



PUBP 3120 TERM DATE

Statistical Analysis For Public Policy

Tuesdays & Thursdays, 12:30 pm - 1:45 pm, CLASSROOM



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OFFICE

Office Hours: T & R 2:30-3:30 or Zoom (via appointment)

This syllabus contains an overview of the nature of the course, the expectations for students, and helpful resources offered by Georgia Tech. Note that this syllabus is subject to change at the discretion of the instructor with reasonable notice (≥ 24 hours) provided to students.

SUBJECT TO CHANGE

Course Description: What do we know and how do we know it? This course introduces students to empiricism, the foundations of probability, and the concepts of statistics and econometrics. The primary emphasis will be on assembling the basic statistical toolkit for applied policy analysis and form a basis for asking and answering empirical questions. Students will be well equipped to carry forward the lessons of this class towards research design, policy evaluation and analysis, and data translation. The course is intended for students without prior knowledge of introductory statistics and those with a wide range of methodological backgrounds (e.g., mathematics, econometrics, and computer science).

Course Goals: The course will develop skills students can use to critically evaluate empirical questions and evidence, especially as they relate to public policy. To do so, the course introduces topics including, but not limited to:

- Descriptive Statistics
- Probability Theory
- Inferential Statistics
- Hypothesis Testing
- Regression
- Research Design

By the end of the course, it is expected that you will be able to:

- Identify and explain basic concepts in probability and statistics.
- Critically digest and describe both observational and experimental data.
- Interpret and critique key issues in public policy.
- Not be fooled by sensational headlines or videos on TikTok.

Prerequisite(s): No prior courses are required. A strong grasp of algebra is suggested, though not necessary.

Required Text: *Statistical Methods for the Social Sciences*, 5th Edition

Authors: Alan Agresti and Barbara Finlay; **ISBN-13:** 978-0134507101

This textbook is *required* for the course. However, you do not have to acquire the most recent edition. eBay is your friend.

Recommended Text: *Introduction to Econometrics*, 4th Edition

Authors: James Stock and Mark Watson; **ISBN-13:** 978-0134461991

This textbook is *recommended* for the course. However, you do not have to acquire the most recent edition. Some chapters will be provided to students via the course page. An interested student can find cheap copies online.

Suggested Text: *Naked Statistics*

Author: Mark Wheelan; **ISBN-13:** 978-0393347777

This short book is suggested for the course. Readings will be suggested periodically to support the material in the course.

Grade Distribution: The course consists of several assessments totaling 1,000 points.

Participation	100 (10 each)
Four Problem Sets	200 (50 each)
Four Quizzes	200 (50 each)
Midterm Exam	200
Final Exam	300

Participation: In-class participation will be assessed via Kahoot! games during the course. Correct answers are not required to earn full credit. For weeks where multiple Kahoot! games are played, the instance that counts for participation credit will be selected at random. There will be ten Kahoot! games assessed for participation, each receiving 10 points (1% of your overall grade).

Problem Sets: Four problem sets will be assigned throughout the semester, each worth a total of 50 points (5% of your overall grade). The problem sets will be assigned and submitted via the online course page.

Quizzes: Four quizzes will be assigned throughout the semester, each worth a total of 50 points (5% of your overall grade). Quizzes will be assigned during the class period and must be submitted at the end of the allotted time. Quizzes are meant to be short simulations of exam conditions and are designed to be completed in less than 15 minutes. Quizzes dates will be announced the class period before the quiz takes place and make-up quizzes will not be provided unless a university-approved excuse is given.

Midterm Exam: The midterm exam will cover material from the first half of the semester and will count for 200 points (20% of your overall grade). The exam will be taken during the class period and materials (such as course notes, computers, or smart phones) will not be allowed. Calculators (including graphing calculators) can be used during the exam. The midterm will take place during class on February 27. Make-up exams will not be provided unless a university-approved excuse is given.

Final Exam: The final exam will cover material throughout the semester, but will focus more on material we cover after the midterm, and will count for 300 points (30% of your overall grade). The exam will be taken during the assigned final exam period and materials (such as course notes, computers, or smart phones) will not be allowed. Calculators (including graphing calculators) can be used during the exam. The final will take place on Monday, April 28 at 11:20 AM to 2:10 PM.

Grading Scale:

≥ 900	A
800 - 899	B
700 - 799	C
600 - 699	D
≤ 599	F

Course Policies, Expectations, and Guidelines:

Attendance: Although attendance is not required, it is *strongly* suggested. Participation, quizzes, and exams will be assessed in class, and no alternatives will be provided unless an Institute-approved exception is provided. For guidance on approved Institute activities and policies surrounding religious or unexpected absences, see the published guidance on approved exceptions.

Late submissions: Problem set submissions past the assignment deadline can be submitted up to four days late and will receive a penalty for each day late. Submissions submitted one day late are eligible for a maximum of 40 points. Those submitted two days late are eligible for a maximum of 30 points. Those submitted three days late are eligible for a maximum of 20 points. Submissions that are four days late are eligible for a maximum of 10 points. All other submissions will receive no credit. Late submissions will not be permitted via the course page and must be emailed directly to the instructor.

Technology Policy: Laptops, smart phones, and tablets are permitted in class for the purposes of taking notes, recording lecture audio, and participating in Kahoot! games *only*. If you intend to use your device during class, please sit behind pen-and-paper students so that your screen does not distract the class. I have a two-strike policy for class interruption from digital audio: if your device makes noise in class, you must silence it immediately. If there is another infraction, you will surrender your device until the end of the class period. Please be respectful of your fellow students.

Large language models are a reality of today's learning environment. Be careful not to rely on generative models, such as ChatGPT or Google Gemini, for answers to interpretation ques-

tions. Keep in mind that 70% of your course grade will be assessed without additional materials.

Collaboration Policy: I encourage you to work and study together. In my view, education is a collaborative effort from instructor to student, and student to student. However, keep in mind that submissions must be made individually, and quizzes and exams must be taken individually.

Office Hours: My office hours are a time dedicated to YOU! Please take advantage of them. I am here to help you succeed, not just in this course, but as a student here at Georgia Tech. Office hours are reserved to answer questions regarding course material, ask about empirical public policy, and think about big-picture questions that challenge society. I will always make myself available if you have a question about course material. If the office hours listed above are in conflict with your own schedule, I can meet (via appointment) over Zoom.

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.

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:

If necessary, there are a variety of resources available to you that can help you succeed in this class and at Georgia Tech. For help with academic issues, please see the Georgia Tech Library, the Communication Center, and the Center for Academic Success. For mental and emotional help, please reach out to the Counseling Center, the Division of Student Life, and the Women's Resource Center. For a full list of suggested student resources, see this document published by the Center for Teaching and Learning.

Core IMPACTS Statement:

This is a Core IMPACTS course that is part of the Social Sciences area. Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students' broad academic and career goals.

- This course should direct students toward a broad Orienting Question:
How do I understand human experiences and connections?
- Completion of this course should enable students to meet the following Learning Outcomes:
Students will effectively analyze the complexity of human behavior, and how historical, economics, political, social or geographic relationships develop, persist or change.
- Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:
Intercultural Competence, Perspective-Taking, Persuasion

Sketch of Course Outline:

The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments.

Week	Content	Assignments
Week 1	<ol style="list-style-type: none"> 1. Syllabus 2. Introduction to Statistics 	<ul style="list-style-type: none"> • Agresti Ch 1 • Stock and Watson Ch 1* • Wheelan Ch 0 and 1*
Week 2	<ol style="list-style-type: none"> 1. Descriptive Statistics, Types of variables and data. 2. Describing a sample 	<ul style="list-style-type: none"> • Agresti Ch 2 and 3 • Wheelan Ch 2
Week 3	<ol style="list-style-type: none"> 1. Deceptive Statistics, Answering Empirical Questions 2. Probability Theory, Single Variable 	<ul style="list-style-type: none"> • Agresti Ch 4.1-4.3 • Stock and Watson Ch 2.1-2.2 • Wheelan Ch 5
Week 4	<ol style="list-style-type: none"> 1. Probability, Expectations and Variance 2. The Standard Normal 	<ul style="list-style-type: none"> • Agresti Ch 4.4-4.7 • Stock and Watson Ch 2.3, 2.5, 2.6 • Wheelan Ch 5$\frac{1}{2}$, 8
Week 5	<ol style="list-style-type: none"> 1. Probability, Two Variables and Conditional Expectations 2. Probability, Sampling Distributions 3. Probability, Central Limit Theorem 	<ul style="list-style-type: none"> • Agresti Ch 4.4-4.7 • Stock and Watson Ch 2.3, 2.5, 2.6 • Wheelan Ch 5$\frac{1}{2}$, 8
Week 6	<ol style="list-style-type: none"> 1. Statistical Inference, Estimators 2. Least Squares Estimator 3. Confidence Intervals 	<ul style="list-style-type: none"> • Agresti Ch 5.1-5.3 • Stock and Watson Ch 3.1 • Wheelan Ch 9
Week 7	<ol style="list-style-type: none"> 1. Hypothesis Testing 2. P-values and Statistical Significance 3. Types of errors 	<ul style="list-style-type: none"> • Agresti Ch 6.1-6.3 • Stock and Watson Ch 3.2-3.3
Week 8	<ul style="list-style-type: none"> • Midterm Review • Midterm Exam 	<ul style="list-style-type: none"> • MIDTERM EXAM

Week	Content	Assignments
Week 9	<ol style="list-style-type: none"> 1. Significance Tests for a Proportion 2. Alternative Tests 3. Decisions and Limitations with P-values 	<ul style="list-style-type: none"> • Agresti Ch 6.2-6.5, 6.8 • Stock and Watson Ch 3.4, 3.5, 3.7
Week 10	<ol style="list-style-type: none"> 1. Comparing Two Groups 2. Randomized Controlled Trials 3. Correlation 	<ul style="list-style-type: none"> • Agresti Ch 7.1-7.4 • Stock and Watson Ch 3.4, 3.5, 3.7
Week 11	<ol style="list-style-type: none"> 1. Linear Relationships 2. Ordinary Least Squares 3. Regression Inference 	<ul style="list-style-type: none"> • Agresti Ch 9.1-9.5 • Stock and Watson Ch 4.1-4.4, 5.1-5.3 • Wheelan Ch 11
Week 12	<ol style="list-style-type: none"> 1. Multivariate Relationships 2. Association vs. Causality 3. Omitted Variable Bias 4. Multiple Regression 	<ul style="list-style-type: none"> • Agresti 10, 11.1 • Stock and Watson 6.1-6.3
Week 13	<ol style="list-style-type: none"> 1. Inference for Multiple Regression 2. Comparing Models 3. Dummies and interactions 	<ul style="list-style-type: none"> • Agresti 11.2-11.5
Week 14	<ol style="list-style-type: none"> 1. Interval vs. External Validity 2. Research Design & Causal Inference 	<ul style="list-style-type: none"> • Stock and Watson Ch 9 • Wheelan Ch 13
Week 15	<ol style="list-style-type: none"> 1. Final Exam Review 2. Reading Period, No class 	
Week 16	<ul style="list-style-type: none"> • Final Exam 	<ul style="list-style-type: none"> • FINAL EXAM