

Landscape Ecology for Natural Resource Management

ENR 5374 (3 credits) – Spring 2023

Meeting Time: **Lecture** – Monday / Wednesday 1:50–2:45 KH245
 Lab – Friday 1:00–3:00 KH231

Instructor: Dr. William Peterman
 375B Kottman Hall
 Phone: 614-292-9795
 E-mail: Peterman.73@osu.edu
 Office Hours: by appointment

Description

This course will introduce students to the concepts and methods of landscape ecology and demonstrate the role of landscape ecology in applied management and conservation of natural resources. At its core, landscape ecology is the study of spatial heterogeneity and understanding its effect on ecological processes. The course will progress through the following:

- 1) *Critical concepts in landscape ecology*
- 2) *Drivers of landscape patterns*
- 3) *Characterization and description of landscape patterns*
- 4) *Effects of landscape patterns on populations, communities, and ecosystems*
- 5) *Management of landscapes*

Objectives

This course is heavily project-based and focused on student-directed learning. The primary objective of the course is for you to gain a practical working understanding of landscape ecology and its role in natural resource management and conservation. To achieve this goal, it will be necessary for you to:

- 1) *Understand how to define and detect landscape patterns, the causes of these patterns, the implications of these patterns on populations, communities, and ecosystems, as well as strategies to effectively manage human-dominated landscapes*
- 2) *Gain comfort with reading, interpreting, and discussing primary literature*
- 3) *Develop problem solving skills through collaboration with peers*
- 4) *Develop writing and oral presentation skills*
- 5) *Integrate and synthesize concepts across scientific disciplines*

Prerequisites

Graduate standing **OR** instructor permission. Moderate proficiency with geographic information systems (e.g., QGIS, ArcGIS) is expected.

Expectations

This is a 5000-level course that will be taught at the graduate level to all students enrolled. All undergraduates will be expected to meet these expectations. This course is designed for in-person attendance, but we may have to use Zoom lectures/recordings depending on the state of public health.

Text

PDFs for all readings will be made available on the course website on Carmen.

Labs

All files and directions needed for lab will be available [HERE](#). We will also send a link to each lab through Carmen Announcements.

Course Format

This course will meet twice a week for lecture and once a week for lab. Course lectures will involve discussion of assigned readings. A 1–3 question quiz will be administered at the beginning of each lecture (see Student Evaluation below). Weekly labs will provide hands-on experience using a variety of landscape ecological tools to assess and quantify landscapes and landscape patterns. There will be a final independent project that will require application and synthesis of methods and concepts learned in lecture and lab.

Lab Projects

Project 1 —Deriving and assessing landform indices from a DEM surface

Project 3 — Independent Project

Student Evaluation

Student performance in this course will be based upon daily quizzes, a midterm lecture exam, a final lecture exam, and the participation and completion of lab exercises and projects. Daily quizzes will be 1–3 short questions covering material from the previous class or lab. These quizzes are meant to hold students accountable for the material covered in class and to encourage attendance.

Lab exercises (6) will be worth 25 points each, and Lab Project with a written report (1) will be worth 50 points. There will also be a final independent project. As part of this project, all students will prepare a project proposal (25 points). We will then have an NSF-style review of proposals (25 points). Everyone will present their projects at the end of the semester and will be evaluated by your peers based upon presentation and interpretation of results as well as synthesis of topics discussed in lecture (50 points). A final written project report will follow the presentation (100 points).

Task	Points	% Grade
Daily quizzes / participation	75	12%
Midterm Exam	75	12%
Lab Exercises 7 @ 25 points each	175	28%
Lab Project Written Report 1 @ 50 points each	50	8%
Lead Class Topic	50	8%
Final Project Proposal	25	4%
Peer Review of Proposal	25	4%
Final Independent Project: Report	75	12%
Final Independent Project: Presentation	25	4%
Final “Not-Test” [see below]	50	8%
Total	625	100%

Grading scale:

A 93–100%	B– 80–82	D+ 67–69
A– 90–92	C+ 77–79	D 60–66
B+ 87–89	C 73–76	E < 60
B 83–86	C– 70–72	

“Not-Final” Exam

In lieu of a traditional final exam, you will complete a “not-final”. For the not-final, you can select any one (or a combination) of the topics covered in lecture. You are then free to design and produce any sort of product that explains the topic(s). Examples include creating an infographic, performing a song, drawing a comic, creating a game, writing a short story, interviewing a researcher, writing a grant proposal, creating a series of memes, creating a piece of artwork, writing a poem, etc. Think outside the box and utilize your talents! All not-final ideas must be approved ahead of time.

Academic misconduct

Academic misconduct will not be tolerated in this course. The Ohio State University’s Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: “Any activity that tends to compromise the academic integrity of the University, or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University’s Code of Student Conduct is never considered an “excuse” for academic misconduct, so I recommend that you review the Code of Student Conduct (<http://studentaffairs.osu.edu/csc/>) and, specifically, the sections dealing with academic misconduct. I am obligated by University Rules to report suspected academic misconduct in the course. Please see the Student Resource Guide if you have questions about this policy and as always please contact me if you have any questions.

Reporting Incidents of Bias

To ensure a safe learning environment, please speak to the instructor immediately if you feel that you have experienced bias (whether based on race, ethnicity, gender identity or expression, sexual orientation, religion, national origin, age or sex) within the classroom. You can also anonymously report any incidents of bias experienced on campus to the [Bias Assessment Response Team](#) (BART).

Writing Assistance

Writing is a critical form of communication, and effective writing takes time, effort, and practice. The Center for the Study and Teaching of Writing (<http://cstw.osu.edu/writing-center>) “offers free help with writing at any stage of the writing process for any member of the university community. During our sessions, consultants can work with you on anything from research papers to lab reports, from dissertations to résumés, from proposals to application materials.” Please take advantage of this resource to submit the best possible writing assignments in this course.

Religious Accommodations

Our inclusive environment allows for religious expression. Students requesting accommodations based on faith, religious or a spiritual belief system in regard to examinations, other academic requirements or absences, are required to provide the instructor with written notice of specific dates for which the student requests alternative accommodations at the earliest possible date. For more information about religious accommodations at Ohio State, visit odi.osu.edu/religious-accommodations.

Special Needs

If you need an accommodation based on the impact of a disability, please contact me to discuss as soon as possible. We can discuss the course format, anticipate your needs and explore potential accommodations. I rely on the Office for Disability Services for assistance in verifying the need for accommodations and developing accommodation strategies. If you have not previously contacted the Office for Disability Services, I encourage you to do so (<http://www.ods.ohio-state.edu>, Phone: 614-292-3307)

Course Topics

Note: Syllabus is subject to change

Week	Date	Topics	Readings	Assignment Due
1	9-Jan	Introduction to Landscape Ecology	With Ch 1	
	11-Jan	Defining landscapes	T&G Ch 1 [1–15]	
	13-Jan	<i>Lab 1: (Re) Introduction to GIS</i>		
2	16-Jan	No Class: Martin Luther King Day		
	18-Jan	Defining landscapes & Scaling Issues	T&G Ch 1 [16–32]	
	20-Jan	<i>Lab 2: DEM Processing</i>		Lab 1
3	23-Jan	Scaling Issues in Landscape Ecology	Scholes 2017	
	25-Jan	Scaling Issues in Landscape Ecology	Wiens 1989	
	27-Jan	<i>Lab 3: GIS with R / RStudio</i>		Lab 2
4	30-Jan	Landscape Heterogeneity & Dynamics	T&G Ch 2	
	1-Feb	Landscape Heterogeneity & Dynamics	[2° – With Ch3]	
	3-Feb	<i>Project 1: DEM processing and analysis</i>		Lab 3
5	6-Feb	Landscape Pattern & Metrics	T&G Ch 4	
	8-Feb	Landscape Pattern & Metrics		
	10-Feb	<i>Lab Update / Catch-up</i>		
6	13-Feb	Landscape Connectivity	With Ch 5	
	15-Feb	Landscape Connectivity		
	17-Feb	<i>Lab 4: Landscape Metrics</i>	FRAGSTATS Manual	Project 1
7	20-Feb	Fragmentation, Edge Effects	Fahrig 2017; Fletcher et al. 2018; Fahrig et al. 2018	
	22-Feb	Debate: Fragmentation, <i>per se</i>		
	24-Feb	<i>Lab 5: Remote sensing</i>	Gergel & Turner Ch 1	Lab 4
8	27-Feb	Landscape Effects: Individuals (Student Lecture?)	With Ch 6 [240–264]	
	1-Mar	Landscape Effects: Populations (Student Lecture?)	With Ch 7 [292–302]	
	3-Mar	<i>Lab 6: Landscape resistance & connectivity</i>		Lab 5
9	6-Mar	Landscape Effects: Organisms (Student Lecture?)	With Ch 8 [337–344]	
	8-Mar	Guest Lecture: Steve Matthews		
	10-Mar	<i>Lab 6: Landscape resistance & connectivity (cont)</i>		Project Proposal
10	13-Mar	SPRING BREAK		
	15-Mar			
	17-Mar			

11	20-Mar	NO CLASS – IALE CONFERENCE		
	22-Mar	NO CLASS – IALE CONFERENCE		Midterm [Take home]
	24-Mar	Lab 7: Scale of Effect		Lab 6
12	27-Mar	Proposal Review Panel		Proposal Reviews
	29-Mar	Proposal Review Panel		
	31-Mar	Individual project work day / Lab 7: Scale of Effect (cont)		Lab 7
13	3-Apr	Student Lectures		
	5-Apr	Student Lectures		
	7-Apr	Individual project work day		
14	10-Apr	Landscape Genetics	With Ch 9	
	12-Apr	Landscape Genetics	Balkenhol TBD	
	14-Apr	Individual project work day		
15	17-Apr	Student Lectures		
	19-Apr	Student Lectures		
	21-Apr	Individual project work day		
16	24-Apr	Project Presentations		Presentations
	26-Apr	“Not-Final” DUE		Not-Final

T&G = Turner, M. G., and R. H. Gardner. 2015. Landscape Ecology in Theory and Practice: Pattern and Process. 2nd edition. Springer New York, New York, NY.

With = With, Kimberly A. 2019. Essentials of Landscape Ecology. Oxford University Press.

Student Topics

- Animal movement / home range
- Species distributions and distribution models
- Metapopulation / source-sink dynamics
- Invasive species spread
- Disease spread
- Landscape corridors
- Species interactions
- Community composition / dynamics
- Ecosystem processes
- Landscape management and planning