Data Analysis and Statistical Inference
Spring 2023

Course: STA101L-001

Professor: Dr. Andrea Lane

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Lecture: Tue/Thu 3:30-4:45pm

Lab: Fri

- 01: 8:30-9:45am
- 02: 10:15-11:30am
- 03: 12:00-1:15pm
- 04: 1:45-3:00pm

Website: sta101-spr23-lane.netlify.app

Textbooks: Introduction to Modern Statistics by Mine Çetinkaya-Rundel and Johanna Hardin. Available free at https://openintro-ims.netlify.app/

Course objectives

STA 101 provides an introduction to principles of data exploration and analysis. Data literacy, or the ability to draw meaningful conclusions from quantitative information, is an important skill regardless of your field of study. In this course, you will develop data analysis skills that you will be able to apply in many areas. The course does not assume any prior experience with programming or statistical analysis.

By the end of this course you will be able to:

1. explore, visualize and analyze real data in a reproducible manner

2. gain proficiency in the statistical computing language R and integrated development environment RStudio

3. work collaboratively to apply statistical analyses to a data set of your own choosing

4. present and communicate statistical results effectively

5. be a critical consumer of statistics

Grading policy

Assignment	Description
Labs (20%)	One lab per week.
Exams (30%)	Two take-home, open notes exams.
Regression project (20%)	Written report (PDF).
Final project (30%)	Proposal, video presentation and written report. Students will work in teams.

A >= 93.0, A- < 93.0, B+ < 90.0, B < 87, B- < 83, C+ <80, C < 77, C- < 73, D+ < 70, D < 67, D- < 63, F < 60

Labs

In labs, you will apply the concepts discussed in lecture to various data analysis scenarios. Labs will focus on both computation and conceptualization. Lab assignments will be completed using R Markdown and submitted as PDF for grading in Gradescope. While you may collaborate with others on lab assignments, your final solution should be your own.

Exams

There will be two take-home, open notes exams. Through these exams you have the opportunity to demonstrate what you've learned in the course thus far. Each exam will include small analyses and computational tasks related to the content in application exercises and labs. More details about the content and structure of the exams will be discussed during the semester.

Projects

There will be a mid-semester prediction project and a final project. The prediction project will introduce you to conducting independent analyses and writing a formal report using a pre-specified data set. The final project allows you to explore a question and data set of your own. More details about the projects will be provided during the semester. Projects will be completed in teams.

Course policies

Inclusive 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 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.

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 symptoms related to COVID-19, have had a known exposure to COVID-19, or have tested positive for COVID-19. 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 at 919-681-9355. 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.

Academic honesty: You should be familiar with Duke's community standard: https://studentaffairs.duke.edu/conduct/about-us/duke-community-standard

By enrolling in this course, you commit to upholding Duke's community standard reproduced as follows:

- I will not lie, cheat, or steal in my academic endeavors;
- I will conduct myself honorably in all my endeavors; and
- I will act if the Standard is compromised.

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.

Please abide by the following as you work on assignments in this course: - You may discuss lab assignments with other students; however, you may not directly share (or copy) code or write up with other students. For team assignments, you may collaborate freely within your team. You may discuss the assignment with other teams; however, you may not directly share (or copy) code or write up with another team. Unauthorized sharing (or copying) of the code or write up will be considered a violation for all students involved. - 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. - Reusing code: Unless explicitly stated otherwise, you may make use of online resources (e.g. Stack-Overflow) 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.

Late policy:

Late work will not be accepted. To accommodate this strict policy, your lowest lab will be dropped.

Missed lab or exams can only be excused under exceptional circumstances. The Duke policy for illness requires a short-term illness report or a letter from the Dean; except in emergencies, all other absenteeism must be approved in advance (e.g., an athlete who must miss class may be excused by prior arrangement for specific days). For emergencies, email notification is needed at the first reasonable time.

Procedures for Requesting a Regrade

Every effort will be made to mark your work accurately. We are on your side, and want you to receive every point you have worked to earn. However, sometimes grading mistakes happen. If you believe that an error has been made, return the paper to the instructor within four days, stating your claim in writing.

The following claims will be considered for re-grading:

(i) points are not totaled correctly;

(ii) the grader did not see a correct answer that is on your paper;

(iii) your answer is the same as the correct answer, but in a different form (e.g., you wrote a correct answer as 1/3 and the grader was looking for .333);

(iv) your answer to a free response question is essentially correct but stated slightly differently than the grader's expectation.

The following claims will not be considered for re-grading:

(v) arguments about the number of points lost;

(vi) arguments about question wording.

Considering re-grades consumes time and resources that TAs and the instructor would rather spend helping you understand material. Please bring only claims of type (i), (ii), (iii), or (iv) to our attention.

Communication: All lecture notes, assignment instructions, an up-to-date schedule, and other course materials may be found on the course website. Announcements will be emailed to the class through sakai.

Please check your email regularly to ensure you have the latest announcements for the course. For quick communication with your peers and the teaching team, see the course slack for general questions and discussion.

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.

Additional resources

Academic Resource Center: There are times when you may need help with the class beyond what can be provided by the teaching team. In those instances, I encourage you to visit the Academic Resource Center. The Academic Resource Center (ARC) offers free services to all students during their undergraduate careers at Duke. Services include Learning Consultations, Peer Tutoring and Study Groups, ADHD/LD Coaching, Outreach Workshops, and more. Because learning is a process unique to every individual, they work with each student to discover and develop their own academic strategy for success at Duke. Contact the ARC to schedule an appointment. Undergraduates in any year, studying any discipline can benefit! Contact ARC@duke.edu, 919-684-5917.

CAPS: Duke Counseling & Pyschological Services (CAPS) helps Duke Students enhance strengths and develop abilities to successfully live, grow and learn in their personal and academic lives. CAPS recognizes that we are living in unprecedented times and that the changes, challenges and stressors brought on by the COVID-19 pandemic have impacted everyone, often in ways that are tax our well-being. CAPS offers many services to Duke undergraduate students, including brief individual and group counseling, couples counseling and more. CAPS staff also provides outreach to student groups, particularly programs supportive of at-risk populations, on a wide range of issues impacting them in various aspects of campus life. CAPS provides services to students via Telehealth. To initiate services, you can contact their front desk at 919-660-1000.