

Community Ecology Lab Syllabus – Fall 2025

v. 08.18.2025

BIOL 4051+4052; 4 credit hrs. (must be co-enrolled in 4051 and 4052)
BIOL 5051+5052; 4 credit hrs. (must be co-enrolled in 5051 and 5052)

Meeting place & time:

Lab: GAB 550; Section 501: Th 2:00pm – 4:50pm
Section 503: F 12:00pm – 2:50pm

Instructors: Dr. Ana Hoeinghaus; AnaPaula.Hoeinghaus@unt.edu

Office hours: By appointment

Dr. David Hoeinghaus; David.Hoeinghaus@unt.edu

Office hours: By appointment

Teaching assistants: Ms. Sophie Davis; SophiaDavis@my.unt.edu

Office hours: By appointment.

Mr. Michael Curtis; MichaelCurtis3@my.unt.edu

Office hours: By appointment.

Description: This lab will reinforce lecture by providing hands-on experience with models, indices, multivariate analyses and other analytical approaches frequently used in ecological research. Lab meetings will explore specific analytical approaches that accompany each topic from lecture. All assignments will use the open-source statistical language *R*, and students will gain sufficient competence with *R* to upload and manipulate data, generate data summaries and indices, evaluate model performance, and conduct common statistical analyses. Besides providing an important ‘tool kit’ of approaches useful in your technical training, the focus on interpreting outcomes of ecological models and analyses should enable students to understand published research when reading primary literature.

Prerequisites: Biology Foundation requirements, including Ecology

Required texts: Borcard, D., F. Gillet & P. Legendre. 2018. Numerical Ecology with *R*, 2nd edition. Springer [Note: This book is available as a PDF from the publisher. See Canvas for a link to download, or you can purchase a physical copy from the bookstore.]

Other recommended software and materials: We have computers available in the lab (GAB 550) but you may prefer additional access to the software outside of lab meeting times. Laptop/computer compatible with *R* software (free to download). First, download the most recent version of the *R* software from this link (<https://cloud.r-project.org/>) for your operating system (i.e. Windows, Mac, Linux). Once *R* is downloaded on your laptop/computer, then download the most recent version of the (free) RStudio Desktop software from this link (<https://rstudio.com/products/rstudio/download/>) for your operating system at the bottom of the page.

Course structure: The course is taught in person. We expect this class to be highly interactive and engaging. Lab meetings will explore analytical approaches that accompany each topic. We will cover a large amount of material very quickly, and your success at later stages of the course will depend on developing a strong foundation early on. This course is taught at an advanced level. That being said, we recognize that students will have various levels of experience and we will make the information as easily accessible as possible. Please contact your TA by email or via Canvas if you are struggling with the material and/or course structure – we are happy to help you achieve the best

possible outcome, but we cannot help you if you only reach out at the end of the semester.

Canvas: Get familiar with Canvas – it is the portal through which primary course communication will take place, materials will be disseminated and assignments submitted. Check Canvas regularly for course updates. *Students are responsible for checking for announcements*; we recommend that you select notifications ‘on’ in your Canvas settings.

Grading: Lecture and lab grades are reported separately. Lab grades are based on performance on weekly lab assignments. Attendance is mandatory for your assignment to be graded. Weekly lab assignments will be due by 11:59pm on the day before class (i.e. Wednesdays at 11:59pm for Section 501 and Thursdays at 11:59pm for Section 503). Lab assignments will be submitted via Canvas and prior to grading will be checked using Turn-it-In to assess degree of similarity and possible plagiarism with other submitted assignments (from this and previous semesters) and online and published material – plagiarism will result in a grade of zero. Reports will also be assessed for possible AI generated responses – *reports must be entirely your work* and AI-generated responses will result in a grade of zero. There will be 12 assignments submitted during the semester, each worth 20 points, resulting in a total of 240 possible points. Letter-grades will be calculated based on percentage of possible points attained, with A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, and F = below 60%. *Late assignments will not be accepted, and there will be no extra credit.* Grades for graduate students will be assigned using the same approach except that weekly assignments will require additional components not required of undergraduates. For example, for some weeks, graduate students will be required to find and review a recently published scientific article in their field of expertise that employs the analytical approach covered that week. Additional graduate student assignments will vary from week to week and will be outlined in the assignment document.

Other: All College of Science computer labs have R and RStudio available to use (GAB 330, GAB 550). If you do not have a computer, laptops are available for students to checkout at Willis Library. Mobile hotspot devices, for students who need internet connectivity, are also available for checkout. You can make a request at Lib.Support@unt.edu. If you have any technical difficulties with UNT information technology please contact UIT (<https://it.unt.edu/helpdesk>).

Incomplete and drop: An incomplete (I) grade is given only during the last one-fourth of a semester and only if a student is: (1) passing the course; (2) has a justifiable reason why the class cannot be completed on schedule; and (3) arranges with the instructor to finish the course at a later date. All work must be completed within the time specified by the instructor (not to exceed one year after taking the course). The first day to request a grade of ‘Incomplete’ is November 8. The last day to drop the course with a grade of ‘W’ is November 7.

Attendance: Attendance is required. Unexcused absences will result in a zero for that day’s assignment. Contact the TA as soon as possible, preferably before an absence, if you will miss a lab meeting. See university guidelines for specifications on unexcused absences. In the event of a university excused absence, an alternate assignment will be provided.

ADA Policy: The University of North Texas complies with the Americans with Disabilities Act of 1990 in making reasonable accommodation for qualified students with disabilities. If you have a qualifying disability as defined in the ADA and would like to request accommodation, please contact the Office of Disability Accommodation at (940) 565-4323. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. For additional information see the Office of Disability Accommodation website at <http://www.unt.edu/oda>.

Academic integrity: According to UNT Policy 06.003 on Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating,

fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University. Visit University of North Texas' Student Academic Integrity Policy: <https://policy.unt.edu/policy/06-003> to obtain additional information and refer to the Student Code of Conduct and the Office of Students' Rights and Responsibilities (<http://www.unt.edu/csrr>) for information on how any cases of academic dishonesty will be handled.

TENTATIVE SCHEDULE

Week 1 (Aug 21/22): Welcome

Data literacy, and a very brief intro to R

Week 2 (Aug 28/29): Exploring Community Data

Intro to R, start learning the basics,
"R for Ecologists"; read Ch. 1 in BGL

Week 3 (Sept 4/5): Quantifying Diversity

Rank-abundance curves, diversity indices, and community diversity
Ch. 2, 8.1-8.4.2 in BGL

Week 4 (Sept 11/12): Intro to Population Models; Predator-prey

Population modeling (excerpts from Ch. 1-3 in Stevens)
Enemy-victim models (Ch. 6 from Stevens)

Week 5 (Sept 18/19): Competition

Competition models (Ch. 9 in Stevens)

Week 6 (Sept 25/26): Associations and Community Structure

Association measures and matrices, and cluster analyses; Ch. 3 in BGL

Week 7 (Oct 2/3): Unconstrained Ordination

Unconstrained ordination; Ch. 5 in BGL

Week 8 (Oct 9/10): Constrained Ordination

Constrained ordination; Ch. 6 in BGL

Week 9 (Oct 16/17): Networks

Food webs and bipartite networks (R package *cheddar*)

Week 10 (Oct 23/24): Integrating Species Traits

Trait-based approaches, RLQ and 4th corner analyses; Ch. 6.11 in BGL

Week 11 (Oct 30/31): Catch-week: TBD

Week 12 (Nov 6/7): Metacommunity Structure

Metacommunity structure analysis (R package *metacom*)

Week 13 (Nov 13/14): Dimensions of Diversity

Spatial, phylogenetic and functional diversity; Ch. 8.3-8.6 BGL

Week 14 (Nov 20/21): Evolutionary Community Ecology

Integrating phylogenetic relationships in community ecology (R package *picante*)

Week 15 (Nov 27/28): No class – Thanksgiving Break

Week 16 (Dec 4/5): No class – Pre-finals and Reading days