WILD240: Introduction to Biostatistics (Honors) Fall 2023

Course Information

Instructor: Madeline Damon, madeline.damon@mso.umt.edu
Course Times: Tuesday and Thursday, 9:30AM – 11:00AM
Location: Stone Hall, Room 106
Office Hours: TBD based on survey (will be updated)
Course Webpage: Moodle
Moodle 101 for Students tutorial
UMOnline Help Desk contact info: 243-4999 and umonline-help@umontana.edu (Open M-F, 8-5)

Course Description

This class is an introduction to statistical ecology, including probability distributions, hypothesis testing, statistical theory, philosophy of science, and fitting models to data with emphasis on problems in ecological sampling. Since this is an honors class, we will spend a lot of time in R learning how to implement to concepts we learn through code.

Required Materials

There are no required texts for purchase, any materials will be posted on Moodle or sent via UMOnline. **However, there is required software:**

You will need to download both R (https://www.r-project.org) as well as RStudio (https://rstudio.com/products/rstudio/download/#download). We will discuss them in detail later, but both are required for the coding we do in class.

There will be computers in the classroom that have R and RStudio already installed if needed, but you'll have to email any work in R you've done to yourself, or you'll only be able to complete coding assignments while in the classroom.

If you have issues installing R, there is a cloud-based version, RStudio Cloud, which is available in the browser: https://rstudio.cloud/. While this is handy short-term, it has a monthly time limit that can be troublesome for students who try to use it long-term. I highly recommend using R on your own device: you'll continue using R in most WILD classes in the future.

Course Objectives

1. Demonstrate comprehension of foundational statistical concepts
    a. Probability distributions
    b. Sampling
    c. Descriptive Statistics
    d. Hypothesis testing
2. Identify appropriate statistical models based on research needs and execute them
3. Gain familiarity with scientific papers and learn to communicate statistics effectively
4. Collect, manage, and analyze data for research using R

Course Schedule

Below are the approximate dates of assignments, exams, and topics throughout the semester. These are subject to change based on how quickly the class covers concepts and whether additional days are taken to further go over certain topics.

Date	Topic	Assignments
29-Aug	Introduction to Biostatistics	Intro Survey (ungraded)
31-Aug	R Demonstration and Activity	
5-Sep	Probability	R Basics Script Due
7-Sep	Probability Distributions	
12-Sep	Probability Distributions	
14-Sep	Descriptive Statistics	Probability Distributions Homework Due
19-Sep	Descriptive Statistics	
21-Sep	Confidence Intervals	Paper Breakdown: Descriptive Statistics Due
26-Sep	Hypothesis Testing	
28-Sep	Hypothesis Testing	
3-Oct	Experimental Design	Paper Breakdown: Hypothesis Testing Due
5-Oct	Experimental Design	
10-Oct	MIDTERM	Exam Review Due
12-Oct	Regression	
17-Oct	Regression	Regression Script Due
19-Oct	ANOVA	
24-Oct	ANOVA	Paper Breakdown: ANOVAs Due
26-Oct	Project Introduction/Work Day: Collecting and Managing Data	
31-Oct	Model Selection/Inference	ANOVA Homework Due
2-Nov	Model Selection/Inference	
7-Nov	General Linear Models	Models Assignment of Choice Due
9-Nov	General Linear Models	
14-Nov	Common Ecological Models	Final Project Check-In Due
16-Nov	Common Ecological Models	
21-Nov	Data Visualization	
23-Nov	NO CLASSES	
28-Nov	Work day/ coding errors	Turn in coding errors/ questions
30-Nov	Work day/ coding errors	
5-Dec	Presentations	
7-Dec	Presentations	
	FINALS WEEK	
15-Dec	Final Paper Due	

Final Project

You will be conducting a research project in groups. You will find your own data online, identify hypotheses, conduct analyses, create visualizations, write a paper summarizing your results, and give a brief presentation. The final project itself will be worth 100 points, and 20 points will be dedicated to a personal and group member evaluation

More specific project information, rubric, and expectations will be provided on October 26th, the project introduction/work day.

Assignments

Assignments are typically due at midnight on Tuesdays, and will be a mix of coding exercises, scientific paper reviews, and statistics problems. Assignments are a large portion of your grade because they offer the opportunity for practical applications of biostatistics concepts and will demonstrate knowledge instead of quizzes or additional exams. You are welcome to work with other students, but must turn in your own work. **Since there are few quizzes and exams, late homework will only be accepted within 24 hours of the due date (so until Wednesdays at midnight) with a 10% penalty to the grade. The lowest assignment grade will be dropped.**

Midterm Exam

The midterm exam will be after we've covered foundational concepts in biostatistics, and before we start using them in statistical models and doing more analysis. This is our only traditional exam, and is worth 20% of your grade. This is closed book, but I will give you necessary equations and R commands. Please make DSS accommodations or notify me about missing the **exam at least two weeks prior** to the exam to we have time to schedule.

Attendance

Attendance will be taken using Moodle. Attendance is important because learning R can be challenging, and errors are easiest to resolve when we are together. Additionally, class will heavily involve hands-on activities that will help you learn and retain concepts.

Grading

Traditional grading will be used: i.e. A is 90-100%, B is 80-89%, C is 70-79%, D is 60-69%, and F is 59% or below

Component	**Percentage**	**Points**
Assignments	30%	10 assignments x 10 points each = 100 points
Midterm Exam	20%	60 points
Final Project	40%	120 points
Attendance	10%	30 points
Totals	100%	310 points (subtract one assignment)
		300 points total

Academic Calendar

Monday, August 28th: Autumn classes begin

Monday, September 4th: Labor Day: no classes

Monday, September 18th: Last day to drop class on CyberBear with no W on transcript, autumn registration bill payment deadline

Monday, October 30th: Last day to drop without Dean approval, last day to drop a class with a W rather than WP or WF

Friday, November 10th: Veterans Day: no classes

Wednesday, November 22nd- Friday November 24th : Travel day and Thanksgiving holiday

Friday, December 8th: Last day of regular classes

Monday, December 11th-Friday December 15th: Final exams week

UM Policies and Guidelines

Disability Modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Student Conduct Code

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code (or see link: https://www.umt.edu/student-affairs/community-standards/default.php).

Mental Health

College students often experience issues that may interfere with academic success such as academic stress, sleep problems, juggling responsibilities, life events, relationship concerns, or feelings of anxiety, hopelessness, or depression. If you or a friend is struggling, we strongly encourage you to seek support. Helpful, effective resources are available on campus.

- If you are struggling with this class, please visit during office hours or contact me by email.
- Check in with your academic advisor if you are struggling in multiple classes, unsure whether you are making the most of your time at the University of Montana.
- Reach out for Support-Curry Health Center Counseling-to make a counseling appointment call 406-243-4712 or email mary.rust@mso.umt.edu.
- If you feel that you would benefit from general wellness skills to support your overall stress, reach out to Curry Health Center Wellness: 406-243-2809.
- If you are experiencing a mental health crisis and seeking immediate help, call 911, go to the nearest hospital emergency room or call Campus Safety at 406-243-4000.
- If you have experienced sexual assault, relationship violence, bullying, intimidation, or

discrimination contact Student Advocacy Resource Center (SARC): 406-243-4429; 24-hour support line: 406-243-6559.