Syllabus

Teaching team & office hours

Role	Name	Office hours	**Location**
Instructor	Prof. Maria Tackett	Mon 10:30 - 11:30am Wed 1:30 - 2:30pm	Old Chem 118B
		or by appointment	Old Chem 118B or Zoom
Teaching Assistant	Hun Kang	Tue 3 - 5pm	Old Chem 203B

Course info

	Day	Time	Location
Lectures	Mon & Wed	3:05 - 4:20pm	Physics 205
Lab 01	Thu	3:05 - 4:20pm	Perkins 071 (Link #5)
Lab 02	Thu	4:40 - 5:55pm	Perkins 087 (Link #3)

Textbooks

All books are freely available online. Print copies are also available for purchase.

Beyond Multiple Linear Regression	Roback, Legler	CRC Press, 1st edition, 2020
R for Data Science	Wickham, Cetinkaya-Rundel, Grolemund	O'Reilly, 2nd edition, 2023

Tidy Modeling with R	Kuhn, Silge	O'Reilly, 1st edition, 2022

Course description

STA 310 builds upon the content in STA 210: Regression Analysis. In STA 310 students will be introduced to generalized linear models (GLMs), a broad modeling framework that includes linear and logistic models, among others. Students will learn the basic theory of GLMs and how they can used to model a variety of response variables with non-normal distributions. Students will also learn an extension of GLMs that can be applied to modeling data with correlated observations, such as data with repeated measures.

Prerequisites

The prerequisites for the course are STA 210 and one of STA 230/STA 231/STA 240. This course assumes students have some familiarity with linear regression, analyzing data using RStudio, using version control with Git and collaborating using GitHub. The semester will start with a short review of linear regression and computing.

Course learning objectives

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

- describe generalized linear models (GLMs) as a unified framework.
- explain how specific models fit into the GLM framework, including extensions for correlated data.
- identify the appropriate model given the data and analysis objective.
- analyze real-world data by fitting and interpreting GLMs.
- use R for analysis, Quarto to write reports, git for version control, and GitHub for collaboration.
- effectively communicate results from statistical analyses to a general audience in writing and oral presentations.

Course community

Duke Community Standard

As a student in this course, you have agreed to uphold the Duke Community Standard as well as the practices specific to this course.

Inclusive community

It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity and in alignment with Duke's Commitment to Diversity and Inclusion. 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 that supports a diversity of thoughts, perspectives and experiences, and honors your identities. To help accomplish this:

- If you have a name that differs from those that appear in your official Duke records, please let me know! You'll be able to note this in the Getting to know you survey.
- 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 Duke Hub. You can learn more at the Center for Sexual and Gender Diversity's website.

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.

The Student Disability Access Office (SDAO) is available to ensure that students are able to engage with their courses and related assignments. Students should be in touch with the Student Disability Access Office to request or update accommodations under these circumstances.

Communication

All lecture notes, assignment instructions, an up-to-date schedule, and other course materials may be found on the course website, sta310-sp24.netlify.app

Announcements will be sent through Canvas and email. Please check your email regularly to ensure you have the latest announcements for the course.

Where to get help

- 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. Please use them!
- Outside of class and office hours, any general questions about course content or assignments should be posted on the course Slack. There is a chance another student has already asked a similar question, so please check the other posts on Slack before adding a new question. If you know the answer to a question posted on Slack, I encourage you to respond!

Check out the Support page for more resources.

Email

If there is a question that's not appropriate for Slack, please email directly with "STA 310" in the subject line. Barring extenuating circumstances, I will respond to STA 310 emails within 48 hours Monday - Thursday. Response time may be slower for emails received Friday - Sunday.

Activities & Assessment

The activities and assessments in this course are designed to help you successfully achieve the course learning objectives. Each activity and assessment is part of the *prepare, practice, perform* cycle for each topic.

[1] Office hours are times the teaching team set aside each week to meet with students. Click here to learn more about how to effectively use office hours.

- **Prepare**: Includes reading assignments and occasional videos to introduce new concepts and ensure a basic comprehension of the material.
- **Practice**: Includes in-class activities and application exercises to explore the topics new topics in more depth. These activities will be completed during lecture. As they are intended for practice, they will not be graded.
- **Perform**: Includes homework, quizzes, and the projects. These assignments are an opportunity for you to demonstrate your understanding of the course material and how it is applied to the analysis of real-world data.

Readings

There will be reading assignments to accompany each topic. Readings will primarily come from the course textbook *Beyond Multiple Linear Regression*, but they may periodically include articles and other resources. It is strongly recommended that you complete the readings before lectures, so you have an introduction to the topic before class.

Lectures

Lectures will be interactive with a mix of presenting lecture notes, short in-class activities, and application exercises. The activities and application exercises will give you an opportunity to explore concepts in more depth and get practice applying them to real-world data.

Homework

There will be 6 homework assignments during the semester. In these assignments, you will apply what you've learned as you answer conceptual questions and complete guided and open-ended analyses. You may discuss homework assignments with other students; however, homework should be completed and submitted individually. Homework will be submitted in your private GitHub repo.

The lowest homework grade is dropped.

Quizzes

There will be 6 quizzes during the semester. Quizzes will cover the readings, lecture notes and activities, and any assignments since the previous quiz.

The lowest quiz grade is dropped.

Projects

There will be 2 short group projects and 1 final individual project in this course. Teams will be randomly assigned for each of the mini projects. More details about each project will be available as they are assigned.

Grading

The final course grade will be calculated as follows:

Category	Percentage
Homework	40%
Project 01	10%
Project 02	10%
Final project	20%
Quizzes	20%

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

Letter Grade	Final Course Grade
A	>= 93
A-	90 - 92.99
B+	87 - 89.99
B	83 - 86.99
B-	80 - 82.99
C+	77 - 79.99
C	73 - 76.99
C-	70 - 72.99
D+	67 - 69.99
D	63 - 66.99
D-	60 - 62.99
F	< 60

These are upper bounds for grade cutoffs, depending on the class performance the cutoffs may be lowered but they won't be increased.

Course policies

Academic honesty

By participating in this course, you agree to abide by the following when completing assignments:

- 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 quizzes. Unauthorized collaboration or using unauthorized materials will be considered a violation for all students involved.
- For the projects 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 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.

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

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.

Any violations in academic honesty standards as outlined in the Duke Community Standard and those specific to this course will automatically result in a 0 for the assignment and will be reported to the Office of Student Conduct for further action.

Late work & extensions

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 within a timely manner. We understand that things come up periodically that could make it difficult to submit an assignment by the deadline.

- Homework will be accepted up to 48 hours after the deadline. There will be a 5% deduction for each 24-hour period the assignment is late.
- No late work is accepted on quizzes, and there are no makeups for missed quizzes.
- Late policy for the projects:
  - **Presentation:** Late presentations are not accepted and there are no make ups for missed presentations.
  - **Write up:** GitHub repositories will be closed to contributions at the deadline. If you need to submit your work late, please send me a message via Slack or email to reopen your repository. There will be a 5% deduction for write ups submitted late but the same day (by 11:59pm). There will be a 10% deduction for write ups submitted the next day (by 11:59pm). There will be a 15% deduction for write ups submitted two days late (by 11:59pm). No credit given for write ups submitted more than 2 days after the deadline.
  - **Peer evaluation:** No late work is accepted on peer evaluations. If you do not turn in your peer evaluation, you get 0 points for your own peer score as well, regardless of how your teammates have evaluated you. There are no make ups for peer evaluations.

Late waiver for extenuating circumstances

If there are circumstances that prevent you from completing a homework assignment by the deadline, you may email me 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 for 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 via email to me within a week of when an assignment is returned. Regrade requests will only be considered if points were tallied incorrectly or a correct answer was mistakenly marked as incorrect. Requests to dispute the number of points deducted for an incorrect response will not be considered. If a regrade request is submitted, the entire question will be regraded, so your score could increase, decrease, or remain unchanged.

Attendance

You are expected to attend all lectures and labs with a fully-charged laptop or tablet with access to RStudio. We understand there may be times when you are unable to attend a class meeting; in such instances it is your responsibility to make up the missed material. Labs will primarily be used to work on homework and the projects. If you miss a lab meeting dedicated to group work, please communicate with your teammates to make a plan to contribute to the assignment. Click here for more information on the Trinity attendance policies.

Attendance Policy Related to COVID Symptoms, Exposure, or Infection

Student health, safety, and well-being are the university's top priorities. To help ensure your well-being and the well-being of those around you, please do not come to class if you have tested positive for COVID-19 or have possible symptoms and have not yet been tested. If any of these situations apply to you, you must follow university guidance related to the ongoing COVID-19 pandemic and current health and safety protocols. If you are experiencing any COVID-19 symptoms, contact student health (dshcheckin@duke.edu, 919-681-9355). Learn more about current university policy related to COVID-19 at coronavirus.duke.edu.

To keep the university community as safe and healthy as possible, you will be expected to follow these guidelines. Please reach out to me and your academic dean as soon as possible if you need to quarantine or isolate so that we can discuss arrangements for your continued participation in class.

Accommodations

Academic accommodations

If you are a student with a disability and need accommodations for this class, it is your responsibility to register with the Student Disability Access Office (SDAO) and provide them with documentation of your disability. SDAO will work with you to determine what accommodations are appropriate for your situation. Please note that accommodations are not retroactive and disability accommodations cannot be provided until a Faculty Accommodation Letter has been given to me. Please contact SDAO for more information: sdao@duke.edu or access.duke.edu.

Religious accommodations

Students are permitted by university policy to be absent from class to observe a religious holiday. Accordingly, Trinity College of Arts & Sciences and the Pratt School of Engineering have established procedures to be followed by students for notifying their instructors of an absence necessitated by the observance of a religious holiday. Please submit requests for religious accommodations at the beginning of the semester so that we can work to make suitable arrangements well ahead of time. You can find the policy and relevant notification form here: trinity.duke.edu/undergraduate/academic-policies/religious-holidays

Additional support

Academic Resource Center

The Academic Resource Center (the ARC) offers services to support students academically during their undergraduate careers at Duke. The ARC can provide support with time management, academic skills and strategies, unique learning styles, peer tutoring, learning consultations, learning communities, and more. ARC services are available free to any Duke undergraduate student, in any year, studying in any discipline.

Contact ARC@duke.edu, 919-684-5917.

Mental health and wellness resources

Student mental health and wellness is of primary importance at Duke, and the university offers resources to support students in managing daily stress and self-care. Duke offers several resources for students to seek assistance on coursework and to nurture daily habits that support overall well-being, some of which are listed below

- **DuWell**: (919) 681-8421, provides Moments of Mindfulness (stress management and resilience building) and Koru (meditation) programming to assist students in developing a daily emotional well-being practice. Click here to see schedules for programs please see. All are welcome and no experience necessary. duwell@studentaffairs.duke.edu, or studentaffairs.duke.edu/duwell

If your mental health concerns and/or stressful events negatively affect your daily emotional state, academic performance, or ability to participate in your daily activities, many resources are available to help you through difficult times. Duke encourages all students to access these resources.

- **DukeReach**: Provides comprehensive outreach services to identify and support students in managing all aspects of well-being. If you have concerns about a student's behavior or health visit the website for resources and assistance. studentaffairs.duke.edu/dukereach
- **Counseling and Psychological Services (CAPS)**: CAPS services include individual, group, and couples counseling services, health coaching, psychiatric services, and workshops and discussions. CAPS also provides referral to off-campus resources for specialized care. (919) 660-1000. studentaffairs.duke.edu/caps
- **Blue Devils Care**: A convenient, confidential, and free way for Duke students to receive 24/7 mental health support through TalkNow and scheduled counseling. bluedevilscare.duke.edu
- **Two-Click Support**: Duke Student Government and DukeReach partnership that connects students to help in just two clicks. bit.ly/TwoClickSupport

Technology Accommodations

Students with demonstrated high financial need who have limited access to computers may request assistance in the form of loaner laptops. For new Spring 2024 technology assistance requests, please go here. Please note that supplies are limited.

See the Support page for a more comprehensive list of academic and mental health wellness resources.

Important dates

- **Jan 10:** Classes begin
- **Jan 15**: Martin Luther King, Jr. Holiday - No classes
- **Jan 24**: Drop/add ends
- **Mar 11 - 15**: Spring break - No classes
- **Mar 27** :Last day to withdraw with W
- **Apr 24**: LDOC
- **Apr 25 - 28**: Reading period

- **Apr 19 - May 04**: Final exams

Click here for the full academic calendar.