

BIOL 4395/5301/6321 SPATIAL ECOLOGY

CRN 13412/15270/15633

Fall 2023, 3 credits, MW 9:00-10:20 AM, LART 405A.

A. INSTRUCTOR AND CONTACT

Professor: Dr. Elizabeth LaRue, **E-mail:** ealarue@utep.edu, **Office:** B-404

Office hours: Monday 10:40 – 11:40 AM or by appointment

* Emails will be responded to within 24 hours on the next business day (M-F). Failure to prepare for an assignment deadline is not an emergency, therefore emails sent less than 24 hours or the weekend before a deadline are not guaranteed to be answered before the due date. Please give at least 72 hours of notice when requesting an appointment.

B. COURSE DESCRIPTION

Spatial ecology focuses on understanding ecological patterns and processes across space. This course will introduce students to theory, analytical techniques, and applications from spatial ecology, including the current state of the field. Students will learn how to use common spatial analytical methods and will be expected to apply these to answer scientific questions. A basic proficiency with the R programming language and GIS is recommended, but motivated students without prior experience will have opportunities to learn these skills.

C. LEARNING OBJECTIVES

- Understand the principles of spatial ecology, including historical and current advances described in the primary literature.
- Address questions on land use change, species distributions, ecosystem functioning, and global change from the perspective of spatial ecology.
- Learn basic GIS and spatial analysis skills for ecological applications in the R programming language.
- Learn how to obtain and use open-source data in spatial ecology analyses from the National Ecological Observatory Network (www.neonscience.org).
- Demonstrate a proficiency in communicating spatial ecology principles and analytical approaches in written, discussion, and presentation formats.

D. FORMAT OF INSTRUCTION

Class time will focus on spatial ecology principles, literature discussions with classmates, and hands-on GIS and spatial analyses in R. ***Students are required to attend in-person class sessions MW 9:00-10:20 AM in LART 405A.** There will be no recordings. Although the class periods are intended to be delivered in person, course content such as required readings and assignment submission is delivered through Blackboard.

E. COURSE COMMUNICATION:

- a) Email: UTEP e-mail is the best way to contact me. When e-mailing me, be sure to email from your UTEP email or Blackboard with spatial ecology included in the subject.
- b) Announcements: Check the Blackboard announcements frequently for updates/deadlines.

F. REQUIRED MATERIALS

There is no textbook. Required readings will be provided on Blackboard.

You will need to have access to a computer with R and R Studio. Approximately half the time spent in class will be working through computational spatial ecology exercises in the programming platform R. Students will need to bring a laptop to each class period with the most recent version of the required free software installed (R, R Studio – installation instructions will be given in week 1) or use the lab computers in LART 405A. Assignments using R will require access to a computer with the course software outside of formal class time. Students should backup their assignments whether using a personal or campus computer.

IMPORTANT: If you encounter technical difficulties with your UTEP account or UTEP owned computers, please contact the [UTEP Help Desk](#). You should contact me with difficulties running R code assigned as part of this course.

G. COURSE ASSIGNMENTS AND GRADING:

- a. Grades will be based upon the following assignments (points earned / 100 points total):
 - b. 9% (9 pts) -- Questions for literature discussion participation/attendance (1 pt/discussion, 2 dropped out of 11 possible)
 - c. 40% (40 pts) -- Weekly spatial analysis lab (4 pt/lab with 2 out of 12 dropped)
 - d. 1% (1 pt) - R quiz
 - e. 10% (10 pts) -- Midterm take-home written assignment
 - f. 10% (10 pts) -- Present and lead one paper discussion (partner activity)
 - g. 30% (30 pts) – Independent spatial analysis project
 - i. Project idea (2 pt)
 - ii. Project dataset (2 pt)
 - iii. Project analysis plan (2 pt)
 - iv. Project draft code (4 pt)
 - v. Final project report and code (20 pt)
- h. Participation and attendance: Students are expected to attend class and participate. A student's grade will suffer from poor attendance.
- i. Preparation for class: Students will lose points on assignments due to a lack of preparation for class periods. This includes reading assigned papers, downloading data and/or installing R packages.
- j. Make-up and late work policy: A zero will be given for any late assignments except in the case of a university or instructor approved absence. Documentation is needed for extensions and make-up work (e.g., emergency, official UTEP business). Please contact the instructor to discuss any absences and extensions (you don't know if you don't ask).
 - k. A student may miss 2 literature discussions and 2 labs without penalty (does not include independent project, midterm, R quiz, or leading one paper discussion). This is to accommodate for short-term illness not documented by a doctor's note or personal emergencies. At the end of the semester, 2 literature discussions and 2 labs will be dropped for all students, such that no one can earn more than 9 pts for literature discussions and 40 pts for lab assignments.
 - l. **Precautions when ill:** Please stay home and send me an email before class if you have been diagnosed with or are experiencing symptoms of a contagious illness (COVID-19, flu). *** Students are still responsible for turning in assignments on Blackboard by the due date even if missing class due to illness. Short-term illness such as the flu typically only happen once or twice a semester and should be covered by the 2 dropped literature questions and lab assignments. Long-term

illness that goes beyond a couple of missed class periods will require appropriate documentation; students are encouraged to contact CASS (see K. below).

- m. Group work policy: All course assignments are to be a student's own work and completed individually unless otherwise instructed. It is expected that each submission is written in the student(s)'s own words. Students may work on solutions for the R lab assignments with others but must turn in their own work.
- n. The course grade will be derived as points earned / 100 points total from the assignments: A (0.900 -1.00), B+ (0.800 – 0.899), C (0.700 – 0.799), D (0.600 – 0.699), F (< 0.600)

H. ALTERNATE MEANS OF SUBMITTING WORK IF TECHNICAL ISSUES

Frequently save copies of your work. It is your responsibility to give yourself enough time to submit assignments by the deadline. If you are experiencing difficulties submitting through Blackboard, contact the UTEP Help Desk. You can email me your back-up document as a last resort, but it must be emailed to me within 10 minutes of the deadline. You are not allowed to use email to submit assignments more than a couple of times.

I. COURSE DROP POLICY

The Fall 2023 Drop/Withdrawal Deadline is Friday Nov. 3rd; you cannot drop after this date. If you feel that you are unable to complete the course successfully, please let me know and then contact the [Registrar's Office](#) to initiate the drop process. You must initiate the request to be dropped from the course; if you do not, you are at risk of receiving an "F".

J. INCOMPLETE GRADE POLICY

Incomplete grades may be requested only in exceptional circumstances after you have completed most of the course requirements. Talk to me immediately if you believe an incomplete is warranted. Students will still need to complete all assignments to earn a grade.

K. ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#) (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the [CASS portal](#).

L. SCHOLASTIC INTEGRITY

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. In this course, any work not written and prepared by the student is considered academic misconduct. Unless otherwise instructed on an assignment, copying material generated from an AI, such as ChatGPT, or another student, and claiming it as your own work, is plagiarism.

Student must always cite their references when using another's work with an appropriate bibliography and in-text citations. Any act of academic dishonesty attempted by a UTEP student will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso will be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

M. COPYRIGHT STATEMENT FOR COURSE MATERIALS

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.

N. COURSE RESOURCES

- [Help Desk](#): Students experiencing technology challenges (email, Blackboard, software, etc.).
- [UTEP Library](#): Access a wide range of written and technology resources.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing.
- [RefWorks](#): A bibliographic citation tool.
- [Military Student Success Center](#): Assists personnel in any branch of service to reach their educational goals.
- [Center for Accommodations and Support Services](#): Assists students with ADA-related accommodations for coursework, housing, and internships.
- [Counseling and Psychological Services](#): Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

O. FALL 2023, WEEKLY SCHEDULE (SUBJECT TO CHANGE)

Week	Monday: Lecture/discussion topic		Readings (Discussion questions are due 8:59 AM the day assigned)	Wednesday: spatial analysis lab topic (Labs are due 8:59 AM the following Wednesday)	
1	8/28	Course intro, what is spatial ecology?	---	8/30	Intro to R, R Studio, and R Markdown
2	9/4	Labor Day (no class)	---	9/6	R skill building 1
3	9/11	Pattern and scale	Mata Silva et al. 2017	9/13	R skill building 2
4	9/18	Causes of landscape pattern	Bradley and Mustard 2006	9/20	Introduction to NEON open-source data, R quiz 9:00 – 9:10 AM
5	9/25	Project idea due 11:59 PM	---	9/27	Making maps in R, introduction to shapefiles
6	10/2	Geographic coordinates systems	McCullough et al. 2019	10/4	Introduction to rasters with NEON AOP data
7	10/9	Quantifying landscape pattern Mid-term take-home assigned	Wang et al. 2014	10/11	Landscape patch metrics w/NLCD landcover
8	10/16	3D ecology Midterm due 8:59 AM	D'Urban Jackson et al. 2020	10/18	Practice handling NEON data
9	10/23	Macrosystems ecology	Heffernan et al. 2014,	10/25	Nonstationarity in macrosystems datasets
10	10/30	Landscape models	Gardner et al. 1987	11/1	Project dataset due 11:59 PM
Fall Drop/Withdrawal Deadline Friday Nov. 3rd					
11	11/6	Species distribution models	Zacarias-Correa et al. 2020	11/8	Environmental correlates of southwest species distributions
12	11/13	Analysis plan for project due 11:59 PM (no class)	---	11/15	Spatial autocorrelation in the NEON design
13	11/20	Climate change	McGuire et al. 2016, vonHedemann et al. 2023	11/22	Draft project R code due 11:59 PM
14	11/27	Urban landscapes	Groffman et al. 2014	11/29	3D scanning in the Chihuahuan Desert
15	12/4	Processes & services	Liu et al. 2015	12/6	Final project peer help activity
Independent project due Friday 12/8 at 5 PM (No exam during finals week)					

This syllabus is subject to change. The most recent version will be on Blackboard.