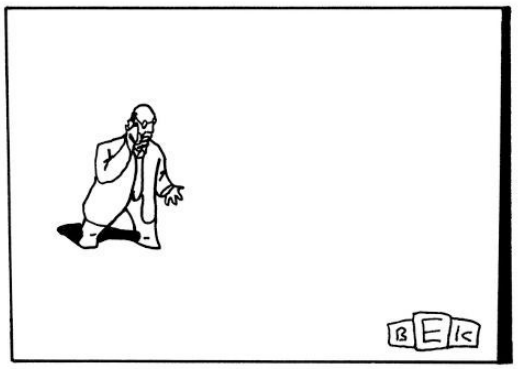
Landscape Ecology

GEOG 41195 | 51195 | 71195 (3 credits)
Spring 2022 | McGilvrey 310 | TR 3:45-5:00pm

Instructor	**Office Hours**
Dr. Timothy Assal (he/him/his) Office: 437 McGilvrey Hall Email: tassal@kent.edu (*best way to contact me)* Phone: 330-672-2046	T & R 11-12 pm; 1:45 pm – 2:45 pm in office or Rm 403 (after class) W 1 – 2:30 pm (online - Zoom Room, password: "geog")

Course Description

Landscape ecology is the study of the interaction between spatial pattern and ecological processes. The emphasis on spatial patterning – its development and importance for ecological processes – often focuses on broad spatial and temporal scales. This course aims to provide a comprehensive introduction to the field by coupling theoretical concepts (lecture, readings, discussion) with applications through modeling projects (exercises in quantitative approaches) to provide hands-on practical experience with landscape analysis tools and ideas. ***This field of study combines the spatial approach of the geographer with the functional approach of the ecologist.*** The course should be useful to students in geography and ecology as well as those with interests in natural resource, landscape architecture, land use planning, etc.



"I lost everything—the business, the house, the landscape."

Prerequisites:

Graduate standing (instructor permission for undergraduate students)

It is recommended students meet at least one of the following criteria:

- An introductory biology and/or ecology course
- Extensive coursework in physical geography/natural resources
- Experience with geographic techniques (GIS, remote sensing)
- Familiarity with statistics, modeling, R

Course Learning Outcomes and Goals

Upon completion of this course, students are expected to:
1. Understand the concepts and consequences of scale, scaling techniques, and spatial pattern;
2. Explain how ecological systems are dynamic in space and time;
3. Infer the abiotic and biotic processes that structure landscape mosaics and patterns of biodiversity at multiple spatial scales;
4. Use the tools specific to landscape ecology to answer questions about heterogeneity, scale, and ecosystems dynamics.
5. Review the theory, methodology, and application of landscape ecology to contemporary issues in conservation biology and resource management;

Course Materials

Required Textbooks:

- Turner, M.G., and R.H. Gardner. 2015. *Landscape Ecology in Theory and Practice*, 2nd edition. Springer, New York. 482 pp. ISBN 978-1493927937
- Gergel, S.E., and M.G. Turner (eds.). 2017. *Learning Landscape Ecology: A practical guide to concepts and techniques*, 2nd edition. Springer, New York. 482 pp. 978-1493963720
- Both textbooks are available for download as eBooks at the KSU library.
- All required readings in the form of journal articles will be provided.

Software:

- **Students are not required to purchase any software.** All software is available in the McGilvrey computer labs. However, all software is open source (free!) and can be downloaded on a personal computer (note: this will require some minimal space on your personal computer to be useable). We will move to a computer lab during lab exercises unless all students have laptops and would prefer to work on those.
- We will primarily use R and QGIS in this class. Students are not expected to have prior knowledge in either program.
- The R statistical program
- R Studio - an Integrated Development Environment (IDE) for R
- *QGIS* – a free an open-source cross-platform desktop geographic information system (GIS) application that supports viewing, editing and analysis of geospatial data, including numerous remote sensing techniques. This software parallels many of the types of analysis that is possible in *ArcGIS Desktop*; however, I believe it is more flexible and is it open source (download QGIS).

Hardware:

- A flashdrive or external hard drive will be necessary if you work on lab assignments in a campus computer lab.

COVID-19 Information

- This course is being offered as a traditional on-campus class and there is no plan to change the form of delivery at this time. Nevertheless, please see the university website for current COVID information and sign up for Flash Alerts to be notified if the university makes changes to course delivery at any point during the semester. Please let me know if you become ill during the semester and we will make arrangements where appropriate. I will do the same if I become ill. Please follow the Flashes Safety Principles, take care of yourself and each other. I am confident we will have a great semester.
- In the event I am unable to teach the class due to a COVID related reason, I will hold class over Zoom. I will send out more information if that is necessary.

Course Structure

Classes will be conducted as lecture, discussion, and lab. The course instructor will deliver course materials and additional materials via Canvas.

Labs: The major purpose of these labs is to give you the skills and practice you need to learn the methods used in this field. There will be 6 labs in total (10 points/each). Although one class is set aside for each lab you are expected to complete each lab on your own time. Labs will typically be due one week later (unless otherwise noted), and must be submitted via Canvas. You can discuss the labs with classmates, but each student must turn in their own lab, with written responses in their own words. You are expected to write in complete sentences using proper grammar/spelling.

Take-home midterm: The midterm will contain short essays and problems covering the lecture material and readings. Students will have approx. one week to complete the exam and must work independently on the exam.

Discussion/Participation: Attendance and participation is expected, and absences are noted. Be present, be inquisitive, be conscientious. There may be occasional quizzes, in-class reflection assignments, etc. COVID-19 is a challenge to everyone and affects everyone in different ways. If you find yourself struggling this semester, please reach out. Communication with the instructor is key. All students are expected to participate in discussion and each student will be assigned as the discussion lead for a paper during the semester. Students will also present findings from their research papers to the class at the end of the semester. *The instructor will post information regarding discussion and discussion lead instructions early in the semester*.

Term Paper: In lieu of a final exam, students must write a final paper that explicitly deals with landscape ecology and the concepts, ideas or themes discussed in the class and readings. You will be graded on the quality of your work, including the content and form (e.g., spelling, grammar, organization, etc.). The paper may take one of two forms: 1) a review or criticism of the published literature, or 2) a manuscript reporting the results of a research project. The instructor will provide more details early in the semester. It will involve a short proposal (due mid-semester), the final paper, and the a brief presentation on the results of the paper (during the final exam period).

Field trip: There will be an optional field trip to Cuyahoga Valley National Park that will allow us to view some of the processes and patterns discussed in class. More details to come.

Course Assessment

Category	Points per item	Total Points in Category	Percentage of class grade
Lab Assignments	10	60	34%
Take-home midterm	1	25	14%
Discussion Lead	1	10	11%
Term Paper	1	50	29%
Participation	1	20	6%
Total		**175**	**100%**

Final Grade Scale

A 92.5 - 100	B+ 86.5-89.4	C+ 76.5 - 79.4	D+ 66.5 - 69.4
A- 89.5 – 92.4	B 82.5 - 86.4	C 72.5 - 76.4	D 59.5 - 66.4
	B- 79.5 - 82.4	C- 69.5 - 72.4	F < 59.4

HOW TO SUCCEED IN THIS CLASS - "*Tell me and I forget, teach me and I may remember, involve me and I learn."* B. Franklin

• ***Do the readings* –** so much of this class depends on the reading! Not only is it expected, but your life in this class will be much easier if you allow yourself enough time to devote to the readings. A**llow adequate time to read the discussion articles**. Some of them might be difficult, but it's important to put in time and push through them so you can contribute in discussion.
• ***Participation and attendance*** – participating in class discussions will increase your awareness of the material and issues; take notes of key points. Only "legitimate" reasons for an excuse are accepted – communicate with the instructor know if you will miss class.
• ***Collegiality and professionalism*** – Respect your instructors, peers and colleagues. Please silence phones/laptops and refrain from using except for class related purposes.
• ***Always ask questions*** – if there is something that you do not understand do not be afraid to ask questions, even if this means interrupting the class.
• ***Late work*** – points will be deducted for late submissions.

University Policies

Important Dates
The official registration deadline for this course is **January 24th**. University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by published deadlines should not be attending classes and will not receive credit or a grade for the course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashLine) prior to the deadline indicated. Registration errors must be corrected prior to the deadline. The course withdrawal deadline is **April 4th**.

Academic Dishonesty
University policy 3-01.8 deals with the problem of academic dishonesty, cheating, and plagiarism. None of these will be tolerated in this class. The sanctions provided in this policy will be used to deal with any violations. If you have any questions, please read the policy at http://www.kent.edu/policyreg/administrative-policy-regarding-student-cheating-and-plagiarism

Accommodations & Accessibility
University policy 3-01.3 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented

disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through Student Accessibility Services (contact 330-672-3391 or visit www.kent.edu/sas for more information on registration procedures).

Survey of Instructor
The Student Survey of Instruction (SSI) is now online. We will dedicate a portion of a class period later in the semester for students to complete this survey.

Course Policies

Respect for Diversity, Equity, and Inclusion
In this class, we are seriously committed to supporting diversity and inclusion among all classroom community members (our university is too!). We treat one another fairly and honor each other's experiences, beliefs, perspectives, abilities, and backgrounds, regardless of race, religion, language, immigration status, sexual orientation, gender identification, ability status, socio-economic status, national identity, or any other identity markers. It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

Land Acknowledgment
We acknowledge that the territory on which Kent State University stands is that of The Kaskaskia and The Erie People. This statement is one small step in acknowledging the history that brought us to reside on the land, and to help us seek understanding of our place within that history. For more information, please visit the Native American Indian Center of Central Ohio.

Mental Health
College life can be incredibly stressful, and you may experience a range of issues that can cause barriers to learning and your well-being. Learn more about university sponsored resources to help.

Course Schedule (next page)

Week	Date	Day	Topic	Reading
1	18-Jan	T	Course Introduction	
	20-Jan	TH	What is Landscape Ecology?	TG Ch. 1
2	25-Jan	T	Lab 1: Historical Aerial Photog for landscape analysis	LLE Ch. 2
	27-Jan	TH	Intro to QGIS and R Primer	
3	1-Feb	T	What creates landscape pattern?	TG Ch. 2
	3-Feb	TH	Lab 2: Creating Landscape pattern with Markov Models	LLE Ch. 8
4	8-Feb	T	How can we quantify landscape pattern?	TG Ch. 4
	10-Feb	TH	Lab 3: Understanding landscape metrics	LLE Ch. 4
5	15-Feb	T	Quantifying landscape pattern II	TG Ch. 4
	17-Feb	TH	Lab 3 (cont'd)	LLE Ch. 4
6	22-Feb	T	Spatial statistics in landscape ecology	TG Ch. 5
	24-Feb	TH	Discussion (take home exam distributed)	
7	1-Mar	T	**No class**	
	3-Mar	TH	Modeling landscapes: neutral and spatial models	TG Ch. 3
8	8-Mar	T	Discussion	
	10-Mar	TH	Landscape Disturbance	TG Ch. 6
9	15-Mar	T	Discussion	
	17-Mar	TH	Landscape Disturbance II	TG Ch. 6
10	22-Mar	T	Discussion	
	24-Mar	TH	Organisms and Landscape Pattern	TG Ch. 7
11	29-Mar	T	Spring Recess: no class	
	31-Mar	TH	Spring Recess: no class	
12	5-Apr	T	Lab 4: Assessing multi-scale landscape connectivity	LLE Ch. 12
	7-Apr	TH	Discussion	
13	12-Apr	T	Ecosystem processes on landscapes	TG Ch. 8
	14-Apr	TH	Lab 5: Spatial dynamics of ecosystem processes	Ch. 16
14	19-Apr	T	Discussion	Paper
	21-Apr	TH	Land use planning and conservation	TG Ch. 9
15	26-Apr	T	Lab 6: Conservation Planning with Marxan	
	28-Apr	TH	Discussion	
16	3-May	T	TBD: open date	
	6-May	F	Final Exam Period (10:15 am - 12:30 pm) - Papers due; student presentations	