STAT 205: Elementary Statistics for the Biological and Life Sciences
Fall 2024
Section 005 MW 2:20 – 3:35 p.m. Petrigru 108

Instructor: Dr. David Hitchcock   **E-mail:** hitchcock@stat.sc.edu

Office: LeConte 202   `http://people.stat.sc.edu/hitchcock/stat205.html`

Office Hours: Monday, Tuesday, Wednesday, Thursday 9:00-9:50 a.m. or by appointment

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Description: Three (3) credit hours; Prerequisite: MATH 111 or higher. Introduction to fundamental statistical methods with applications in the biological and life sciences. Includes descriptive statistics; probability; one and two-sample models for population means; contingency tables (including relative risk, odds ratios, case-control studies, and estimation of sensitivity and specificity); linear regression; logistic regression; aspects of survival analysis, and ANOVA. Carolina Core: ARP

Purpose: To give students in biology, ecology, public health, pharmacy, nursing, and other life sciences a non-calculus-based introduction to the application of modern statistical methods including descriptive and inferential statistics. To show students that statistics is an important research tool within the biological life sciences.

Learning Outcomes: By the end of the term, successful students should be able to do the following:
- Understand and interpret common graphical displays and summary statistics from data.
- Apply the rules of probability to solve basic problems
- Understand aspects of one and two sample problems, including confidence intervals, hypothesis testing, sample size calculation, power, and checking assumptions.
- Understand basic ideas underlying one-way analysis of variance
- Understand aspects of the simple linear regression model: least squares estimation, the normal-errors model, confidence interval and hypothesis tests for slope
- Understand the logistic regression model and its use for analyzing Bernoulli outcomes with a continuous predictor
- Understand aspects of 2x2 contingency tables: relative risk, odds ratio, difference in proportions, case-control studies, independence, sensitivity, specificity, and prevalence, and Simpson's paradox.
- Be able to carry out common statistical methods in the computing package R.

Textbook: *Statistics for the Life Sciences*, 5th Ed., by Samuels, M.L., Witmer, J.A., and Schaffner, A.

Calculator and Computing: Each student will need a scientific calculator and internet access. Lecture notes, homework, and grades for each assessment will be posted online in Blackboard. Statistical analyses will be carried out online via R, which is a software for statistical computing and graphics. Students may optionally use Posit, a free website with access to RStudio, a more advanced interface for R. Video instructions for registering for Posit are posted in Blackboard. Use of Posit and RStudio is optional – you are welcome to use the regular R interface.

Attendance: Regular participation and attendance during the entirety of each class meeting is expected. I will not record attendance and it will not be a part of your course grade directly. However: attending class, paying attention, and asking questions WILL improve your understanding of the course material and will therefore affect your grade, especially on tests.

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Student Success Center: Students seeking tutoring are encouraged to contact the Student Success Center
https://sc.edu/about/offices_and_divisions/student_success_center/study-smart/tutoring/

Accommodations: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please contact the Student Disability Resource Center. All accommodations must be approved through the Student Disability Resource Center.
https://www.sc.edu/about/offices_and_divisions/student_disability_resource_center/

Classroom Courtesy: Please be considerate of the instructor and fellow classmates by remembering the following:
- Exit and re-enter the classroom as quietly as possible if you must leave during lecture
- Silence cell phones and electronic devices once you have entered the classroom
- Do not use cell phones during lecture – put them away during class
- Do not have conversations with fellow classmates during lecture

Please Note: If you are observed talking repeatedly during lecture, you will be asked to leave the classroom and reported to the Office of Student Conduct and Academic Integrity.

Honor Code: See the *Carolinian Creed* at Carolinian Creed - Student Affairs and Academic Support | University of South Carolina (sc.edu). Violations of the Carolina Creed will be reported to the Office of Student Conduct and Academic Integrity.

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 using and/or submitting another student's work, collaborating or helping others with exams, 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
- Academic Responsibility
- Office of Student Conduct and Academic Integrity

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Course Assignments:

Textbook Readings (not graded): You are expected to read the textbook section(s) to be covered in class prior to coming to class. For a list of sections we will cover each day, please see the schedule of topics at the end of this syllabus. Note: any changes to the schedule will be announced in class.

Practice Problems (not graded): After each lecture, review your notes and re-read the textbook. Then complete the practice problems from the textbook that are assigned after nearly all lectures. These should be completed before the next lecture. The practice problems cover concepts taught in class and offer an opportunity for practicing and deepening understanding. While these assignments are not collected or graded, it is vital to your success that you complete these assignments and ask questions when you experience difficulty.

Homework: Homework assignments covering the concepts taught in the class will be posted on Blackboard. Some assignments require the use of R (you may use either traditional R or RStudio on Posit.Cloud). Students will submit their answers online and will be given four (4) attempts to complete each assignment. No additional attempts will be granted. The due date for each assignment is given in the schedule of topics and will be posted in Blackboard. Any changes to the due dates will be announced in class. Each assignment will close at 11:59 PM ET on the due date. **No late assignments will be accepted.** The highest eight (8) homework grades will be counted as part of the homework average.

Quizzes: Quizzes will be given almost once a week and will be based on the most recent homework and practice problems. Students should review those assignments before the quiz. Quizzes will consist of 2-6 items and will be administered online in Blackboard, typically with a time limit. Questions will be a combination of short answer questions and applications where you will work out problems. Students will only be given two (2) attempts to complete each quiz. Each assignment will close at 11:59 PM ET on the due date. Any changes or additional quizzes will be announced in class. **Make-up quizzes will generally not be given.** The highest eight (8) quizzes will be counted as part of the quiz average. Note: Each student is required to complete all quizzes alone without the help or assistance of others.

Exams: Three (3) in-class exams will be given during the semester. The first two (2) exams will be given during the semester and the third exam will be given during the scheduled final exam time. See the schedule on the last page of this syllabus for specific dates of exams. **Make-up exams will generally not be given except for reasons documented by the Office of Student Advocacy.** Exceptions may be made for documented illness/emergencies/other incidences of excused absences.

As soon as you know you will miss an exam date, you must email me at hitchcock@stat.sc.edu (before the exam or within 24 hours of the scheduled exam time to schedule a make-up), if the Student Advocacy Office deems the absence excused. Documentation of illness or emergency MUST come to me from the Office of Student Advocacy. This office is the one that will determine if your request meets the standards of an excused absence. (Class Absences - Student Affairs and Academic Support | University of South Carolina (sc.edu)).

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Grade Components:

Assignment	Percent
Homework	20%
Quizzes	17%
Exam 1	21%
Exam 2	21%
Exam 3	21%
Total	**100%**

Grading Scale:

Letter Grade	Percent
A	≥ 90%
B+	87%-89%
B	80%-86%
C+	77%-79%
C	70%-76%
D+	67%-69%
D	60%-66%
F	< 60%

Course Schedule:

Labor Day (no class): Monday, Sept. 2
Exam 1: Wednesday, Sept. 25
Exam 2: Wednesday, Oct. 30
Last day to drop/withdraw without a grade of "WF" being recorded: Wednesday, Nov. 6
Thanksgiving Break (no classes): Sun., Nov. 24 – Sun., Dec. 1, Sunday – Sunday
Last Day of Classes: Friday, December 6 (for this MW class, Dec. 4)
Final Exam: Friday, December 13 - 12:30-3:00 p.m.