Graduate Statistics I (3.0 Credits)

BIOL 5315, Biostatistics I; WATR 5320 Statistical Methods in Research

Texas A&M University—San Antonio

Fall 2026

Contact Information

Instructor: Dr. Ashley Teufel
Office: 311C STEM
E-mail: ateufel@tamusa.edu

Preferred Contact Method: e-mail ateufel@tamusa.edu
Do not use "blackboard messenger"

Office Hours: M 5:00-7:00PM, W 1:30-3:00PM
or by appointment

General Information

Prerequisites: No prerequisites are listed for this course; however, at least one undergraduate course in statistics is strongly recommended.

Time & Place: M/W 7:00pm – 8:15pm Madla 206

Optional Textbooks

Whitlock MC, Schluter D. 2020. *The Analysis of Biological Data, 3rd Edition*. MacMillan Learning.

Leps, J, Smilauer P. 2020. *Biostatistics with R: An Introductory Guide for Field Biologists.* Cambridge University Press.

Course Description: This course is designed to introduce students to the fundamentals of experimental design, parameter estimation via sampling, and statistical inference. Emphasis will be placed on the selection and appropriate use of widely used statistical methods in the life sciences (e.g., t-tests, correlation, general linear modeling). Students will also learn the principles of model criticism and how to assess whether data meet the assumptions of a variety of inferential statistical approaches. Students will gain hands-on experience with statistical computing, with the goal of developing students' abilities to implement the methodologies covered in the course using a modern statistical computing environment (e.g., R; www.r-project.org).

Objectives: To provide students with a sound foundation in applied statistical reasoning. Specifically, during the course of and/or upon completing Graduate Statistics I, students should:

1. Deepen their abilities to engage in population-level thinking and appreciate the importance of sampling in drawing inferences about populations
2. Develop an appreciation for the role that probability distributions play in statistical analysis

3. Become familiar with the basic tenets of sound experimental design
4. Develop an understanding of the concepts of statistical error and power
5. Become competent with a variety of inferential statistics that are commonly used in biology and environmental science
6. Deepen their appreciations for the concept of statistical association and how such associations are quantified
7. Learn the principles of model criticism and how to assess whether data meet the assumptions of a variety of statistical tests and modeling approaches
8. Develop the ability to choose and defend which statistical procedure among the procedures explored during the course is most appropriate for a particular dataset/experimental design
9. Develop basic statistical computing skills, including the ability to make customized publication quality graphics

Evaluation & Course Structure

Assignment	Points	Total
Exam	200 pts × 3 Exams	600 pts
Final Project	200 pts	200 pts
Homework	40 pts × 5 HWs	200 pts
		1000 pts

Grading Scale:

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F < 60

Exam Format: Exams will include both an in-class portion and a take-home portion. For the take-home portion, you may use any resources you like (e.g., the textbook, course notes, webpages, R documentation), but you may not work with or receive assistance from other people.
Take-home exam questions will focus primarily on applying statistical methods to datasets. You may be asked to determine which statistical technique(s) are appropriate for a given dataset or research question, justify your choices, interpret results, and write R code needed to carry out the analysis in the R Statistical Computing Environment**.**

Policy on Assignments and Exam Questions Involving Written Communication: The ability to write clearly is a fundamental skill. While I will not deduct points for grammar and spelling per se, if your writing is muddled to the point that the content of your answer is unclear, you will lose points. While you are always free to ask why points were deducted, subsequent clarification of your answer via verbal conversation will not result in the restoration of deducted points to your grade, as grades must be based upon the answer that was turned in at the time that the assignment was due.

Policy on Grade Appeals: We all make errors, and I'm no different. If you feel that I am in error upon receiving a grade for an exam or assignment please let me know during an office visit.

If your concern warrants further consideration. Please note that a request for you to elaborate verbally or in writing does not guarantee that points will be restored to your grade.

Policy on Late Assignments & Making Up Exams: Please complete exams and other assignments by their due dates. Should extenuating circumstances arise that prevent you from taking or turning in an exam at the normal time, I may ask you to present verifiable documentation of the circumstances. Failure to produce such documentation may result in refusal to except your late exam/assignment and a grade of '0'. Whenever possible, let me know ahead of time if you are going to be tardy with an exam or assignment.

Broader Use of Generative AI Permitted Within Guidelines: Use of artificial intelligence (AI) tools, including ChatGPT, is permitted in this course for students who wish to use them. To adhere to our scholarly values, students must cite any AI-generated material that informed their work (this includes in-text citations and/or use of quotations, and in your reference list). Using an AI tool to generate content without proper attribution qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

FOR UNIVERSITY POLICES SEE ADDITIONAL DOCUMENT ON BLACKBOARD

Week	Lecture	Homework
8/24	Syllabus/Introduction to R	
8/31	Describing data	
9/7 (no class Monday - Labor Day)	Data visualization and tidyverse	9/11 HW 1 Due by 11:59PM
9/14	Probability	
9/21	Probability distributions and statistical inference	9/25 HW 2 Due by 11:59PM
9/28	Review Exam 1	
10/5	Hypothesis testing, X^2 goodness of fit	
10/12	Contingency tables, X^2 contingency tests	10/16 HW 3 Due by 11:59PM
10/19	t-distribution, t-test Non-parametric tests	
10/26	ANOVA Adhoc testing Non-parametric tests for more than 2 groups	10/30 HW 4 Due by 11:59PM
11/2	Review Exam 2	
11/9	Linear Modeling Correlation, Regression	
11/16	General Linear Models Interactions	11/20 HW 5 Due by 11:59PM
11/23 (no class Wednesday - Study Day)	Logistic regression	
11/30 (classes end 12/4)	Final Exam	
12/5-12/11 finals week	Grad student presentations	Graduate student project due on date of final