ECON2250 - Statistics for Economists

Fall 2025

Course info

Class meetings

Lecture	Mon & Wed 3:30 - 4:45pm	TBA

Teaching team

Name	Role
Afi Ramadhani	Instructor
TBA	Head TA

Office hours times and locations on Canvas.

Course description

ECON2250 serves as an introduction to probability and statistics for economics. This course contains three main parts: basic probability theory, the nature of data and distributions, and basic statistical inference. Students will build a conceptual understanding of probability/statistics theory and implement and comprehend basic hypothesis testing and utilize appropriate test statistics. Finally, the course will provide a brief introduction to linear regression. Throughout the semester, students will work on a team project where they will develop a research question, answer it using methods learned in the course, and share results through a written report and presentation.

The course is designed to offer a rigorous quantitative approach while emphasizing the visualization of critical concepts using R. Particular emphasis will be given to economic data and

applications. Completing this course will provide students with the necessary background for more advanced courses, such as ECON 3161: Econometric Analysis. Students will gain experience using the computing tools R and GitHub to analyze real-world data from a variety of fields.

Prerequisites

There are no prerequisites for registering for this course, but students are strongly encouraged to complete Calculus courses, such as MATH 1551 (Differential Calculus) and MATH 1552 (Integral Calculus), before enrolling. Interested students with different backgrounds should seek instructor consent.

Course learning objectives

By the end of the semester, you will be able to...

- analyze data to explore real-world multivariable relationships.
- fit, interpret, and draw conclusions from linear and logistic regression models.
- implement a reproducible analysis workflow using R for analysis, Quarto to write reports and GitHub for version control and collaboration.
- explain the mathematical foundations of linear and logistic regression.
- effectively communicate statistical results to a general audience.
- assess the ethical considerations and implications of analysis decisions.

Course materials

Main Textbook:

- Schervish, Mark J., and Morris H. DeGroot. Probability and Statistics, 4th Edition.

Optional Textbook:

- Jason Abrevaya/ Probability and Statistics for Economics and Business An Introduction Using R

Additional readings will be made available as they are assigned. We will use the statistical software R. Students will be able to access R through IAC VLab. See the computing page for more information.

Course community

Supportive community

It is my intent that students from all backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that these rich perspectives be viewed as a resource, strength, and benefit. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups.

Furthermore, I would like to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities. To help accomplish this:

- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. If you prefer to speak with someone outside of the course, your academic dean is an excellent resource.
- I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please let me or a member of the teaching team know.

Pronouns

Pronouns are meaningful tools to communicate identities and experiences, and using pronouns supports a campus environment where all community members can thrive. Please update your gender pronouns in Canvas. You can find instructions to do so here.

Accessibility

If there is any portion of the course that is not accessible to you due to challenges with technology or the course format, please let me know so we can make appropriate accommodations.

Communication

All lecture notes, assignment instructions, an up-to-date schedule, and other course materials may be found on the course website, maghfiraer.github.io/Stats-F25.

Links to Zoom meetings may be found in Canvas. Periodic announcements will be sent via email and will also be available through Ed Discussion and Canvas Announcements. Please check your email regularly to ensure you have the latest announcements for the course.

Email

If you have questions about assignment extensions, accommodations, or any other matter not appropriate for the class discussion forum, please email me directly at maghfira.ramadhani@gatech.edu. **If you email me, please include "ECON2250" in the subject line.** Barring extenuating circumstances, I will respond to ECON 2250 emails within 48 hours Monday - Friday. Response time may be slower for emails sent Friday evening - Sunday.

Five tips for success

Your success on this course depends very much on you and the effort you put into it. Your TAs and I will help you be providing you with materials and answering questions and setting a pace, but for this to work you must do the following:

1. Complete all the preparation work before class.
2. Ask questions. As often as you can. In class, out of class. Ask me, ask the TAs, ask your friends, ask the person sitting next to you. This will help you more than anything else. If you get a question wrong on an assessment, ask us why. If you're not sure about the homework, ask. If you hear something on the news that sounds related to what we discussed, ask. If the reading is confusing, ask.
3. Do the readings and other preparation work.
4. Do the homework and lab. The earlier you start, the better. It's not enough to just mechanically plow through the exercises. You should ask yourself how these exercises relate to earlier material, and imagine how they might be changed (to make questions for an exam, for example.)
5. Don't procrastinate. The content builds upon what was taught in previous weeks, so if something is confusing to you in Week 2, Week 3 will become more confusing, Week 4 even worse, etc. Don't let the week end with unanswered questions. But if you find yourself falling behind and not knowing where to begin asking, come to office hours and work with a member of the teaching team to help you identify a good (re)starting point.

Getting help in the course

- If you have a question during lecture or lab, feel free to ask it! There are likely other students with the same question, so by asking you will create a learning opportunity for everyone.

- The teaching team is here to help you be successful in the course. You are encouraged to attend *office hours*[1] to ask questions about the course content and assignments. Many questions are most effectively answered as you discuss them with others, so office hours are a valuable resource. You are encouraged to use them!
- Outside of class and office hours, any general questions about course content or assignments should be posted on the class discussion forum Ed Discussion. There is a chance another student has already asked a similar question, so please check the other posts in Ed Discussion before adding a new question. If you know the answer to a question posted in the discussion forum, you are encouraged to respond!

Check out the Support page for more resources.

What to expect in the course

Lectures and labs

Lectures and labs are designed to be interactive, so you gain experience applying new concepts and learning from each other. My role as instructor is to introduce you to new methods, tools, and techniques, but it is up to you to take them and make use of them. A lot of what you do in this course will involve writing code, and coding is a skill that is best learned by doing. Therefore, as much as possible, you will be working on a variety of tasks and activities during the lectures and labs. You are expected to prepare for class by completing assigned readings, attend all lecture and lab sessions, and meaningfully contribute to in-class exercises and discussion. Additionally, some lectures will feature application exercises that will be graded based on completing what we do in class.

You are expected to bring a laptop, tablet, or any device with internet and a keyboard to each class so that you can participate in the in-class exercises. Please make sure your device is fully charged before you come to class, as the number of outlets in the classroom will not be sufficient to accommodate everyone.

Teams

You will be assigned to a team at the beginning of the semester. You are encouraged to sit with your teammates in lecture and you will also work with them in the lab sessions. All team members are expected to contribute equally to the completion of the group activities, labs and the final project. You will be asked to complete teamwork evaluations and self-reflections throughout the semester. Failure to adequately contribute to an assignment can result in a penalty to your score relative to the team's overall mark.

[1] Office hours are times the teaching team set aside each week to meet with students.

You are expected to make use of the provided GitHub repository as the central collaborative platform. Commits to this repository will be used as one of several metrics of each team member's relative contribution for each project.

Activities & Assessment

You will be assessed based on six components: application exercises, homework, labs, exams, project, and teamwork.

Labs

In labs, you will apply the concepts discussed in lecture to various data analysis scenarios, with a focus on the computation and communication. Most lab assignments will be completed in teams, and all team members are expected to contribute equally to the completion of each assignment. You are expected to use the team's Git repository in the course's GitHub organization as the central platform for collaboration. Commits to this repository will be used as a metric of each team member's relative contribution for each lab, and there will be periodic peer evaluation on the team collaboration. Lab assignments will be completed using Quarto, correspond to an appropriate GitHub repository, and submitted for grading in Gradescope.

The lowest lab grade will be dropped at the end of the semester.

Homework

In homework, you will apply what you've learned during lecture and lab to complete data analysis tasks and explain the underlying mathematics. You may discuss homework assignments with other students; however, homework should be completed and submitted individually. Similar to lab assignments, homework must be typed up using Quarto and GitHub and submitted as a PDF in Gradescope.

One homework assignment will be dedicated to a ***statistics experience***. The statistics experience is an opportunity to engage with statistics and data science outside of the classroom through podcasts, books, seminars, data analysis competitions, and other activities. As you complete these experiences, the goal is to consider how the material you're learning in the course connects with society more broadly.

The lowest homework grade will be dropped at the end of the semester.

Exams

There will be two exams in this course. Each exam will include a closed-notes in-class component and an open-note take-home component. Through these exams you have the opportunity to demonstrate what you've learned in the course thus far. The exams will focus on both conceptual understanding of the applied and mathematical content and application through analysis and computational tasks. The exams will be based on content in reading assignments, lectures, application exercises, homework, and lab assignments. More detail about the exams will be given during the semester.

Project

The purpose of the final project is to apply what you've learned to analyze an interesting data-driven research question. The project will be completed with your lab teams, and each team will present their work through a written report and presentation. More information about the project will be provided during the semester. You can learn more on the final project page.

Participation (Application exercises + teamwork)

Application exercises

You will get the most out of the course if you actively participate in class and when working with your team. Parts of some lectures will be dedicated to working on Application Exercises (AEs). AEs are submitted by pushing your work to the relevant GitHub repo.

AEs will be graded based on making a good-faith effort to attempt all questions covered in class. You are welcome to, but not required, to work on AEs beyond lecture.

Successful effort on at least 80% of AEs will result in full credit for AEs in the final course grade.

Teamwork

Given the collaborative nature of statistics and data science work, teamwork will be a key part of this course. You will work in teams for in-class activities, lab assignments, and the final course project. There will be periodic peer and self-evaluations to reflect on the team's collaboration. These evaluations will be counted as part of the participation grade.

Grading

The final course grade will be calculated as follows:

Category	Percentage
Homework	30%
Final project	15%
Labs	10%
Exams (2 Midterms)	40%
Participation (AEs + Teamwork)	5%

The final letter grade will be determined based on the following thresholds:

Letter Grade	Final Course Grade
A	>= 90
B	80 - 89.99
C	70 - 79.99
D	60 - 69.99
F	< 60

Course policies

Georgia Tech's Academic Honor Code

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. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or http://www.catalog.gatech.edu/rules/18/.

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.

Student-faculty expectations agreement

It is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See https://catalog.gatech.edu/rules/22/ for an articulation of 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.

Academic honesty

TL;DR: Don't cheat!

- The homework assignments must be completed individually and you are welcomed to discuss the assignment with classmates at a high level (e.g., discuss what's the best way for approaching a problem, what functions are useful for accomplishing a particular task, etc.). However you may not directly share answers to homework questions (including any code) with anyone other than myself and the teaching assistants.
- You may not discuss or otherwise work with others on the exams. Unauthorized collaboration or using unauthorized materials will be considered a violation for all students involved. More details will be given closer to the exam date.
- For the projects and team labs, collaboration within teams is not only allowed, but expected. Communication between teams at a high level is also allowed however you may not share code or components of the project or team labs across teams.
- **Reusing code**: Unless explicitly stated otherwise, you may make use of online resources (e.g. StackOverflow) for coding examples on assignments. If you directly use code from an outside source (or use it as inspiration), you must explicitly cite where you obtained the code. Any recycled code that is discovered and is not explicitly cited will be treated as plagiarism.
- **Use of artificial intelligence (AI)**: You should treat AI tools, such as ChatGPT, the same as other online resources. There are two guiding principles that govern how you can use AI in this course:[2] (1) *Cognitive dimension:* Working with AI should not reduce your ability to think clearly. We will practice using AI to facilitate—rather than hinder—learning. (2) *Ethical dimension*: Students using AI should be transparent about their use and make sure it aligns with academic integrity.
  - **AI tools for code:** You may make use of the technology for coding examples on assignments; if you do so, you must explicitly cite where you obtained the code. Any recycled code that is discovered and is not explicitly cited will be treated as plagiarism. You may use these guidelines for citing AI-generated content.
  - **No AI tools for narrative:** Unless instructed otherwise, AI is **not** permitted for writing narrative on assignments. In general, you may use AI as a resource as you complete assignments but not to answer the exercises for you. You are ultimately responsible for the work you turn in; it should reflect your understanding of the course content.

[2] These guiding principles are based on *Course Policies related to ChatGPT and other AI Tools* developed by Joel Gladd, Ph.D.

If you are unsure if the use of a particular resource complies with the academic honesty policy, please ask a member of the teaching team.

Regardless of course delivery format, it is the responsibility of all students to understand and follow all Duke policies, including academic integrity (e.g., completing one's own work, following proper citation of sources, adhering to guidance around group work projects,and more).Ignoring these requirements is a violation of the Duke Community Standard. Any questions and/or concerns regarding academic integrity can be directed to the Office of Student Conduct and Community Standards at conduct@duke.edu.

Recording classroom activities and sharing course material

In order to preserve class integrity, student privacy, and a safe environment to express opinions, recording of our classes in any format (e.g. using digital, tape, or audio devices) is not allowed. This policy can be waived for students with accommodations upon explicit recommendation from the Office of Disability Services.

Students must receive the written consent of the instructor to sell or otherwise commercialize class notes, lecture slides, lecture videos, and materials such as homework assignments and answers. All of the materials for this course is publicly available.

Freedom of expression

As a member of academic community at Georgia Tech, I respect your rights to the freedom of speech and expression. I am also committed to maintaining an orderly learning environment for all students and ensuring that all facilities are used in a way that facilitates teaching, learning, and research. Therefore, you should treat your peers and instructor respectfully in discussion. Disagreements are likely to happen. When they do, you are expected to disagree respectfully and to keep your discussion focused on evidence.

Discussions in this class are expected to take place solely within the course. Thus, statements made during class should not be quoted on social media unless the individual being quoted has provided their express permission. This applies to the instructor, students, and classroom guests. This policy is meant to protect student privacy and create a safe environment to learn.

Electronic devices

Research on learning shows that unexpected noises and movement automatically divert and capture people's attention, which means you are affecting everyone's learning experience if your cell phone, laptop, tablet, etc. makes noise or is visually distracting during class. In

addition, it is difficult or impossible to take good notes on an electronic device due to the abundance of mathematical notation and graphing in this course.

Thus, students will not use cell phones in class, and devices must be set to silent. You may use a laptop or tablet to take notes, but being distracted in class by social media will result in the loss of participation points.

There may be times, however, when you cannot attend class. If you miss a lecture, make sure to review the material and complete the application exercise, if applicable, before the next lecture. Labs dedicated to completing the lab assignment and collaborating with your lab team. If you miss a lab session, make sure to communicate with your lab TA and teammates about how you can make up your contribution. If you know you're going to miss a lab session and you're feeling well enough to do so, notify your TA and teammates ahead of time.

Attendance and tardiness

Every student is expected to attend and participate in lecture and labs. Attendance is key for success in this class. I will not keep track of attendance; however, participation is part of the course grade. In previous years, students who skipped class consistently perform worse on exams. I strongly encourage students to attend every class.

Please arrive on time for class and avoid leaving class early. If this cannot be avoided on a given class day, please communicate with the instructor beforehand. Students who disrupt class by arriving late and leaving early may have their participation grade penalized.

Excused absences

If you are sick or there is a death in the family, per Georgia Tech's policy, you must submit your doctor's note/documentation to the Office of the Dean of Students for verification: https://studentlife.gatech.edu/resources/class-attendance.

Athletics absences

If you are a student athlete, you must obtain statements of approved absence from the Office of the Registrar https://studentlife.gatech.edu/resources/class-attendance one week in advance of your planned absence. I will accommodate your schedule if I have enough time, so please get in touch early.

Late work policy

The due dates for assignments are there to help you keep up with the course material and to ensure the teaching team can provide feedback in a timely manner. We understand that things come up periodically that could make it difficult to submit an assignment by the deadline. *Note that the lowest homework and lab assignment will be dropped to accommodate such circumstances.*

- Homework and labs may be submitted up to 2 days late. There will be a 10% deduction for each 24-hour period the assignment is late.
- The late work policy for exams will be provided with the exam instructions.
- The late work policy for the project will be provided with the project instructions.

Waiver for extenuating circumstances

If there are circumstances that prevent you from completing a lab or homework assignment by the stated due date, you may email me at maghfira.ramadhani@gatech.edu before the deadline to waive the late penalty. In your email, you only need to request the waiver; you do not need to provide explanation. *This waiver may only be used once in the semester, so only use it for a truly extenuating circumstance.*

If there are circumstances that are having a longer-term impact on your academic performance, please let your academic dean know, as they can be a resource. Please let me know if you need help contacting your academic dean.

Regrade Requests

Regrade requests must be submitted on Gradescope within a week of when an assignment is returned. Regrade requests will be considered if there was an error in the grade calculation or if you feel a correct answer was mistakenly marked as incorrect. Requests to dispute the number of points deducted for an incorrect response will not be considered. Note that by submitting a regrade request, the entire question will be graded which could potentially result in losing points.

No grades will be changed after the final project presentations.

Accommodations

Academic accommodations

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404) 894-2563 or http://disabilityservices.gatech.edu, 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 to set up a time to discuss your learning needs. Your accommodations cannot be put into place until you discuss them with me.

Religious accommodations

Students are permitted by university policy to be absent from class to observe a religious holiday. You can find the relevant notification form here: https://registrar.gatech.edu/info/institute-approved-absence-form-for-students

Academic and wellness support

Center for Academic Success

There are times may need help with the class that is beyond what can be provided by the teaching team. In those instances, I encourage you to visit the Center for Academic Success. The Center for Academic Success offers free tutoring, guided group study, co-curricular assistance, and more.

Mental Health and Wellness

The VP of Student Engagement and Well-Being offers supports for mental health, wellness, psychiatry, and supports to victim-survivors of sexual violence

Important dates

- **August 18**: Classes begin
- **September 1**: Labor Day
- **October 6 - 7**: Fall Break
- **TBD**: Last day to withdraw with "W"
- **November 26 - 28**: Thanksgiving break
- **December 1**: Last class
- **December 3 - 4**: Reading period

- **December 4 - 11**: Final exam period

Click here for the Georgia Tech Fall 2025 academic calendar.