourself, you will also have short assignments that require you to read pieces of research articles and answer questions about the statistics they should or did perform. This may include suggesting a statistical test based on the data they collected, explaining why a particular statistical method was used instead of another option, or interpreting the numerical or graphical results they presented.

Grading Scale

A = 100 – 94%; A- = 90 – 93.9%; B+ = 87 – 89.9%; B = 83 – 86.9%; B- = 80 – 82.9%; C+ = 77 – 79.9%; C = 73– 76.9%; C- = 70 – 72.9%; D+ = 67 – 69.9%; D = 63 – 66.9%; D- = 60 – 62.9%; F = <60.0%

Course Policies

Late Assignments

All assignments are due on Wednesdays (for Mon/Tues lessons) and Saturdays (for Wed-Fri lessons) at 11:59pm. Extensions may be granted for College-approved reasons that include proper documentation. Extension requests should be made before the deadline or within 24 hours (for unexpected emergencies). Late assignments without an approved extension will be penalized 10% for each day late. *Assignments submitted more than one week after the deadline but before the last day of class will receive a 75% penalty.*

Resubmissions and Grade Disputes

I have found that the best way to get students to read the feedback I give them on assignments is to give them the chance to get some of the points back. For that reason, all assignments (not exams) can be resubmitted for a higher grade. I will try to have all grades back within 48 hours of the posted deadline, and any resubmissions must

be turned in within 72 hours of the grade being posted. However, they can be resubmitted an unlimited number of times until you get a perfect score as long as each resubmission is turned in within 72 hours of the most recent grade being posted. All resubmissions must be received before 5pm on Thursday, August 14.

If you want to dispute an exam question, you should write a short paragraph explaining the dispute and why your answer was correct, including page numbers that support your answer.

MISSED EXAMS

Make-up exams will be offered only for excused absences, and requests should be made **as soon as possible**. If you know about an excused absence ahead of time (e.g. for a college-sponsored game or competition), you should plan to take the exam BEFORE the scheduled time. For unexpected emergencies, you should let me know within 12 hours of the scheduled exam. If you waited until the last minute to take the exam, and your internet goes out, **text me immediately**.

STUDENTS IN DISTRESS

Your success in this course and throughout your college career depends heavily on your personal health and wellbeing. Stress is a common part of the college experience, and it often can be compounded by unexpected life changes outside the classroom. Summer courses can be pretty intense because you have a full semester's worth of content to cover in only about 5 weeks, and many of you also have work or other family obligations to juggle at the same time. I strongly encourage you to take care of yourself throughout the term and to pace yourself. Please don't hesitate to speak with me about any difficulty you may be having that may affect your academic performance before it becomes a major issue. I am happy to work with you to help you succeed, but I can't do much if you wait until the end of the semester.

AUTHORIZED MATERIALS FOR EXAMS AND ASSIGNMENTS

Because the assignments and exams for this course will be completed outside of the classroom, I want to make it crystal clear what materials are allowed.

Using the internet (including generative AI) to understand concepts: You are actively encouraged to use any resources at your disposal to help you to understand the concepts from this course, including YouTube videos, online forums, and even generative AI (e.g. ChatGPT). However, all submitted work—including assignments, reading guides, and exam responses—must be entirely your own work.

Using the internet (including generative AI) to perform analyses: Jamovi is a very widely-used program, so there are tons of videos and other resources online that can walk you through performing various statistical analyses. These resources are always allowed, including on homework assignments. However, use of online calculators or sites like Wolfram Alpha are not allowed for homework assignments or exams unless explicitly stated in the instructions.

- Assignments: If you are stuck on a question, you are welcome to seek out online resources or to discuss it with another person *in order to help you better understand the concept or the steps required*. If you know someone in this course, you are welcome to talk through the steps required for the homework assignments, but you should complete the work independently.
    - Example 1: Hailey and Addie are both completing a homework assignment that requires them to perform an analysis in Excel. Hailey is confused about one of the steps, so she asks Addie for help. Addie explains the step, but Hailey is still the one who types it into Excel in order to get the answer. This is allowed because Hailey is still learning the steps involved in the analysis.
    - Example 2: James is completely stumped on how to interpret the results in an Application/Interpretation assignment, and he asks Nick for help. Nick can explain how to interpret that type of test generally, or he can explain the results from a made-up study that used the same type of test. But Nick cannot just tell James, for instance, "This means that Group A did significantly better than Group B on the task" because that does not give James the opportunity to practice interpreting the results of that test.
    - Example 3: Lindsay is working on a homework assignment but can't remember how to run a correlation analysis in jamovi. She finds a YouTube video that walks her through each of the steps. This is allowed because Lindsay still has to do each of the steps herself and therefore is able to learn to do it.
    - Example 4: Janet is completing a homework assignment that requires her to calculate the mean and standard deviation for a list of values. She finds an online calculator where you can enter the data, and it will spit out the values. This is allowed ONLY IF the homework instructions explicitly said it was. If the point of the homework assignment is for you to learn to calculate them yourself, it is not allowed. Each

homework assignment will include details about what resources you are allowed to use for calculations.

- Exams: you may use your textbook, notes, and the internet. You may not work with or get assistance from another person (either in person or online) for exams. Use of Generative AI on exams is cheating and will result in a 0 for the entire exam.

NOTE: this list is not exhaustive. If I missed a potential resource, you must consult me before using it or assume that it is not allowed.

Hanover College Policies

Honor Code

As stated in the Hanover College Principles, students, faculty, staff, and trustees of Hanover College seek to promote academic, personal, and moral growth within a safe, challenging, and responsive community. This includes a commitment to academic integrity. Violations of academic integrity have a broad impact on the College and will result in College review and action.

Academic dishonesty includes any action with the intent to deceive in order to obtain an unfair advantage, as well as any act of aiding and abetting academic dishonesty. Note that the use of Generative Artificial Intelligence (AI) tools without the direction or approval of the instructor may be considered academic dishonesty. The Hanover College statement on academic dishonesty may be found in the Catalog and in the Student Handbook. Any given instance of academic dishonesty is dealt with by the instructor of the course in which it occurs. All instances of academic dishonesty are reported to the chair of the Student Academic Assistance Committee, and repeated instances of academic dishonesty will subject a student to additional penalties up to and including dismissal from the College as outlined in the College Catalog.

Nondiscrimination

Hanover College is committed to providing equal access to its educational programs, activities, and facilities to all otherwise qualified students without discrimination on the basis of race, national origin, color, creed, religion, sex, age, disability, veteran status, sexual orientation, gender identity, or any other category protected by applicable state or federal law. Anyone who observes or who is a victim of bias is encouraged to report incidents using the online bias reporting forms. An Equal Opportunity employer, the College also affirms its commitment to nondiscrimination in its employment policies and practices. In compliance with Title IX (20 U.S.C Sec. 1681 et seq.) Hanover College prohibits sex discrimination, including sexual harassment. For student related disability discrimination concerns, contact the Gladish Center for Teaching and Learning at 812-866-6840. For other discrimination complaints, including any arising under Title IX, contact the Title IX Coordinator at 812-866-6740 or the Deputy Title IX Coordinator at 812-866-7097.

Accessibility Services

Hanover College offers accessibility services to students with documented physical, visual, hearing, learning, or psychiatric disabilities. Any Hanover student is eligible for special services or accommodations if: 1) The student self-identifies that he or she has a disability and needs accommodation; 2) The student provides appropriate and verifiable documentation of the disability; and 3) The student provides notification in a timely fashion. For accessibility services, **Email Accessibility Services** or call 812-866-6844. The Accessibility Services (AS) office is in the Gladish Center for Teaching and Learning on the first floor of Duggan Library.

SUGGESTED COURSE SCHEDULE

Week	*Date*	*Lecture Topic*	*Reading*
1	10-Jul	Scientific variables	Ch 1
	11-Jul	Distributions	Ch 2
	12-Jul	Central tendency	Ch 3
2	15-Jul	Variability	Ch 4
	16-Jul	z-scores	Ch 5
	17-Jul	Other descriptives & distributions	Ch 5 & 7
	18-Jul	Presenting Data	Ch 2, 5, 16
	19-Jul	Probability Theory	Ch 7
Exam 1: Complete by 11:59pm on Sunday, July 21			
3	22-Jul	Sampling & sampling distributions	Ch 8
	23-Jul	Confidence Intervals	Ch 8
	24-Jul	NHST, tails	Ch 9
	25-Jul	*p*-hacking	Appendix H
	26-Jul	t-distribution; 1-sample t-test	Ch 9
4	29-Jul	Independent t-test	Ch 10
	30-Jul	Dependent t-test	Ch 10
	31-Jul	Analysis of Variance	Ch 11
	1-Aug	More ANOVA	Ch 11
	2-Aug	Repeated Measures ANOVA	Ch 12
Exam 2: Complete by 11:59pm on Sunday, August 4			
5	5-Aug	Factorial ANOVA	Ch 13
	6-Aug	Interactions	Ch 13
	7-Aug	Correlation	Ch 6
	8-Aug	Regression	Ch 6
	9-Aug	Chi-Square	Ch 14
6	12-Aug	Parametric vs. non-parametric tests	Ch 15
	13-Aug	Non-parametric tests	Ch 15
Exam 3: Complete by 11:59pm on Thursday, August 15			