STAT 515: Statistical Methods I
Fall 2026
MW 9:40 AM - 10:55AM, LeConte 206

Instructor: Yen-Yi Ho
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Class Meeting Times: MW 9:40 AM- 10:55AM, LeConte 206
Office Hours: Th 16:30– 17:30 PM, Friday 11:00 AM -12:00PM or by appointment.
Teaching Assistant: Alex Goebel (AJGOEBEL@email.sc.edu).
TA Office Hours: Tuesday at 12PM -1 PM, Thursday at 12PM - 1 PM (LeConte 219A) or Virtual (please email TA for the link).

Textbook and Required Material

1. An Introduction to Statistical Methods & Data Analysis (R. Lyman Ott and Michael Longnecker) 7th Edition (Required)

Course Description

A data-centered introduction to statistical reasoning and applied analysis. Students learn to define research questions, collect and summarize data, use probability models, make inferences about means, variances, and proportions, compare several groups, analyze categorical data, and fit and evaluate simple linear regression models. The course emphasizes interpretation, assumptions, practical significance, ethical communication, and the use of R for selected analyses.

The semester follows Chapters 1-11 of Ott and Longnecker, the sequence the authors identify for a one-semester course. The organizing framework is the four-step process: **define the problem; collect the data; summarize the data; and analyze, interpret, and communicate the results.**

Course Learning Outcomes

1. Formulate a clear statistical question and identify the target population, sample, variables, parameters, and appropriate unit of analysis.
2. Distinguish observational studies from experiments and evaluate sampling bias, confounding, randomization, replication, blocking, and the limits of causal claims.
3. Construct, select, and interpret appropriate graphical and numerical summaries for one or more variables.
4. Apply probability rules and common probability distributions, including binomial, Poisson, and normal models, and explain the role of sampling distributions.

5. Construct and interpret confidence intervals and hypothesis tests for one and two population central values, proportions, and selected variance parameters.
6. Use one-way ANOVA, nonparametric alternatives, and multiple-comparison procedures to compare more than two groups.
7. Analyze categorical data using proportion methods, chi-square procedures, odds, and odds ratios.
8. Fit and evaluate a simple linear regression model, make predictions, assess assumptions, and interpret correlation without confusing association with causation.
9. Use R to create reproducible summaries, graphics, probability calculations, inferential analyses, and diagnostic displays.
10. Communicate conclusions in context, including uncertainty, assumptions, limitations, statistical significance, and practical significance.

Details on Graded Assignments

Homework (10%): Weekly homework assignments will be posted on Blackboard. Homework will be collected on Monday before class starts and only graded for completeness. Doing homework well is essential for preparing for quizzes and exams.

Quizzes (15%): Weekly in-class quizzes will be given on Wednesday. You need a calculator for quizzes. The quizzes will be graded for correctness. No make-up quizzes will be given.

Exams: There will be two midterm exams (**25% each**) (tentatively on Sep 30 and Nov 04) and a final exam (**Dec. 9, 9:00 AM**). All exams are closed notes, closed book with a formula sheet provided. You need a calculator for exams.

Grading

Components		**Grading Scale:**			
Quizzes	15%	A	90-100%	C	70-76.9%
Exam 1	25%	B+	87-89.9%	D+	67-69.9
Exam2	25%	B	80-86.9%	D	60-66.9%
Homework	10%	C+	77-79.9%	F	Less than 60%
Final Exam	25%				
TOTAL	100%				

Expectations

- Attend classes regularly.
- Mute cell phones and refrain from using them during class.
- Read/review appropriate sections or slides before/after class.

- Spend sufficient time on homework assignments (by doing them, you are essentially studying for quizzes and exams).
- Visit office hours for help with homework or class materials.

Excused Absences and How to Report an Illness

All absences due to documented illness or quarantine will be excused, and no grade penalty will be assessed for missing classes for this reason. If you experience COVID-19 symptoms, please stay home, contact the COVID-19 Student Health Services (SHS) nurse line (803-576-8511), complete the COVID-19 Student Report Form (go.sc.edu/covidstudentreport), and select the option allowing the Student Ombuds to contact your professors. When talking with the SHS nurse, be sure to ask for documentation of the consult as you will need this to document why you missed class. You will also use the COVID-19 Student Report Form if you have tested positive for COVID-19 or if you have been ordered to quarantine because of close contact with a person who was COVID-19 positive. In each of these situations you will be provided appropriate documentation that can be shared through the Student Report Form.

Student Well-Being

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact the Division of Student Affairs and Academic Support. If you are comfortable doing so, please notify me as the professor so that we can find resources that may be helpful.

Students do not learn when they do not feel safe. If you feel unsafe on campus at any time in any place, please contact Police Dispatch at 803-777-4215 (in an emergency, please call 911 and reach out to the Division of Student A airs and Academic Support. Again, if you are comfortable doing so, please notify me as the professor, and I will do my best to make appropriate accommodations.

Students may experience situations or challenges that can interfere with learning and inter-personal functioning including stress, anxiety, depression, substance use, concern for a family/friend, or feelings of hopelessness. Pay attention to what is happening in the classroom and in the lives of your fellow students. There are numerous campus resources available to students including University Counseling Psychiatry Service and University Student Health Services. Help is available 24/7. Students who need immediate help should call 803-777-5223. An outside resource is the National Suicide Prevention Lifeline (800-273-8255).

Attendance Policy

When you miss class, you miss important information. If you are absent, you are responsible for learning material covered in class. If you are absent when an assignment is due, you must have submitted the assignment prior to the due date to receive credit. If you miss more than 20% of the classes unexcused, your grade will be dropped one letter grade.

Academic Integrity

You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment and will result in additional disciplinary measures. This includes improper citation of sources, using another student's work, and any other form of academic misrepresentation.
The first tenet of the Carolinian Creed is, "I will practice personal and academic integrity."
Below are some websites for you to visit to learn more about University policies:
Carolinian Creed (http://www.sa.sc.edu/creed)
Academic Responsibility (http://www.sc.edu/policies/staf625.pdf)
Office of Student Conduct and Academic Integrity (https://www.sa.sc.edu/academicintegrity/)
Network Guidelines for Responsible Computing (http://www.sc.edu/about/offices_and_divisions/university_technology_services/policies_procedures/networkguideline.php)

Plagiarism

Using the words or ideas of another as if they were one's own is a serious form of academic dishonesty. If another person's complete sentence, syntax, key words, or the specific or unique ideas and information are used, one must give that person credit through proper citation.

Class Conduct

Professionalism will be expected at all times. Because the university classroom is a place designed for the free exchange of ideas, we must show respect for one another in all circumstances. We will show respect for one another by exhibiting patience and courtesy in our exchanges. Appropriate language and restraint from verbal attacks upon those whose perspectives differ from your own is a minimum requirement. Courtesy and kindness is the norm for those who participate in my class.

Instructional Methods

The course will be taught using multiple instructional methods. These methods will include lecture, computer programming exercise sections.

Disabilities

If you qualify for accommodations because of a disability, please submit a letter to me from the Student Disability Resource Center in a timely manner so that your needs can be addressed. The Student Disability Resource Center determines accommodations based on documented disabilities. Contact: 777-6741, Close-Hipp 102, sadrc@mailbox.sc.edu (sc.edu/about/offices_and_divisions/student_disability_resource_center/)

Required Computing Resources

Access to a computer (64-bit operating system) with **R** (available as a free download from the CRAN home page), **R Studio** (available as a free download). Notice that **a Chromebook will not have sufficient computing power** required by this course.

Help in using R can be found on the CRAN home page (http://www.r-project.org). Help in using SAS can be found on https://support.sas.com/en/documentation.html.

Course Policies and Procedures

- Incomplete Contracts: A grade of incomplete "I" shall be assigned at the discretion of the instructor when, due to extraordinary circumstances (e.g., documented illness or hospitalization, death in family, etc.), the student was prevented from completing the work of the course on time. The assignment of an "I" requires that a contract be initiated and completed by the student before the last official day of class, and signed by both the student and instructor. If an incomplete is deemed appropriate by the instructor, the student in consultation with the instructor, will specify the time and manner in which the student will complete course requirements. Extension for completion of the work will not exceed one year (or earlier if designated by the student's college).

Diversity and Inclusion

The university is committed to a campus environment that is inclusive, safe, and respectful for all persons, and one that fully embraces the Carolinian Creed. To that end, all course activities will be conducted in an atmosphere of friendly participation and interaction among colleagues, recognizing and appreciating the unique experiences, background, and point of view each student brings. You are

expected at all times to apply the highest academic standards to this course and to treat others with dignity and respect.

Expectations of the Instructor

I am expected to facilitate learning, answer questions appropriately, be fair and objective in grading, provide timely and useful feedback on assignments, maintain adequate office hours, and treat you as I would like to be treated.

Course Communication

I will be communicating with you regarding grades and assignments. If you need to get in touch with me, the best method is via email.
If you are having trouble with this course or its material, you should contact me via email to set up an appointment to discuss the issues.
Emails will be sent your email address. In addition, announcements may be posted on the course website. If you primarily use another email account, you should make sure that the Blackboard account is linked to that address. It is your responsibility to ensure that your email account works properly in order to receive mail.

Please be sure that the email you check regularly is set in Blackboard:

- Click on the My USC tab along the top of the page in Blackboard
- In the Tools module, click on "Personal Information"
- Click on "Edit Personal Information"
- Scroll down to the listing for Email
- In the box will be listed what Blackboard has as your email address. If you wish to change it, delete the email address in the box and type in the email address you want to use.
- Click on the Submit button at the top or bottom of the page.

Writing Center

Writing Center (http://artsandsciences.sc.edu/write/university-writing-center)
This course has many of writing assignments. The University Writing Center is an important resource you should use! It's open to help any USC student needing assistance with a writing project at any stage of development. The main Writing Center is in Byrnes 703.

Library Resources

Library Resources (http://library.sc.edu)

The university library has great resources for finding out how to cite materials in your projects. Remember that if you use anything that is not your own writing or media (quotes from books, articles, interviews, websites, movies – everything) you must cite the source in MLA format.

Blackboard and Technology (http://www.sc.edu/about/offices_and_divisions/university_technology_services/) As a student in this course, you have access to support from the Division of Information Technology (DoIT) for Blackboard and computer issues. The service desk can be reached at 803-777-1800.

Counseling Services (https://sc.edu/about/offices_and_divisions/student_health_services/medical-services/counseling-and-psychiatry/index.php): The University offers counseling and crisis services as well as outreach services, self-help, and frequently asked questions.

Copyright and Fair Use

Course readings, lecture slides, recordings, datasets, code examples, software documentation, assignment materials, and other resources may be protected by copyright or subject to license restrictions. Some materials are made available for educational purposes under the doctrine of fair use or through licenses held by the University.

Students may download or reproduce course materials as reasonably necessary for their personal study and completion of course requirements. Unless the copyright holder, license, or instructor expressly permits otherwise, students may not post, publish, sell, upload, or distribute course materials, assignment prompts, solution code, recordings, or another person's work. This restriction includes posting materials to public websites, repositories, file-sharing services, or generative artificial intelligence systems.

When incorporating code, text, graphics, datasets, or other materials created by someone else, students must provide appropriate attribution and comply with any applicable copyright, open-source license, data-use agreement, or terms of service. Materials carrying an explicit open license may be reused only according to that license. An educational purpose does not automatically make every use permissible.

Use of Generative Artificial Intelligence

Generative artificial intelligence tools can support learning, but they cannot replace the individual practice required to become proficient in statistical reasoning, programming, debugging, interpretation, and reproducible analysis. This policy applies to chatbots, generative code-completion systems, AI features built into

programming environments, and other tools that generate or substantially rewrite code, prose, analyses, or answers.

Default course rule. Unless an assignment states otherwise, limited use of generative AI is permitted on homework and projects only as described below and only when the use is disclosed. Generative AI is prohibited on quizzes, examinations, individual proficiency assessments. Instructions provided for a particular assessment take precedence over this general policy.

Permitted uses. On assignments for which AI use is allowed, students may use it to:

- Request explanations of statistical or programming concepts.
- Ask for clarification of an error message.
- Obtain debugging suggestions for code the student has already written.
- Generate small practice examples or test cases.
- Compare possible ways to organize, document, or improve code.
- Receive feedback on the clarity of an explanation written by the student.

Prohibited uses. Unless the instructor explicitly authorizes them, students may not:

- Ask an AI system to complete an assignment or generate substantially all of a solution.
- Submit AI-generated code, output, interpretations, visualizations, or written explanations as though they were created independently.
- use AI to translate a complete solution from R to Python, Python to SAS, or any other language when the translation effectively supplies the required solution.
- Use AI during a quiz, examination, or other restricted assessment.
- Fabricate data, program output, citations, package documentation, or results.
- Upload answer keys, restricted course materials, proprietary datasets, confidential information, personally identifiable information, or another person's work to an AI system.
- Rely on generated code or statistical advice without independently testing and verifying it.

Generative inline code suggestions count as AI assistance. Ordinary syntax highlighting, spell-checking, and deterministic autocomplete that merely complete known commands are not considered generative AI under this policy.

Verification and responsibility. You are responsible for everything you submit, regardless of how it was produced. Before submission, you must run the code yourself, confirm that it works with the required data and software,

verify relevant functions and statistical assumptions using authoritative documentation, and ensure that the results support your interpretation. Submitted work must be reproducible from the code and files provided. You must also be prepared to explain your code, methodological choices, and results without assistance. Explanation or reproducing part of a submitted analysis might be requested. Failure to disclose AI assistance, use of AI on a prohibited assessment, or submission of generated work that does not represent the student's own understanding may be treated as an academic-integrity violation.