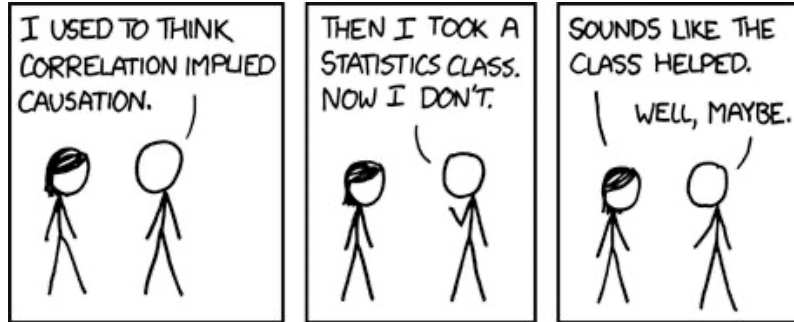


## Introduction to Biostatistics - WILD 240 (3 credits)



<https://xkcd.com/552/>

Spring Semester 2024

**Instructor: Dr. Elizabeth Simpson**

Adjunct Professor & Research Associate – Avian Science Center

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**Course Description:** An introduction to statistical ecology, including statistical theory, philosophy of science, probability distributions, sampling design, hypothesis testing, and fitting models to data.

**Class meeting times:** Tu/Th, 12:30 - 1:50 PM, Stone (SH) 218, a computer lab with workstations available for your use. You may also use your personal laptop. East entrance is closest to the elevator.

**Office hours:** 2-3 PM Tuesdays and 11 AM-12 PM Thursdays, Stone (SH) 307B, and by appointment [zoom or in-person]. This time is an opportunity for students to ask questions, get help, and to further discuss course topics that they're interested in.

**Contact me:** Please include WILD 240 at the start of the Subject so I know to prioritize your message. Emails received between 8 am and 4 pm on a weekday will usually receive a response day-of. Otherwise, expect a response within 24 hours on weekdays.

**Course outcomes:** By the end of the semester, students will be able to...

- Demonstrate comprehension and the ability to communicate statistics.
- Describe probability distributions of data.
- Discuss appropriate sampling and statistical approaches based on research needs.
- Collect, manage, and analyze data for ecological research using program R and Excel.

**Inclusive learning statement:** Your success in this class is important to me and I recognize that we each have unique and valuable learning styles. My instructional style focuses on experiential learning and uses and embraces different learning modalities. Class time will typically include a mix of introduction to new ideas and concepts (via lecture), collaborative work including discussion, data collection, problem solving (both by hand and in program R), and time to ask questions and reflect. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course.

I make every effort to provide accessible content for this course. If you have any issues opening, reading, or viewing content, let me know and I will remediate it as quickly as possible. If you have a documented disability and need to request accommodation for coursework or need assistance with figuring out how to improve your learning, please connect with the [Office for Disability Equity \(ODE\)](#) for accommodation guidance.

**Tentative Topics:** This course will be structured into three modules---

1. **Foundations of statistical thinking** – We will learn how probability, statistical distributions, descriptive statistics, and hypothesis testing can help us think about and understand ecological systems better. We will start to work in R during this module and use that program to explore concepts throughout all modules.

**Exam I, during class on Thursday, February 22<sup>nd</sup>,** will evaluate your understanding and application of these foundational concepts.

2. **Experimental design** – We will learn how to set up a study to answer a question (i.e., test a hypothesis). This will include identifying an appropriate and effective analyses, sampling approaches, and data management techniques to answer research questions.

**Exam II, during class on Thursday, April 4<sup>th</sup>,** will evaluate your understanding and application of experimental design.

3. **Application** – We will use the framework we developed in the first two modules to introduce and practice different types of data analyses. These may include analysis of variance, linear models, and analyses common in wildlife biology (e.g., occupancy, abundance, community, and demographic models). Let me know if you want me to prioritize teaching certain analyses.

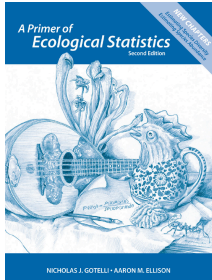
**Your final project, which you will present on and submit a report about by/during our final exam on Friday May 10<sup>th</sup> from 8-10 AM,** will be a culmination of work throughout the semester in all three modules, and may use analyses we learned about in the application module.

**Weekly schedule:** I will post lecture slides, readings, and reference materials by 5 PM the Thursday before we cover them. I will also audio-record lectures and post those after. Please plan on a quiz (due by 12:30 pm on Tuesdays) and homework assignment (due by 10 am on Mondays) every week as well as the two exams and final project presentation and report.

**Typical weekly schedule**

Monday	Tuesday	Wednesday	Thursday	Friday
<p><b>10 AM Homework due</b> (from previous week)</p>	<p><b>12:30 PM quiz due</b> on Moodle</p> <p><b>12:30 – 1:50 PM Class</b> - quiz review &amp; discussion - review last week’s homework - lecture &amp; in-class activities</p> <p><b>2-3 PM Office Hours</b></p>		<p><b>11 AM – 12 PM Office Hours</b></p> <p><b>12:30 – 1:50 PM Class</b> - homework questions - lecture &amp; in-class activities</p> <p><b>5 PM Materials</b> for the next week <b>released</b></p>	

**Course Website:** MOODLE UOnline (<https://umonline.umt.edu/>). If you have not used Moodle in prior courses, I encourage you to use the 'Moodle 101 for Students' tutorial to help with learning the basics. Youtube videos on Moodle may also be a helpful resource.



**Textbook:** *None required.* I will supply the required readings and supplemental reference materials and resources throughout the semester. The course is loosely based on *A Primer of Ecological Statistics, Second Edition*, by Gotelli and Ellison (2013). I encourage you to spend time thoughtfully engaging with the material before, during, and after class. This amount of time is different for each of us, and I will try to provide structured ways to guide your engagement. The quizzes will typically require you to reference the provided materials for the week.

**Course Software (required):** Program R and RStudio will both be available on the workstation in our computer lab classroom. Please also download **Program R** and **RStudio**, a user interface for R, both available for free, here: <https://posit.co/download/rstudio-desktop/#download>, onto your personal computer.



**Classroom engagement:** Together, we co-create our learning environment. This relies on each of us bringing informed, curious, and active involvement in class. I recognize that different people participate in class in different ways and will try to provide different types of opportunities for engagement. If you have any concerns about your participation in class, please contact me so that we can work together to figure out the best way for you to participate.

I encourage you to use our class time as a focused learning opportunity for this course. Please respect your fellow classmate's learning opportunities refrain from computer and cell phone use that is not related to classwork. Co-created standards for in-class technology use:

- **Use technology responsibly** (not bothering anybody).
  - Don't be disruptive.
- Can be used to get more information in the moment.
  - E.g., Chat GPT can be a useful resource.
- Check in with me if you have a question about how to use technology responsibly and as a resource.

I encourage you to prioritize respect, communication, and open-mindedness. Please respect the unique and valuable perspectives of yourself, your peers, and I. Co-created standards for classroom engagement and discussion:

- **Be respectful** of other people's opinions.
  - Thoughtfully listen, pay attention to the discussion and what people are saying.
  - Don't be afraid to be wrong; we're all here to learn. It's ok to make mistakes.
  - Disagreement is ok.
- **Be supportive** of people who have a hard time (speaking up). Support don't criticize.
  - Don't depend on the same students to speak up all the time.
- **Ask for help.** Sometimes other people can see what you can't.
- **Be patient** with each other.
- **Take care of yourself** (and each other).

**Attendance policy:** If you miss class time, know that we miss your presence. Email me to let me know you'll be absent so I can support you and help you catch up. I encourage you to arrive to class a few minutes early to settle in. Exams will start promptly when class begins and be collected when class ends. If you enter the classroom late, please do so in the least disruptive manner possible. To respect my time, remember I am best able to help you learn the course material during class and office hours.

*Excused absence* - If you need to miss class because of illness; injury; family emergency; religious, cultural, or ceremonial observance or event; participation in a university-sponsored activity; military service; or mandatory public service please tell me in advance (or within 2 business days after the absence). You will have 14 days from the date of the absence to review lecture materials and readings and to make up any assignments associated with your excused absence.

**Grading:** Your overall grade will tentatively be based on participation (including active involvement in class, discussion forums, etc.), quizzes and homework, two exams, and a final project. I will drop your lowest quiz and homework grade (one of each). Grading is subject to change. This course is Traditional Grading (e.g., A, B, C, etc.).

*Late homework* – Late homework will be accepted up to two days late but will lose 15% of its total value each day. For example, homework submitted by 10 am on Tuesday would be worth a maximum of 85% and by 10 am on Wednesday would be worth a maximum of 75%. submitted later than that can still receive feedback (on my own timeline) but will not be worth any points.

<b>Tentative Grading</b>	
Participation	15%
Quizzes	10%
Homework	25%
Exam I	15%
Exam II	15%
Final Project	20%

*Grammar and spelling* - Part of this course is learning how to articulate and communicate about statistics. Take time to explain yourself and your logic with clarity. Help me understand how you got your answer. If you need communication support, I can help during office hours. Additionally, the Writing Center provides one-on-one tutoring to students at all levels and at any time in the writing (communication) process. Visit now. Visit often. [www.umt.edu/writingcenter](http://www.umt.edu/writingcenter)

*Quizzes* - These are short and open book, through Moodle. They are meant to help you engage with the readings and practice previously learned concepts.

*Homework* - These assignments will help you practice the theory and concepts. You are welcome to work with other students on the homework, but please submit your own work.

*Exams* (2 total) - These are closed book, but I will provide you with any equations you might need.

*Final project*- You will conduct a research project based on a question you come up. This project is meant to help you integrate and apply the concepts discussed. I will guide you through the steps (including gathering and analyzing data) throughout the semester. You will present your work in class at the end of the semester and turn in a write-up.

**Land Acknowledgement:** The University of Montana acknowledges that we are in the aboriginal territories of the Salish and Kalispel people. Today, we honor the path they have always shown us in caring for this place for the generations to come.

## UM Policies/Guidelines/Information

**Student Conduct Code:** We commit acting with academic integrity this term – to be ethical in what we say and write, and to offer credit to others for thinking of ideas before us. I believe that everyone in my course is fundamentally honest, and I will help you learn the conventions of academic integrity, such as citing sources correctly and being clear about where our own words begin and end ([wording from Cate Denial's syllabus](#)).

For more information on the university's specific expected standards of behavior for all students, including academic conduct and general conduct, and it outlines students' rights, responsibilities, and the campus processes for adjudicating alleged violations please familiarize yourself with the Student Conduct Code ([www.umt.edu/student-affairs/community-standards/default.php](http://www.umt.edu/student-affairs/community-standards/default.php)), if you have not done so already.

**Grading Option Statement:** This class is offered for traditional letter grade only; it is not offered under the credit/no credit option.

**Course Withdrawal Deadlines Statement:**

Important dates restricting opportunities to add or drop a course during Fall 2022 can be found at: <https://www.umt.edu/registrar/calendar/spring.php>

**Students with Disabilities:** The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at (406) 243-2243, [ode@umontana.edu](mailto:ode@umontana.edu), or visit [www.umt.edu/disability](http://www.umt.edu/disability) for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an adequate accommodation, and you are welcome to contact me privately if you wish.

**Cultural Leave:** Cultural or ceremonial leave allows excused absences for cultural, religious, and ceremonial purposes to meet the student's customs and traditions or to participate in related activities. To receive an authorized absence for a cultural, religious, or ceremonial event, the student or their advisor (proxy) must submit a formal written request to the instructor. This must include a brief description (with inclusive dates) of the cultural event or ceremony and the importance of the student's attendance or participation. Authorization for the absence is subject to approval by the instructor. Appeals may be made to the Chair, Dean, or Provost. The excused absence or leave may not exceed five academic calendar days (not including weekends or holidays). Students remain responsible for the completion or make-up of assignments.

**Mental health:** At UM, we value every student's wellbeing and believe that taking care of yourself is imperative to your success as a student. 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 seeking support. Helpful, effective resources are available on campus.

*(see following page for a list of resources)*

- If you are struggling with this class, please visit during office hours or contact me by email, through Moodle or at [elizabeth.simpson@mso.umt.edu](mailto:elizabeth.simpson@mso.umt.edu)
- Check-in with your academic advisor if you are struggling in multiple classes or want guidance on making the most of your time at the University of Montana.
- [Reach out for Counseling Support at Curry Health Center Counseling](#). To make a counseling appointment call **406-243-4712** or go online to the Curry Health Portal to schedule an appointment.
- If you feel you need accommodations for a mental health concern, reach out to the **Office of Disability Equity (ODE)** at **406-243-2243**
- If you feel that you would benefit from general wellness skills to support your overall stress reach out to **CHC-Wellness** at **406-243-2809**
- If you have experienced sexual assault, relationship violence, bullying, intimidation, or discrimination contact the [Student Advocacy Resource Center \(SARC\)](#) **406-243-4429** \*24/7 support line **406-243-6559**
- 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**

#### **24/7 Support Resources** (beyond the university):

- **24/7 Community Resource line, text 211** or go to: <https://montana211.org/>  
*Montana-specific database of community resources for non-emergency needs (e.g., food bank, tax assistance).*
- **24/7 988 Suicide & Crisis Lifeline: dial 988**  
*Free and confidential support for people in distress and prevention and crisis resources for your loved ones. More info about 988 line in MT: <https://dphhs.mt.gov/suicideprevention/988>.*
- **24/7 National Crisis Text line, text "HOME" to 741741**  
*A live, trained Crisis Counselor (a trained volunteer, not a "professional") who can help you sort through your feelings by asking questions, empathizing, and actively listening.*
- **24/7 Steve Fund Crisis Text Line** for students of color, **text "STEVE" to 741741**  
*A partnership with the National Crisis Text line focused on addressing the unmet mental health needs of college and university students of color.*
- **24/7 Trevor Project Lifeline** for LGBTQIA2S+ students, **dial 866-488-7386** or **text "START" to 678678** and more resources at <https://www.thetrevorproject.org/>  
*Text, chat (online), or call to receive support from trained counselors who understand the challenges that LGBTQIA2S+ youth face and are ready to listen without judgement.*
- **24/7 National Domestic Violence Hotline: 1-800-799-7233, text "START" to 88788**
- **24/7 Strong Hearts Native Helpline: 844-762-8483**  
*Safe, confidential, and anonymous domestic and sexual violence helpline for Native Americans and Alaska Natives, offering culturally appropriate support and advocacy.*