PSYC 6022

Psychological Statistics for Human-Computer Interaction

Lecture: Mondays and Wednesdays, 02:00pm – 03:15pm, J. S. Coon Building 161

Lab: Fridays, 11:00am – 01:45pm, J. S. Coon Building 248

Instructor Information

Course Instructor Dr. Dingjing Shi	**Email** dshi32@gatech.edu	**Office Hours & Location** Mondays 03:15pm-04:15pm J.S.Coon 220D
Course TA TBA	**Email** TBA	**Office Hours & Location** TBA TBA
Lab Instructor TBA	**Email** TBA	**Office Hours & Location** TBA TBA

General Course Information

Full Course Description

Statistics is not primarily a matter of plugging numbers into formulas and performing rote computations. It is a way of questioning and thinking that may be unfamiliar to many of us, but available to all of us.

-John Allen Paulos

The idea of this course is to acquaint you with the ideas underlying the seemingly mystical world of statistics. It is my intent to examine the kind of thinking, namely statistical thinking, that goes into the process by which statisticians draw inferences and make decisions from data.

The goal of this course is to equip you with essential statistical reasoning skills to navigate our data-driven world. You'll learn to interpret and analyze information critically, avoid being misled by misleading data, and use statistical tools to make informed decisions. The topics covered in this course will include the basic concepts of statistics, descriptive statistics, inferential statistics (hypothesis tests for the mean and confidence interval), correlation, regression, and analysis of variance.

Lab Section Description

We will have a lab section each week. This is a separate course led by the lab instructor. Lab sections offer a small group setting where you can get help with material that you are uncomfortable with or are having trouble grasping. In addition, your lab instructor will 1) teach you how to use the statistical computing software to conduct statistical analyses covered in the main lecture, 2) review your quizzes, homework, and exams during the lab, and 3) answer additional questions you may have for the statistical concepts covered in the course.

Prerequisites

MATH 1502 (D or higher), MATH 1512 (D or higher), MATH 15X2 (D or higher), MATH 1522 (D or higher), MATH 1551 (D or higher), MATH 1552 (D or higher), and PSYC 2015 (D or higher).

Learning Outcome

By the end of this course, you should be able to:

1. Understand and effectively communicate fundamental statistical concepts using key statistical terminology.
2. Grasp the underlying principles of various statistical tests.
3. Perform and calculate the basic statistical tests.
4. Use statistical software to conduct analyses and interpret the results.
5. Apply your statistical knowledge to answer questions in psychological and behavioral research and in everyday life.

Course Materials and Communication

Lecture

- Foster, G., Lane, D., Scott, D., Hebl, M., Guerra, R., Osherson, D., & Zimmer, H. (2018). An Introduction to Psychological Statistics. Open Educational Resources Collection 4.

Comment: I have based the class content on open educational resources so that course materials are free of charge to you. The book is available to download from the University of Missouri, St. Louis Open Educational Resources Collection at: https://irl.umsl.edu/cgi/viewcontent.cgi?article=1000&context=oer

Lab

- Navaroo, D. (2018). Learning statistics with R: A tutorial for psychology students and other beginners.

Comment: This is a comprehensive open-source textbook by Danielle Navarro that introduces statistical concepts and their implementation using the R programming language. The book is available from https://learningstatisticswithr.com/book/

Course Communication

Email is the easiest way to get in touch with me quickly, and I encourage you to send me an email when you have questions, comments, or concerns. Past experience shows that answers to many questions can directly be found in the syllabus. Please read the syllabus thoroughly before sending over the question.

In your email, please put the class section in the subject line (i.e., PSYC6022). Generally, I will reply to emails within 2 business days. If you do not hear back from me after 3 business days, please (1) read the syllabus again, and (2) make sure you have put the class section in the subject line; if you have done both, please email me again. Additionally, I will hold weekly office hours and will be additionally available to meet by appointment.

Course Assignments & Grading

Assessment of Learning

Participation	5%
Quizzes	20%
Homework Assignments	10%
Lab Assignments	15%
Midterm Exam	20%
Final Exam	20%
An R Application Exam	10%
(Bonus) Discussion Forum	5%
(Bonus) Course Evaluation Survey	5%

Description of Graded Components

Participation (5%)

Regular attendance is strongly encouraged as it plays a vital role in your academic success and engagement with the course material. Attending classes allows you to interact with peers, ask questions, and engage in discussions that contribute to your understanding of the subject matter. Your presence in class reflects your commitment to the learning process and contributes to the overall class dynamics. You are expected to come to class fully prepared, having read and made an effort to understand the assigned material.

To promote active participation and ensure a productive learning environment, we will implement a random class attendance note-taking approach. This means that on select class sessions, your attendance will be recorded without prior notice. Remember that the purpose of this attendance policy is to encourage your active engagement in the learning process. Your consistent presence and participation will contribute significantly to your academic growth and overall success in this course.

If you are unable to attend a class, it is your responsibility to catch up on missed material and assignments. Please inform the professor if you have an excused absence due to medical or other legitimate reasons. The instructor reserves the right to modify the attendance policy if deemed necessary to accommodate special circumstances.

Quizzes (20%)

There will be 12 quiz assignments in the course. Each quiz is worth 20 points.

- The highest 10 quiz assignments will be used to calculate your final grade.
- Quizzes include both multiple choice and fill-in-blank questions.
- For multiple choice questions, the answer options will be shuffled. You will have up to three attempts to answer each multiple-choice question, and your highest score will be recorded.
- All the quiz responses will be submitted electronically via Canvas (please do not send your pop quiz responses using email).
- Quiz assignments are typically distributed after Monday's class at 03:15pm and are due at 1:00 p.m. on Monday of the following week when the assignments are distributed. Assignments must be turned in on the due date listed unless otherwise specified. You are responsible for your own work.
- You can discuss and work on the quiz assignments as a group. However, the submitted responses must be your own work.
- Late work submission.
    - Turning work in on time is a sign of professionalism and respect for not only your professor but also for the other students on the course.
    - Any assignment turned in late (that has not been previously discussed with the professor) will be worth 80% of the possible value.
    - A score of 0 will be given on the Friday of the same week that the quiz is due. For example, if the quiz is due on the Sunday of week 4, the quiz assignment will close on Thursday 11:59pm of the same week (i.e., no late submission is allowed), and a score of 0 will be given to the unsubmitted quiz assignment.

Homework Assignments (10%)

There will be 6 homework assignments in the course. Each homework is worth 20 points. These homework assignments, together with quizzes, are designed to help you keep up with class and to prepare for exams.

- The highest 5 homework assignments will be used to calculate your final grade.
- Homework assignments take on different forms, including, but not limited to, providing computational solutions, performing hand calculations for empirical examples, summarizing results, and interpreting findings.
- You can either 1) print out the .pdf file and write your answers on the printed copy, or 2) write your answers directly on your own paper (you do not have to copy the question itself, but please make sure to number your answers to match the question numbers). You can either take a photo or make a scanned copy of your work for submission.
- Please submit your homework in a PDF or picture format to Canvas. Please double-check and make sure you attach the correct file and it can be opened; no resubmission is allowed after the deadline.
- You can discuss and work on the homework as a group. However, the submitted homework must be your own work. The assigning dates and deadlines are listed in the class schedule.
- Late work submission.
    - Any homework assignment turned in late (that has not been previously discussed with the professor) will be worth 80% of the possible value.
    - No homework assignment will be evaluated after the due date of the next homework. For example, homework 2 will not be evaluated after the due date of homework 3.
    - If you think you are subject to an exceptional circumstance, please discuss it with me in a timely manner if you need flexibility.

If you include material generated by an AI program, it should be cited like any other reference material (with due consideration for the quality of the reference, which may be poor). When/if you use Artificial Intelligence (AI) platforms in your assignments, please write a note to clarify where in your process you used AI, include your prompt, and which platform(s) you used. See this article for proper APA formatting of such citations: How to cite ChatGPT https://apastyle.apa.org/blog/

Lab Assignments (15%)

Students are expected to attend and participate in all scheduled labs.

- Each lab will be led by the lab instructor and will consist of a brief R demonstration, followed by a hands-on activity. Students are expected to work on the activity during the scheduled lab time.
- The lab instructor will also go over quizzes and homework assignments when necessary.
- In general, lab assignments are expected to be completed during the lab session. The official due time of the lab assignments is 11:59pm on the day they are assigned.
- Late submissions will not be accepted.
- However, the lowest 2 lab assignment grades will be dropped from the final grade calculation.

Midterm and Final Exams (40%)

Two midterm exams and one final exam will be given during the semester. Each exam is worth 200 points.

- Your final score will be based on the two highest exam scores, with each contributing 20% to your overall grade.
- Exams can have various forms, including, but not limited to, multiple choice questions, fill in the blank questions, providing computational solutions or hand calculation for a problem, interpreting findings, and writing up results.
- Midterm exams will be proctored in person during the lecture session as listed on the schedule.
- Final exam will be proctored in person based on the final exam matrix from Registrar's office. Date and location TBA.

R Application Exam (10%)

In addition to the midterms and final exam, for graduate students, there will be a required take-home exam focused on testing your skills in using R to solve a real-world question with an empirical dataset provided by the instructor. This exam assesses your proficiency in using R to solve the statistical problem, and will contribute towards your final grade.

Extra Credit Options

1. ***Discussion Forum (5%)***

Throughout the semester, you will have the opportunity to earn bonus points by actively participating in the discussion forum available on Canvas. To receive full bonus credit for this portion of your grade, you must post at least one meaningful contribution per week. Contributions can include:

- Asking questions about statistical concepts
- Posting code-related questions or solutions
- Sharing insights on your approach to lab assignments
- Answering other students' questions
- Discussing any topics relevant to the course material

While course TA will respond and participate in discussions, you are encouraged to support each other by asking and answering questions. Particularly insightful or interesting questions may even be highlighted during lectures or labs for broader discussion.

Note: Posts about logistical matters (e.g., due dates, office hours) are welcome but will not count toward your participation grade.

2. *Course Evaluation Survey Completion (5%)*

At the end of the semester, all students are encouraged to complete the course evaluation survey. If the class achieves a completion rate of 80% or higher, a bonus will be awarded to the class. Your feedback is valuable. Please make sure to participate!

Grading Breakdown (Total 1000 points; Maximum Possible 1100 points)

Class participation score	@50 points = 50 points
10 Quiz assignment scores	@20 points = 200 points
5 Homework assignment scores	@20 points = 100 points
10 Lab assignment scores	@15 points = 150 points
2 Exam scores	@200 points = 400 points
1 R Application Exam	@100 points = 100 points
1 Bonus Discussion Forum	@50 points = 50 points
1 Bonus Course Evaluation Survey	@50 points = 50 points

Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

Grade	Percentage
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

According to policy, grades at Georgia Tech are interpreted as follows:

- A Excellent (4 quality points per credit hour)
- B Good (3 quality points per credit hour)
- C Satisfactory (2 quality points per credit hour)
- D Passing (1 quality point per credit hour)
- F Failure (0 quality points per credit hour)

See the Registrar's breakdown of the grading system for more information.

Course Policies, Expectations, & Guidelines

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Turning work in on time is a sign of professionalism and respect for not only your professor but also for the other students in the course. Any assignment turned in late (that has not been previously discussed with the professor) will be worth 80% of the possible value. However, exceptions can be made for unpredictable events such as family emergencies, approved Institute activities (e.g., field trips and athletic events) and religious observances (Read more about approved exceptions) as well as events like the All-Majors Career Fair and off-campus interviews. Please communicate with the course professor in a timely manner and plan accordingly.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Campus Resources for Students

Undergraduate Student Academic Success Resources

A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech.

- Academic Support: The Office of Learning and Academic Success Initiatives (a division of the Office of Undergraduate Education & Student Success, Academic Success & Advising) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at

success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Graduate Student Academic and Professional Success Resources

A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- Professional Development such as the programming from the Career Center and other professional development resources and events

Student Well-Being

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being student-resource-guide (gatech.edu)

Course Schedule

Week	Dates	Topic	Readings	Important Dates
1	8/24 & 8/26	Welcome, Course Overview Basic Concepts and Notations	Chapter 1	
2	8/31 & 9/2	Describing Data: Central Tendency	Chapter 2 & 3	HW1 Distributed Monday (8/31) after Class
3	9/7 & 9/9	Describing Data: Measures of Variability	Chapter 3	***9/7 – Labor Day No Class***
4	9/14 & 9/16	Z Scores & Normal Curve	Chapter 4	HW1 Due Monday (9/14) before class on Canvas HW2 Distributed Monday (9/14) after Class
5	9/21 & 9/23	Review & Midterm Exam 1		
6	9/28 & 9/30	Sampling Distribution Central Limit Theorem	Chapters 5 & 6	
7	10/5 & 10/7	Introduction to Null Hypothesis Significance Testing (NHST)	Chapter 7	***10/5 – Fall Break No Class**** HW2 Due Wednesday (10/7) before Class on Canvas HW3 Distributed Wednesday (10/7) after Class
8	10/12 & 10/14	More on NHST	Chapter 7	
9	10/19 & 10/21	Confidence Interval One-sample t test	Chapter 8	HW3 Due Monday (10/19) before Class on Canvas

				HW4 Distributed Monday (10/19) after Class
10	10/26 & 10/28	Review & Midterm Exam 2		
11	11/2 & 11/4	Repeated measures t test Independent sample t test	Chapters 9 & 10	
12	11/9 & 11/11	Chi-square distribution Chi-square test	Chapter 14	HW4 Due Monday (11/9) before Class on Canvas HW5 Distributed Monday (11/9) after Class
13	11/16 & 11/18	Correlation & Regression	Chapters 12 & 13	
14	11/23 & 11/25	buffer	Chapter 11	***11/25 – Thanksgiving Break No Class*** HW5 Due Monday (11/23) before Class on Canvas HW6 Distributed Monday (11/23) after Class Optional R Take-Home Exam (Required for 6022) Distributed Monday (11/23) after Class
15	11/30 & 12/2	One-way ANOVA		
16	12/7	Final review		HW6 Due Monday (12/7) before Class Optional R Take-Home Exam (Required for 6022) Due Monday (12/7) before Class