

Instructors

Dr. Dan Uden

302 Hardin Hall

Email: duden2@unl.edu

Office hours: Please email me to make an appointment

Dr. Dirac Twidwell

308 Keim Hall

Email: dirac.twidwell@unl.edu

Teaching assistant

Mr. Daniel Bauloye

Email: dbauloye2@huskers.unl.edu

General information

Credit hours: 3

Delivery format: In-person*

Keim 264 East

Tues & Thurs 9:30–10:45am CST

*To accommodate remote/online graduate students and others unable to attend in-person for any reason, in-person sessions may be accessed via Zoom and will also be posted on Canvas.

Zoom link: <https://unl.zoom.us/j/96474379082>

Course description

This course broadly covers characteristics of Great Plains ecosystems—what they are, where they are, and how they are shaped by pattern–process interactions in landscape systems.

Course goals

1. Recognize the Great Plains as an ecologically distinct region.
2. Relate past, present, and future ecosystem patterns to landscape system processes.
3. Appreciate the past, present, and future roles of people in shaping Great Plains ecosystems.

Course objectives

After successful completion of this course, students will be able to:

1. Delineate the Great Plains region, according to its defining physical characteristics.
2. Recognize Great Plains ecosystems as complex systems that exhibit hierarchical structure, feedbacks, and emergent properties.
3. Relate ecological patterns and landscape processes. **GRADUATE students** will demonstrate advanced proficiency through a series of three essays on past, present, and potential future pattern–process relationships in a Great Plains ecoregion of their choosing.

4. List geological, climatic, biogeographical, and anthropogenic legacies shaping past and contemporary Great Plains ecosystems. **GRADUATE students** will demonstrate advanced knowledge and understanding through two essays on past and contemporary pattern–process relationships in a Great Plains ecoregion of their choosing.
5. Describe how interactions among climate, soils, and disturbance regimes shape variation in ecosystem structure, composition, and function.
6. Interpret trends in climate, biodiversity, nutrient cycling, water, fire, herbivory, and land use, and relate changes in their interactions to changes in ecological systems.
7. Apply key ecological principles to the understanding of how management and land use can increase or decrease the vulnerability of ecosystems to disturbance and change.
8. Evaluate the trade-offs of current and future land use and management within the context of providing for multiple ecosystem services. **GRADUATE students** will demonstrate advanced understanding of land use tradeoffs through two essays on contemporary and potential future pattern–process relationships in a Great Plains ecoregion of their choosing.
9. Understand and appreciate the role of fire in the Great Plains.
10. Demonstrate proficiency in science-based self-education and use of scientific literature to structure arguments and support decision-making. **GRADUATE students** will demonstrate advanced proficiency in the use of scientific literature to structure arguments through a series of three essays on past, present, and potential future pattern–process relationships in a Great Plains ecoregion of their choosing.

Readings

No specific textbook is required. Instead, readings are assigned from peer-reviewed scientific literature. Readings will be available on Canvas. Please note that readings are an important part of your preparedness for class sessions and lectures are not a replacement for the readings. Plan to spend a minimum of two hours studying for each hour of class. Your understanding of the information in the readings will be assessed in the form of short essays submitted in Canvas and test questions, including those that are covered in the readings but not the lectures.

Undergraduate student grading policy

| Assessment | Points | (% of final grade)* |
|-----------------------------------|--------|---------------------|
| Exam 1 | 100 | 20 |
| Exam 2 | 100 | 20 |
| Short essays | 60 | 15 |
| <i>Scientific Scoreboard</i> ** | 70 | 20 |
| Quizzes (pre- and post-course)*** | 20 | 5 |
| Final Exam | 100 | 20 |
| Total | 450 | 100 |

*Assessment groups weighted independently of points (final percentages may not equal proportion of total points; total points subject to change).

**Bonus points awarded through *Scientific Scoreboard* added to lowest exam score.

***Pre- and post-course quizzes are completion-based.

Graduate student grading policy

| Assessment | Points | (% of final grade)* |
|-----------------------------------|--------|---------------------|
| Exam 1 & Ecoregion Essay 1 | 200 | 20 |
| Exam 2 & Ecoregion Essay 2 | 200 | 20 |
| Short essays | 60 | 15 |
| <i>Scientific Scoreboard</i> ** | 70 | 20 |
| Quizzes (pre- and post-course)*** | 20 | 5 |
| Final Exam & Ecoregion Essay 3 | 200 | 20 |
| Total | 750 | 100 |

*Assessment groups weighted independently of points (final percentages may not equal proportion of total points; total points subject to change).

**Bonus points awarded through *Scientific Scoreboard* added to lowest exam score.

***Pre- and post-course quizzes are completion-based

Grading scale

| Grade | Weighted % of available points |
|-------|--------------------------------|
| A+ | 97.0 – 100 |
| A | 90.0 – 96.9 |
| B+ | 87.0 – 89.9 |
| B | 80.0 – 86.9 |
| C+ | 77.0 – 79.9 |
| C | 70.0 – 76.9 |
| D+ | 67.0 – 69.9 |
| D | 60.0 – 66.9 |
| F | < 59.9 |

Weekly rhythm

- Typical (non-exam) weeks
 - Tuesdays
 - Complete readings/other assignments by 9:00am CST
 - Online students complete previous week's *Scientific Scoreboard* discussions on Canvas (if assigned) by 9:00am CST
 - Attend/watch class session
 - Thursdays
 - Submit short essay (if assigned) by 9:00am CST
 - Attend/watch class session
 - Participate in *Scientific Scoreboard* or other activities
- Exam weeks
 - Tuesdays
 - Attend/watch class session (exam review)
 - Thursdays
 - Attend class session (complete exam)

Short essays

There will be multiple short essays assigned throughout the semester. Essays are to be uploaded to Canvas by the assigned due date and time (see specific instructions on Canvas). I will select from the short essays to facilitate discussions during *Scientific Scoreboard* and to emphasize critical lecture, reading, and/or activity materials. Short essays may cover assigned readings, lectures, activities, and/or other materials assigned for the day of the class, as well as those from previous class meetings.

Short essays should reflect the assigned theme, which will be detailed in Canvas instructions. When developing your short essay, support your points by citing information from publications in the peer-reviewed scientific literature. Include a list of references at the end of your essay, consistently and correctly formatted with the full citation. **Each short essay is worth 10 points. Short essays are due at 9:00 A.M. on the specified due date. Late submissions may result in only partial credit being awarded. Grades will be based on your ability to use the scientific literature to support your central thesis (see grading rubric on Canvas for details).** I am not looking for a review of prior lectures/readings/activities. Simple repetition of content from lectures/readings/activities will receive poor grades. Rather, the lectures/readings/activities are to serve as the basis for addressing a complex issue relevant to Great Plains ecosystems. Your mission is to use the scientific literature to creatively confront/challenge/reject/promote the complex issue or question you are assigned. Together, **short essays will account for 15% of your total grade.**

Feature videos will be played during the semester. Videos will be taken from movies, documentaries, scientific debates or presentations, opinion pieces, and animations. These videos will serve as a foundation for framing discussions during *Scientific Scoreboard* and to highlight the disconnect between scientific evidence and popular media. You may reference these videos in your short essays.

***Scientific Scoreboard* (in-person/synchronous participation option)**

The class will be divided into teams to discuss and debate a key question or issue associated with Great Plains ecosystems. Topics assigned for *Scientific Scoreboard* may be taken from the short essay assignments, lectures, videos, or other course materials. Your team is to use the peer-reviewed scientific literature to support, refute, or expand upon the points brought up by the paper/video, the moderator (myself), and the other teams. This means that you will need to become proficient at finding and comprehending information from the scientific literature that is relevant to, but not part of, the assigned reading(s).

Your team does not need to form a consolidated stance and argue a singular point. You can disagree with members of your team and agree with members from other teams. Similarly, collaborating scientists disagree throughout the process of establishing, testing, and publishing their scientific hypotheses. Yet, the common goal is to advance the state of knowledge. You and your teammates should be willing to change your mind based on the points made by other individuals, as well as stand firm when you feel their premise is not sufficiently supported – especially when evidence from the literature is lacking. A major objective of this exercise is to make you familiar with the process used to enter into an objective discussion, with the intent of limiting personal biases and opinion and instead constructing viewpoints around a systematic,

organized means of advancing knowledge (i.e., science). Together, **Scientific Scoreboard sessions will account for 20% of your total grade.**

Rules of *Scientific Scoreboard*:

- Class divided into teams.
- Ten minutes will be allocated prior to *Scientific Scoreboard* for teams to discuss the topic and develop a team strategy. A representative for each team will be asked to **write the names and main points of your group on a Google Jamboard frame (link will be provided).**
- Groups reconvene for entire-class activity.
- Round 1 (round-robin) – At the beginning of *Scientific Scoreboard*, a representative for each team will be asked to concisely present an overview of the team’s most important points.
- Support your discussion points with the scientific literature, and note the paper(s) you are using to support your argument when making your point. Limit presentations based on personal experiences/opinions, unless they are analogous to points raised in the literature.
- Use facts/data, confirmed hypotheses (or rejected ones), conceptual frameworks, scientific conclusions, and scientific debates to expand or refute points of discussion.
- Multiple people need to give their viewpoint on each team. A single individual is not to be the sole communicator of discussion points or grades for the entire team will suffer.
- Rounds 2 and 3 – Groups will be given an opportunity to expand their arguments and respond to those of other teams.
- Discussions must be cordial. Teams will lose points for failing to act in an appropriate manner. All team members will be affected, even if points are lost as a result of the actions of a single individual. Individuals acting in an unruly manner will be excused for the remainder of the *Scientific Scoreboard* exercise.
- I will assign points to each team as the discussion occurs. Points will be accrued based on the validity of your point and mechanisms of support used to frame your argument.
- *Scientific Scoreboard* exercises are worth **10 points each**. Because this is a team exercise and individual grades are dependent on the performance of your team members, I will remove each person’s lowest score from the semester’s exercises when computing final grades.
- **The team with the most points at the end of each *Scientific Scoreboard* exercise will receive 1 bonus point.** At the end of the semester, bonus points will be added to your lowest exam score.
- See grading rubric in Canvas for details.

***Scientific Scoreboard* (online/asynchronous participation option)**

Due to their inability to participate in *Scientific Scoreboard* during in-person class sessions, certain individuals (**especially online graduate students**) will use Canvas Discussion Boards to respond to the assigned *Scientific Scoreboard* prompt. The format of this exercise will largely mirror that of *Scientific Scoreboard* in in-person class sessions, with a few exceptions. This online option of *Scientific Scoreboard* **may also serve as an alternative way for students (undergraduate and graduate) who miss in-person sessions in which we play *Scientific Scoreboard* to receive their points.**

- Instead of being divided into teams, students will participate individually.

- Round 1: Each student will post an initial reply to the discussion prompt that summarizes their central argument and supports it with scientific evidence (see detailed instructions above for synchronous *Scientific Scoreboard*).
- Rounds 2–3: Students will respond to the posts of others in some way (disagreeing, agreeing, expanding, etc.), but you in doing so, you must reference additional evidence (e.g., facts/data, confirmed or rejected hypotheses), conceptual frameworks, scientific conclusions, scientific debates, etc.).
- As detailed in the in-person/synchronous *Scientific Scoreboard* section above, this is meant to take the form of a cordial discussion that advances the state of knowledge.
- *Scientific Scoreboard* exercises are worth **10 points each**. To align with the in-person/synchronous group, I will remove each person's lowest score from the semester's exercises when computing final grades.
- **One bonus point may be awarded to one or two students who go above and beyond in their demonstration of the validity of their arguments with supporting scientific information.** At the end of the semester, bonus points will be added to your lowest exam score.
- To receive full credit, all posts and replies must be submitted by the specified due date.
- Please see Canvas for topics, due dates, and a detailed grading rubric.

Exams

This course contains three exams, with the third (final) being cumulative. Exams may cover topics from all course materials (readings, lectures, short essays, *Scientific Scoreboard*, and other activities). This is another reason class attendance (or watching recordings) is important. Collectively, **exams will account for 60% of your final grade.**

Exams will be administered through Canvas and will be taken during the assigned class session (see detailed course schedule). Online graduate students will be assigned a deadline for completing the test on or around the test day.

Different exams may be administered to undergraduate and graduate students, with the major difference being the addition of **ecoregion essays for all graduate students** (see below).

Ecology essays (graduate students only)

Ecology essays will be added to the exams of graduate students. **Essays must be uploaded to Canvas by 9:00am CST on the day of the exam. Late submissions may result in only partial credit being awarded.**

In ecology essays, each graduate student will select one Great Plains ecoregion from a list of potential ecoregions (TBA). They will then compose an essay documenting past, present, and potential future patterns and processes, according to posted instructions:

- Ecology Essay 1 (Exam 1) will focus on the ecoregion's past (Module 2 material).
- Ecology Essay 2 (Exam 2) will focus on the ecoregion's present (Module 3 material).
- Ecology Essay 3 (Exam 3) will focus on the ecoregion's future (Module 4 material).

Ideally, students will select an ecoregion with relevance to their thesis/dissertation, a peer-reviewed publication, or some other aspect of their research or coursework. Pattern–process descriptions **should be based on scientific evidence, and as such, incorporate information from peer-reviewed literature**. See Canvas for detailed instructions and grading rubric.

Quizzes

This course contains two quizzes (pre-course and post-course), the purpose of which is gathering student feedback on familiarity with course material. Quizzes provide me with useful feedback for tailoring content to student knowledge and experience. Quizzes are completion-based and must be finished by 9:00am CST on the assigned date (see syllabus). Together, **pre- and post-course quizzes account for 5% of your total grade**.

General Course Outline

Module 1: Introduction to Region and Ecology

Module 2: Shaping Processes

Module 3: Contemporary Trajectories

Module 4: Futures

Detailed course outline:

| Date | Module | Class session lectures/activities | Assigned readings/videos* | Assignments due** |
|--------|--------|--|----------------------------------|--|
| 18 Jan | 1 | Introductions and orientation Lecture: The Great Plains Region | | |
| 20 Jan | 1 | <i>Sci. Scoreboard</i> : Is Iowa in the Great Plains? | Rossum & Lavin (2000) | |
| 25 Jan | 1 | Lecture: Ecological and landscape systems Activity: Ecosystem diagrams | Videos: Complex adaptive systems | Pre-course quiz <i>Sci. Scoreboard</i> (Online option, Jan 20 question) |
| 27 Jan | 1 | <i>Sci. Scoreboard</i> : Does the Great Plains need grassland ecosystems? | | Short essay: Why study Great Plains ecosystems? |
| 1 Feb | 2 | Lecture: Geology, climate, and biogeography Videos: Great Plains paleontology | Diffendal (2017), pp. xv–32 | <i>Sci. Scoreboard</i> (Online group, Jan 27 question) |
| 3 Feb | 2 | Activity: Ecosystem diagrams, climate, and/or biogeography | | |
| 8 Feb | 2 | Lecture: Historical disturbance regimes | Samson et al. (2004) | |
| 10 Feb | 2 | <i>Sci Scoreboard</i> : What would the Great Plains have been without people? | | Short essay: What would the Great Plains have been without people? |
| 15 Feb | | Exam 1 prep | | <i>Sci. Scoreboard</i> (Online group, Feb 10 question) |
| 17 Feb | | Exam 1 | | Ecoregion Essay 1*** |
| 22 Feb | 3 | Lecture: The Anthropocene and changing disturbance regimes | Turner (2010) | |
| 24 Feb | 3 | Activity: The Rangeland Analysis Platform | | |
| 1 Mar | 3 | Lecture: Ecosystems service synergies and tradeoffs | Belnap et al. (2012) | |
| 3 Mar | 3 | <i>Sci. Scoreboard</i> : Should we save historical ecosystems or embrace new ones? | | Short essay: Should we save historical |

| | | | | |
|--------|---|---|---|---|
| | | | | ecosystems or embrace new ones? |
| 8 Mar | 3 | Lecture: Afforestation and woody encroachment | Twidwell et al. (2013) | <i>Sci. Scoreboard</i> (Online group, March 3 question) |
| 10 Mar | 3 | Activity: Ecosystem service synergies | | |
| 15 Mar | | Spring Break | | |
| 17 Mar | | Spring Break | | |
| 22 Mar | 3 | Lecture: Landuse and landcover change | Lark et al. (2020) Jin et al. (2019) | |
| 24 Mar | 3 | <i>Sci. Scoreboard</i> : Can agriculture save Great Plains ecosystems? | | Short essay: Can agriculture save Great Plains ecosystems? |
| 29 Mar | 3 | Exam 2 prep | | <i>Sci. Scoreboard</i> (Online group, Mar 24 question) |
| 31 Mar | 3 | Exam 2 | | Ecoregion Essay 2*** |
| 5 Apr | 3 | Lecture: Rangeland ecology, management, and heterogeneity | Fuhlendorf et al. (2012) | |
| 7 Apr | 3 | Video: <i>The Great Plains, America's Lingerin Wild – Part 1</i> | | |
| 12 Apr | 4 | Lecture: Regional climate change (and some responses to it) | Roberts et al. (2019) | |
| 14 Apr | 4 | <i>Sci. Scoreboard</i> : What is the greatest future conservation challenge for the Great Plains? | | Short essay: What is the greatest future conservation challenge for the Great Plains? |
| 19 Apr | 4 | Lecture: Collaborative adaptive management and Scenario planning | Wilmer et al. (2018) | <i>Sci. Scoreboard</i> (Online group, April 14 question) |
| 21 Apr | 4 | <i>Sci. Scoreboard</i> : What is the greatest future conservation opportunity for the Great Plains? | | Short essay: What is the greatest future conservation opportunity for the Great Plains? |
| 26 Apr | 4 | Lecture: Spatial conservation planning | | <i>Sci. Scoreboard</i> (Online group, April 21 question) |
| 28 Apr | 4 | Video: <i>The Great Plains, America's Lingerin Wild – Part 2</i> | | Post-course quiz |
| 3 May | | Final exam prep | | |
| 5 May | | Final exam prep | | |
| 12 May | | Final exam | | Ecoregion Essay 3*** |

*See Canvas (Modules section) to download/link to assigned readings and videos.

**Upload all assignments to Canvas by 9:00am CST on the due date, unless otherwise specified in Canvas instructions

***Graduate students only

Academic flexibility for COVID-19

Students who have medical documentation of a health risk that cannot be mitigated through vaccination should submit a [COVID-19 Academic Flexibility Request](#). Those with a disability and/or chronic health condition that makes them high risk for the virus should seek support via [Services for Students with Disabilities](#). International students should contact the [International Student and Scholar Office](#) to discuss their options.

Academic integrity

Academic integrity is defined in the Student Conduct and Community Standards (<https://studentconduct.unl.edu/student-code-conduct#sectionii>). Plagiarism and all other forms of cheating—as defined in Section II of the student code of conduct—are prohibited. Violations to this policy will be reported. A first offense will result in a warning and failure of the assignment. Additional violations may result in failure of the course. Information on policy and decision appeal processes can be found here:

<http://snr.unl.edu/undergrad/undergraduatehandbook.aspx>

Attendance policy

Attendance of lecture and lab sessions is strongly encouraged, but not mandatory. With that being said, it may be difficult to meet class requirements with sporadic or infrequent attendance. You can find the UNL Faculty Senate’s current Class Attendance Policy here:

<https://www.unl.edu/facultysenate/policies/Class-Attendance-Policy-081121.pdf>

Make-up exams are not allowed unless exceptional circumstances occur. You must make arrangements for a make-up exam prior to the scheduled exam. Any exceptions to the policy in this class must be formally appealed in writing based on the guidelines set forth by the university (<https://registrar.unl.edu/academic-standards/policies/class-attendance/>). Otherwise, a make-up exam will not be granted. It is unfair to the rest of the class.

Remote students, as well as those unable to attend in-person sessions for various reasons, may join live via Zoom at: <https://unl.zoom.us/j/96474379082>

Diversity and inclusion

This class is intended to be an inclusive and welcoming environment where all have the opportunity to learn and succeed. This means that in any form of class interaction (Canvas, in-class discussions, etc.), student should be respectful of one another, regardless of the circumstances, subject matter, or differences encountered.

Emergency resources

Consult UNL emergency planning site for current emergency procedures: <https://emergency.unl.edu/>

Face coverings

The full UNL face covering policy can be found at: <https://covid19.unl.edu/face-covering-policy>

Disposable masks are available for students who need or want them for class. Please check the following locations for a disposable mask at no cost:

- City Campus – a self-service wall dispenser in the hall by the west doors of the Nebraska Union or the Nebraska Union Welcome Desk located on the first floor near the north entrance
- East Campus – the Nebraska East Union Welcome Desk located on the first floor near the north entrance
- Innovation Campus – at Food Innovation Center, 1901 N 21st Street, Room 232
- Peter Kiewit Institute – at the reception desk in Room 107

Instructional continuity (inclement weather policy)

In the even that in-person classes are cancelled, you will be notified of the instructional continuity plan for this class by Canvas email.

The university's campus closing options regarding classes are the following:

- all classes are canceled.
- in-person classes are canceled and follow instructional continuity plans.
- all classes are conducted as usual.

The university's full inclement weather policy can be found at <https://bf.unl.edu/policies/inclement-weather>

Instructor correspondence

I am committed to providing prompt feedback on all course assignments and responding to student emails in a timely manner. However, I will not be responsive to emails 24 hours a day, so please be flexible and patient in waiting for our responses. If you do not receive an initial response within 24 hours, please send a follow-up email.

Mental health and wellbeing resources

UNL offers a variety of options to students to aid them in dealing with stress and adversity. Counseling and Psychological & Services (CAPS) is a multidisciplinary team of psychologists and counselors that works collaboratively with Nebraska students to help them explore their feelings and thoughts and learn helpful ways to improve their mental, psychological and emotional well-being when issues arise. CAPS can be reached by calling 402-472-7450. Big Red Resilience & Well-Being (BRRWB) provides one-on-one well-being coaching to any student who wants to enhance their well-being. Trained well-being coaches help students create and be grateful for positive experiences, practice resilience and self-compassion, and find support as they need it. BRRWB can be reached by calling 402-472-8770.

Recording of class-related activity

I invite all of you to join me in actively creating and contributing to a positive, productive, and respectful classroom culture. Each student contributes to an environment that shapes the learning process. Any work and/or communication that you are privy to as a member of this course should be treated as the intellectual property of the speaker(s)/creator(s), and is not to be shared outside the context of this course.

Students may not make or distribute screen captures, audio/video recordings of, or livestream, any class-related activity, including lectures and presentations, without express prior written consent from me or an approved accommodation from Services for Students with Disabilities. If you have (or think you may have) a disability such that you need to record or tape class-related activities, you should contact Services for Students with Disabilities. If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Failure to follow this policy on recording or distributing class-related activities may subject you to discipline under the Student Code of Conduct.

Instructional methods

This course will be delivered in-person in Keim 264 East on Tuesdays and Thursdays from 9:30–10:45am CST. In-person class sessions will be recorded and posted to Canvas to serve as a student resource for all students, especially online graduate students. Other individuals (undergraduate or graduate) may attend Zoom meetings and/or watch class recordings and complete activities (e.g., *Scientific Scoreboard*) remotely, according to the instructions outlined in this syllabus.

Learning management system and software

- Learning management system: Canvas (you may also download the Canvas student app)
 - UNL Canvas help: <https://canvas.unl.edu/courses/382/pages/canvas-help>
- Video software: Zoom
 - Zoom download and installation: <https://zoom.us/download>
 - Zoom meeting ID: <https://unl.zoom.us/j/96474379082>

Student accommodation resources (ADA statement)

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that I can discuss options privately. To establish reasonable accommodations, I may request that you register with Services for Students with Disabilities (SSD). If you are eligible for services and register with their office, make arrangements with me as soon as possible to discuss your accommodations so they can be implemented in a timely manner.

SSD contact information: 117 Louise Pound Hall Bldg.; [402-472-3787](tel:402-472-3787)

Student concerns and feedback

Your experiences in this course are important to me. If you have questions, concerns, or positive feedback, please contact me via Canvas or email: duden2@unl.edu. If I am unable to respond, or you feel I've not adequately addressed your concerns, you can contact Dr. Dirac Twidwell (email: dirac.twidwell@unl.edu).

Technology and support

NU Information Technology Services (ITS) is available to help you create a functional and efficient work environment in your remote location. NU ITS has published a page, [Remote](#)

Work FAQ, with information on computer equipment, VPN networking, phones and voicemail, digital tools, and IT support.