Syllabus

# This is the tentative set of course policies

| Semester - Fall 2025 | Instructor: Bill Perry |
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| **When**: Monday and Wednesday 14:00 - 15:50 | **Email**: wlperry@d.umn.edu |
| **Where**: We will see | **Assistant**: someone please |
| **How**: Mostly working through the ideas in the PowerPoint slides using code some of which is prewritten | **Assistant email**: someone@d.umn.edu |
| **Required materials**: The textbook and a laptop and tenacity | **Office hours**: TBD and by appointment or walk in |

## **Aim and Scope:**

Welcome to Ecological Statistics! This is a practical course that will introduce you to the topics of experimental design, hypothesis testing, data analysis and visualization in the ecological sciences context. The goal of the course is to enable you to interpret statistical methods and results in the published literature, carry out your own data analyses and conduct a productive conversation with a statistician. We will learn about common statistical approaches in ecology and use the R statistical computing environment to get practice implementing these approaches. Additionally, this course will provide opportunities for students to practice scientific writing skills.

## **Student learning outcomes:**

Learn some useful data skills nd organizaiton and statistical methods and R skills.

## **Course Structure:**

The course will be taught in a combined lecture and computer lab format with mostly hands on activities assuming you have read the materials. Some of our meetings will take a primarily lecture and discussion format, others a primarily computer lab format, but most will have elements of both. Lecture portions will be dedicated to taking up homework questions, going over course concepts and discussing examples. Computer laboratory elements will be dedicated to using the R statistical computing package for data analysis and visualization.

Materials such as lecture slides, computer labs, homework, and assignments will be distributed through the course Canvas site or on the website. The course will mostly be based on the textbook The Analysis of Biological Data (3rd Edition) **Experimental Design and Data Analysis for Biologists** (1st edition) by Michael C. Whitlock and Dolph Schluter. The text is required and we can talk about how to get it. Other textbooks and resources that you may find of use are:

* **The R Book** (1st or 2nd edition) by MJ Crawley. Highly recommended as an all-around reference book.
* **A Primer of Ecological Statistics** (1st or 2nd edition) by NJ Gotelli and AM Ellison.
* **Biostatistical Analysis** (4th or 5th edition) by JH Zar.
* **Handbook of Biological Statistics** by JH McDonald (online at <http://www.biostathandbook.com/>).
* **Institute for Digital Research and Education** (<https://stats.idre.ucla.edu/other/dae/>).
* **A Compendium of Clean Graphs in R** (<http://shinyapps.org/apps/RGraphCompendium/index.php>)
* **Numerical Ecology with R** by D Borcard, F Gillet and P Legendre. A practical introduction to common multivariate methods in ecology.
* **Ordination Methods for Ecologists** by Mike Palmer (<https://ordination.okstate.edu/>)

## **Evaluation scheme:**

Your grade will be based on **homework**, **in-class assignments**, and **take-home** **assignments**:

I will be making this out of points as we get there

|  |  |
| --- | --- |
| Homework | 10% |
| In-class assignments | 20% |
| Take-home assignments (4 assignments) | 70% |

## **Homework:**

you are required to read the class readings (see ‘course schedule’) ahead of each class. Homework questions based on the readings will also need to be completed ahead of many classes. Homework questions will be assigned one class meeting before they are due and will need to be submitted before the start of class. We will spend the portions class taking up and discussing homework questions. I will cold-call students to present and explain their answers to the rest of the class. Homework assignments will receive one of four possible grades: 100% (A) for work that meets or exceeds expectations, 85% (B) for work that meets most expectations, 65% (D) for work that misses most expectations or 0% (F) for work deemed unacceptable.

## **In-class assignments:**

most computer lab exercises will be accompanied by in-class questions and disucssion. You will submit answers to these questions and your functional R code for the exercise by the end of the day of each exercise. In-class assignments will be submitted as *QUARTO* files. In-class assignments will be graded on the same scale as homework.

**Take-home assignments:** four assignments will be completed outside of class. Each assignment will involve the independent analysis, presentation and interpretation of a dataset. The written report will include 3 sections: **abstract**, **statistical** **materials and methods** and **results** (statistical results and figures/ tables), prepared to “publication quality” standards. Assignments will be graded out of 100% and assessed on metrics including statistical literacy (performing analyses correctly), graphical presentation of data, adherence to correct statistical reporting norms, grammar and the quality/functionality of the accompanying R code. The assignments will comprise 70% of your final grade; A1 will be worth 10% of the final grade, A2 15%, A3 20%, and A4 25%.

## **Final letter grades**

will be assigned on a straight 10% scale, with 90-100% receiving some form of A, 80-89% some form of B, etc. + and – grades will fall on the upper (>X7) and lower (<X4) end of the ranges, respectively. Percentage grades below 60% are equivalent to an ‘F’ letter grade.

## **Late/missed assignment policy:**

10% of total possible grade will be deducted per day late in absence of valid excuse. A grade of 0 will be given for assignments that are more than 3 days late.

## **Valid excuses:**

Valid excuses for missed class or late work consist of subpoenas, jury duty, military duty, religious observances, illness, bereavement for immediate family and NCAA varsity intercollegiate athletics. Conflicts with work, vacations, weddings, travel, or some other private situation that was foreseen will not be accommodated.  For further information on excused absences see https://evcaa.d.umn.edu/excused-absences

## **Academic Integrity:**

I take plagiarism and academic dishonesty very seriously and will invoke the full weight of UMD-approved sanctions at the first instance of plagiarism. I am happy to answer questions on what is considered a violation of academic integrity in this class. Please also refer to UMD’s academic integrity policy at: <https://evcaa.d.umn.edu/student-academic-integrity>

## **Student Conduct Code:**

I will enforce, and expect you to follow the University’s Student Code of Conduct. Appropriate classroom conduct promotes an environment of academic achievement and integrity. Disruptive classroom behaviour that substantially or repeatedly interrupts either the instructor’s ability to teach, or student learning, is prohibited. Disruptive behaviour includes inappropriate use of technology in the classroom. Examples include ringing cell phones, text-messaging, watching videos of funny cats (and other videos), playing computer games, doing email, or surfing the Internet on your computer instead of note-taking or other instructor-sanctioned activities. See more here: <https://regents.umn.edu/sites/regents.umn.edu/files/2022-07/policy_student_conduct_code.pdf>

## **Access for Students with Disabilities:**

Individuals who have any disability, either permanent or temporary, which might affect their ability to perform in this course are encouraged to inform the instructor at the start of the quarter. Methods, materials or testing may be modified to provide for equitable participation.

## **Promotion of Bias-free Instruction:**

The University of Minnesota is committed to the policy that all of its students shall have equal educational opportunities. The University expressly forbids discrimination on the basis of race, color, gender, sexual orientation, disability, veteran’s status, ethnicity, religion, creed, national origin or marital status. If you believe that your Ecology instructor has not followed this policy, you are invited to bring this to the attention of the Biology Department Head (207 Swenson Science Building; 218-726-8123). Your conference will be kept confidential.

You may review **other relevant UMD policy statements** at: https://evcaa.d.umn.edu/recommended-syllabi-policy-statements