



SYLLABUS

ENR 8375

Design of Natural Resource Studies

Autumn 2022 (full term)

3 credit hours

Tuesday 9:10–12:10

460 Kottman Hall

COURSE OVERVIEW

This is a discussion-driven course that will focus how we gain knowledge through science, emphasizing understanding of different types of study design, critical considerations when designing studies, and appropriate analytical and inferential frameworks for interpreting results. The course is practical in that students can use this course as an opportunity to develop or flesh out the design of a study relevant to their graduate research.

Instructor

Instructor: Dr. William Peterman

Email address: Peterman.73@osu.edu (preferred contact method)

Phone number: 573-823-0768

Office hours: Thursday 10:00–1:00

Prerequisites

None

Course description

This course will teach beginning graduate students the principles of natural resource study design in the context of wildlife, conservation, ecological, behavioral, and evolutionary research. It is a discussion-driven course revolving around primary literature and book chapters, as well as study design proposals and presentations prepared by each student. The course is meant to be practical in that students can use this opportunity to develop or flesh out the design of a study relevant to their graduate research. Emphasis will be placed on understanding different types of study designs, critical considerations when designing studies, and appropriate analytical and inferential frameworks.

Course learning outcomes

By the end of this course, students should successfully be able to:

- Design a field research study that can critically evaluate research hypotheses or address research goals
- Assess the trade-offs and/or limitations between different study designs
- Develop testable predictions or hypotheses
- Identify the analytical and inferential framework that is most appropriate to evaluating data collected under different study designs

HOW THIS COURSE WORKS

Mode of delivery: This course will meet in-person unless OSU policies prevent this. Class meetings will occur Tuesday 9:10 –12:10.

Credit hours and work expectations: This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (instructor content and group discussion) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

Attendance and participation requirements: Your attendance is based on your presence and participation during the scheduled course time. Your participation grade will be **reduced 5%** for each unexcused absence. Absences can be excused with communication and related to the absence. If you have a situation that might cause you to miss class, please discuss with me *as soon as possible*.

COURSE MATERIALS

Readings

All readings will be made available on Carmen, or can be accessed through OSU library, and will consist of articles from the primary literature and select book chapters.

Carmen access

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions (go.osu.edu/add-device).
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application (go.osu.edu/install-duo) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357(HELP) and IT support staff will work out a solution with you.

GRADING AND FACULTY RESPONSE

How your grade is calculated

ASSIGNMENT CATEGORY	POINTS
Research proposal	25
Peer review	25
Presentation	75
Participation	125
Total	250

See course schedule below for due dates.

Descriptions of major course assignments

Research Proposal

Description:

You will write a research proposal on a topic or project of interest. It should be of practical benefit for you and your research, regardless of where you are in your career. This is not intended to be a full-blown proposal. Much less time and effort will be spent on background, justification, and implications. These are obviously critical but are not the focus of this exercise. Emphasis will be placed on clearly aligning your study design with your stated goals, objectives, and hypotheses, as well as proposed analyses.

- Initial draft due Week 11
- Final proposal due Week 15

Academic integrity and collaboration:

Your research proposal is expected to be your own work but may be modified from an existing written proposal.

Peer Review

Description:

You will provide critical review of a peer's research proposal. We will discuss the anatomy and expectations of a quality peer review, and your review will be evaluated in light of these.

- Reviews will be due Week 12

Academic integrity and collaboration:

This is an independent assignment that must be your own original work.

Presentation

Description:

You will give a ~12 minute presentation, followed by a class discussion. Presentations need to detail the objectives, hypotheses, and analyses being proposed. Emphasis will be placed on developing meaningful visual displays of your study design and hypotheses.

- Presentations will occur during Weeks 13 & 14

Academic integrity and collaboration:

This is an independent assignment that must be your own original work.

Participation

Description:

Each week you are expected to be an active and engaged participant in the discussion of assigned readings.

- Students will lead discussion on at least 1 (likely 2) chapters/papers during the semester – 25 points total
- Participation in weekly discussion when not leading – 100 points total

Academic integrity and collaboration:

NA

Late assignments

****Late assignments will be issued a 5% percent penalty for every 24 hours late, including weekends**** Communication/documentation of extenuating circumstances will remove this penalty Please refer to Carmen for due dates.

Grading scale

93–100: A	73–76.9: C
90–92.9: A-	70–72.9: C-
87–89.9: B+	67–69.9: D+
83–86.9: B	60–66.9: D
80–82.9: B-	Below 60: E
77–79.9: C+	

Instructor feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-4357(HELP)** at any time if you have a technical problem.)

- **Grading and feedback:** For large weekly assignments, you can generally expect feedback within **7 days**.

Email: I will reply to emails within **24 hours on days when class is in session at the university**.

OTHER COURSE POLICIES

Discussion and communication guidelines

Come to class having completed the assigned readings and ready to have open, civil, and supportive discussions. Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. **Above all, please remember to be respectful and thoughtful.**

Academic integrity policy

See **Descriptions of major course assignments**, above, for my specific guidelines about collaboration and academic integrity in the context of this online class.

Ohio State's academic integrity policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's *Code of Student Conduct* (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

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* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- Committee on Academic Misconduct web page (go.osu.edu/coam)
- Ten Suggestions for Preserving Academic Integrity (go.osu.edu/ten-suggestions)
- Eight Cardinal Rules of Academic Integrity (go.osu.edu/cardinal-rules)

Copyright for instructional materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Creating an environment free from harassment, discrimination, and sexual misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university

employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information:
 - 1. Any human resource professional (HRP);
 - 2. Anyone who supervises faculty, staff, students, or volunteers;
 - 3. Chair/director; and
 - 4. Faculty member.

This course adheres to The Principles of Community adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://studentlife.osu.edu/bias/report-a-bias-incident.aspx>.

Safe and Healthy Buckeyes

Health and safety requirements: All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses.

Counseling and Consultation Services/Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting ccs.osu.edu or calling (614) 292- 5766. CCS is located

on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24 hour emergency help is also available through the 24/7 National Prevention Hotline at 1-(800)-273-TALK or at suicidepreventionlifeline.org. The Ohio State Wellness app is also a great resource available at go.osu.edu/wellnessapp.

David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Canvas accessibility (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- CarmenZoom accessibility (go.osu.edu/zoom-accessibility)
- Collaborative course tools

COURSE SCHEDULE

Refer to the Carmen course for up-to-date readings and assignment due dates. Changes are likely!

Week	Dates	Topics, Readings, Assignments, Deadlines
1	Aug 23	<u>Gaining Knowledge</u> Eco-Evo Blog post: http://tinyurl.com/Eco-EvoBlog2017
		Romesburg, H.C. 1981. Wildlife science: Gaining reliable knowledge
2	Aug 30	<u>Philosophy of Science / Types of Study</u> Morrison, M.L.et. al. 2008. <i>Wildlife study design</i> . Chapter 1
		Morrison, M.L.et. al. 2008. <i>Wildlife study design</i> . Chapter 2
3	Sept 6	<u>Experimental Design</u> Morrison, M.L.et. al. 2008. <i>Wildlife study design</i> . Chapter 3
		Diamond, J., 1986. Overview: laboratory experiments, field experiments, and natural experiments. <i>Community ecology</i> , pp.3-22.
		Shaffer, T. L., and D. H. Johnson. 2008. Ways of learning: Observational studies versus experiments. <i>The Journal of Wildlife Management</i> 72:4–13.
4	Sept 13	<u>Pseudoreplication</u> Davies, G. M., and A. Gray. 2015. Don't let spurious accusations of pseudoreplication limit our ability to learn from natural experiments (and other messy kinds of ecological monitoring). <i>Ecology and Evolution</i> 5:5295–5304.
		Colegrave, N., and G. D. Ruxton. 2018. Using Biological Insight and Pragmatism When Thinking about Pseudoreplication. <i>Trends in Ecology & Evolution</i> 33:28–35.
5	Sept 20	<u>Survey Strategies</u> Morrison, M.L.et. al. 2008. <i>Wildlife study design</i> . Chapter 4
6	Sept 27	<u>Sampling Strategies / Impact Assessment</u> Morrison, M.L.et. al. 2008. <i>Wildlife study design</i> . Chapter 5
		Morrison, M.L.et. al. 2008. <i>Wildlife study design</i> . Chapter 6
7	Oct 4	<u>Inventory & Monitoring / Design Applications</u> Morrison, M.L.et. al. 2008. <i>Wildlife study design</i> . Chapter 7
		Morrison, M.L.et. al. 2008. <i>Wildlife study design</i> . Chapter 8
8	Oct 11	<u>Hypothesis Testing & Inference</u> Quinn, J. F., and A. E. Dunham. 1983. On hypothesis testing in ecology and evolution. <i>The American Naturalist</i> 122:602–617.
		Blog Post: https://tinyurl.com/multicausality
9	Oct 18	<u>Model Selection & Competing Hypotheses</u> Betini, G. S., T. Avgar, and J. M. Fryxell. 2017. Why are we not evaluating multiple competing hypotheses in ecology and evolution? <i>Royal Society Open Science</i> 4.
		Burnham, K. P., D. R. Anderson, and K. P. Huyvaert. 2011. AIC model selection and multimodel inference in behavioral ecology: some background, observations, and comparisons. <i>Behavioral</i>

Week	Dates	Topics, Readings, Assignments, Deadlines
		Ecology and Sociobiology 65:23–35.
10	Oct 25	Scale Wiens, J. A. 1989. Spatial scaling in ecology. Functional Ecology 3:385–397.
		Schindler, D. W. 1998. Whole-ecosystem experiments: Replication versus realism: The need for ecosystem-scale experiments. Ecosystems 1:323–334.
11	Nov 1	Analytical Frameworks Bolker, B. M., M. E. Brooks, C. J. Clark, S. W. Geange, J. R. Poulsen, M. H. H. Stevens, and J.-S. S. White. 2009. Generalized linear mixed models: a practical guide for ecology and evolution. Trends Ecol Evol 24:127–135.
		Ellison, A. M. 2004. Bayesian inference in ecology. Ecology Letters 7:509–520.
		Grace, J. B. 2008. Structural equation modeling for observational studies. Journal of Wildlife Management 72:14–22. • *** Proposal Draft Due ***
12	Nov 8	Interpreting / Reporting Statistics Møller, A., and M. D. Jennions. 2002. How much variance can be explained by ecologists and evolutionary biologists? Oecologia 132:492–500.
		Nakagawa, S., and I. C. Cuthill. 2007. Effect size, confidence interval and statistical significance: a practical guide for biologists. Biological Reviews 82:591–605.
		Colegrave, N., and G. D. Ruxton. 2003. Confidence intervals are a more useful complement to nonsignificant tests than are power calculations. Behavioral Ecology 14:446–447. • *** Peer Review Due ***
13	Nov 15	TBD
14	Nov 22	Proposal Presentations
15	Nov 29	Proposal Presentations
16	Dec 6	*** Final Proposals Due [submit to Carmen by midnight, 12/6/2022]