Statistical Methods I – DSA 8010 (401)

Fall 2024

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Email: dekunke@clemson.edu   **Lecture:** Online
Zoom link: See Canvas   **Phone:** 864-656-1656
Office hours: By appointment on Sundays 6pm-7:30pm
and during business hours

Course objectives. The primary goal of this course is to teach students to approach data analysis from a statistical perspective. Students will reach that goal by developing expertise in exploratory data analysis, foundational probability concepts, and widely-used statistical procedures.

Upon completion of this course, students should be able to

(1) perform exploratory data analysis in R and communicate its results clearly.
(2) perform probability calculations using discrete and continuous distributions.
(3) evaluate what population a data set is representative of.
(4) perform standard statistical procedures, such as t-tests, analysis of variance, and linear regression
(5) Select an appropriate statistical procedure for , and explain when they are appropriate.
(6) list modeling assumptions for procedures such as t-test, analysis of variance, and linear regression, and assess whether a statistical model is appropriate.

Recommended textbook. *OpenIntro Statistics, 4th ed.* by D. Diez, M. Cetinkaya-Rundel, C. Barr.

Modality. The course is asynchronous; however, there may be occasional synchronous sessions. These sessions will always be optional and will be recorded.

Assessments. Students will be expected to demonstrate ability in computation, critical statistical thinking, and clear communication of statistical methods and results. Grades will be weighted as follows:

  Participation quizzes (5%)   Quizzes (35%)   Mini projects (35%)   Final quiz/project (25%)

Final course grades will be assigned using the following grading scheme:

A: [90, 100]   B: [80-90)   C: [70-80)   F: [0,70)

Important dates. Students can drop courses without record through August 27 and drop with a W grade through October 28.

Fall break: Oct 14-15.

Election day: Nov 5

Thanksgiving: Nov 27-29

Computing. The primary computational tool for this course is the R statistical programming language. Students are required to download and install R from https://www.r-project.org/. They may choose to use RStudio (https://rstudio.com/) as their editing environment.

Statement of instructor/student interaction. Students are expected to interact with each other and with the instructor on a weekly basis. Interactive discussions on course topics will be posted in Canvas.

Attendance policy. This course is entirely asynchronous. Successful students will engage with the course material each week and participate on a regular basis. Students should expect to spend 3 hours per credit hour on the course every week.

   Students may be dropped from the course for non-participation. This may occur in two possible situations:
   1. If no participation is recorded before the last day to drop without record.
   2. If no participation is recorded for 3 consecutive weeks.

Recorded participation includes completion of checkpoint quizzes, email correspondence with instructor, and/or submission of graded assessments.

Office hours. Office hours are not review sessions, and students are encouraged to bring specific questions when attending. Zoom office hours will be available by appointment. Appointments are available from 8:30am - 4:45pm Monday - Friday and Sundays 6pm-7:30pm. On Sundays, office hours may not be private.

   Students should email the instructor at least 12 hours prior to desired appointment time to request office hours. Please provide three potential 30-minute windows to help us schedule a time efficiently.

Email communication. Because of privacy regulations, University faculty and staff may email students only through Clemson email. Therefore, you must use your Clemson email account in this course for all email communications. Check your Clemson account at least three times per week for important messages.

Students are encouraged to ask course-related questions through the Canvas discussion boards.

The instructor will respond to emails within 48 hours during the week. Response times will generally be longer over the weekends and holidays.

Academic integrity statement. University statement on academic integrity: "As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately to charges of violations of academic integrity."

Please refer to the current Graduate School Policy Handbook for the graduate academic integrity policy.

Accessibility statement. Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to a class should let the instructor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864- 656-6848 or by emailing studentaccess@lists.clemson.edu. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their instructors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: http://www.clemson.edu/campus-life/campus-services/sds/.

Title IX statement. The Clemson University Title IX (Sexual Harassment) statement must be included, as follows:Title IX Policy: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. The University is committed to combatting sexual harassment and sexual violence. As a result, you should know that University faculty and staff members who work directly with students are required to report any instances of sexual harassment and sexual violence, to the University's Title IX Coordinator. What this means is that as your professor, I am required to report any incidents of sexual harassment, sexual violence

or misconduct, stalking, domestic and/or relationship violence that are directly reported to me, or of which I am somehow made aware. There are two important exceptions to this requirement about which you should be aware:

- Confidential Resources and facilitators of sexual awareness programs such as "Take Back the Night and Aspireto be Well" when acting in those capacities, are not required to report incidents of sexual discrimination.

- Another important exception to the reporting requirement exists for academic work. Disclosures about sexual harassment, sexual violence, stalking, domestic and/or relationship violence that are shared as part of an academic project, a research project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX Coordinator.

This policy is located at http://www.clemson.edu/campus-life/campus-services/access/title-ix/. Ms. Alesia Smith is the Executive Director for Equity Compliance and the Title IX Coordinator. Her office is located at 223 Holtzendorff Hall, phone number is 864.656.3181, and email address is alesias@clemson.edu.

Online conduct   Appropriate online academic conduct means maintaining a safe learning environment based on mutual respect and civility. All participants in Clemson online courses are expected to behave professionally by adhering to these standards of conduct:

- Never transmit or promote content known to be illegal.

- Respect other people's privacy as well as your own.

- Never use harassing, threatening, embarrassing, or abusive language or actions.

Online communication that fails to meet these standards of conduct will be removed from the course. Repeated misconduct may result in being blocked from online discussions, receiving a grade penalty, or being dismissed from the course. Such misconduct in the online environment may also be reported to officials for appropriate action in accordance with University policy. If you ever feel as though our online classroom is inappropriate or uncomfortable, please first contact your instructor with your concerns.

AI Policy.   Generative AI tool such as ChatGPT are discouraged for all purposes in this course. These tools can provide helpful information, but they also can generate information that is unclear, irrelevant, or inaccurate. Reliance on AI may hinder students' mastery of the course material. Specific policies are as follows:

- AI may be used to generate ideas, brainstorm, or edit a project document. Students must clearly acknowledge their use of AI using a statement similar to the example here:

- AI may not be cited as a source in a project. Any statement generated by AI must be verified by a reliable, published source (e.g. a journal article) before included in written work.

- Under no circumstances may a course data set be uploaded into an AI tool. Data sets are often full of private or proprietary information, and sometime even protected by copyright. DSA students should not be in the habit of sharing data sets with unauthorized users.

- Use of AI to assist in debugging of code is not strictly forbidden; however, it is highly discouraged. The instructor will typically be unable to assist students in fixing code that they have not written.

- AI may not be used in midterm/final quizzes.

More on assessments.

Participation quizzes. Checkpoint quizzes at the end of most modules serve to check your basic understanding of the topics covered. Students are allowed multiple attempts on these questions. The quizzes should be completed as a module is completed; however, students have until **December 10, 2024** at 11:59pm to earn credit for them.

Mini-projects. The mini-projects will require students to analyze a data set with the goal of addressing one or more key questions about the data. Each project will be a 1-2 page report summarizing the analytical approach and findings. Reports must be carefully proofread and include clear verbal explanations of all analyses conducted. Code for the analysis should be submitted as a supplement.

Purpose. The primary purpose of these assessments is to practice analyzing data and making appropriate conclusions based on evidence from the data.

Late policy. *Late submissions will be accepted at any point before Dec 6. A 10% per day late penalty will apply for a maximum penalty of 30%. There will be no exceptions to the penalty policy except in the most extreme circumstances.*

Collaboration policy. Students may be allowed to collaborate on some or all mini-projects. The collaboration policy will be stated on the assignment document.

Re-grade and re-do policy. Students will have an opportunity to correct and resubmit a mini-project if they are unhappy with their performance. They can also request a re-grade of a project if they believe an error occurred in grading. More details on this policy will be available when these assignments are completed.

Quizzes. For each unit, there will be a timed quiz in Canvas covering concepts and calculations related to that unit. The quiz windows are tentatively schedule for Friday 5pm to Monday at midnight. Books and notes are allowed. All students will have the opportunity to submit quiz corrections, no later than the following Friday, for half credit.

Purpose. To check that you are able to correctly apply correct statistical concepts to data analysis and obtain accurate numeric results.

Late policy. *There will be no extensions of the quiz window for any quiz for any reason. If a quiz is missed, student may submit corrections for half-credit.*

Collaboration policy. Collaboration is not allowed for the quizzes. Collaboration is allowed for quiz corrections.

Labs. The weekly labs provide data sets and exercises to give you hands-on practice with the week's topics. Labs will have suggested due dates but will not be graded. Students are strongly encouraged to complete all labs by the posted due dates.

Purpose. To reinforce the course topics in a hands-on environment and to practice R skills.

Collaboration policy. Collaboration is encouraged.