



# SYLLABUS

## ENR 5280

Stream Ecology  
Spring 2025

### COURSE OVERVIEW

This course is an introduction to freshwater systems and its abiotic and biotic components. During the semester we will look at stream structure, function, and biota. Community dynamics and central stream theories will guide students in understanding ecosystem processes and community dynamics at spatially and temporally explicit scales. Conservation, restoration, water policy, and environmental-justice issues will also be addressed. As a student, familiarizing yourself with weekly journal reading is a good way to understand the current theory and science of this field of research. Students will demonstrate field techniques during laboratories to collect data, analyze lotic systems, and be able to perform duties required by a freshwater research scientist.

### Contact Information

Instructor: Dr. Zach Steffensmeier

Email: [Steffensmeier.7@osu.edu](mailto:Steffensmeier.7@osu.edu)

Office Hours:

Teaching Assistant Aaron Giganti

Email: [giganti.6@buckeyemail.osu.edu](mailto:giganti.6@buckeyemail.osu.edu)

Office Hours:

Lecture Location: Tuesday Hefner Wetlands 108 and Thursday Kottman Hall 333

Lecture Time: 3:00 - 4:20 PM

Lab Location: Olentangy River Wetland Research Park (ORWRP)

Lab Time: Friday 1:00 – 4:00 PM



### **Grade Breakdown:**

- 3 exams total (each ~17% of final grade; 50% total)
  - Exams are based on lectures, assigned journal readings, and lab sessions. Exams consist of short answers, multiple choice, and essay questions. Unless otherwise arranged, exams must be completed during class time.
- Lab Quizzes and class participation (25% of final grade)
  - Quizzes will be given at the beginning of most laboratories. The student will be responsible for reading the modules in advance and being up to date with any other material provided. The format and value of each quiz may change accordingly. The laboratory's dynamic is based on the active performance of field techniques. Therefore, your regular attendance and participation are crucial to the lab grade.
- Journal article summary and critique (10% of final grade)
- Poster project and presentation (15% of final grade)
  - The instructor reserves the right to define the format of this project and will announce all details in advance.

### **Grading scale**

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

### **\*\*LECTURE AND LAB COURSE SCHEDULE (SUBJECT TO CHANGE)**

#### Lecture Schedule

Week	Date	Topic	Chapter/Journal Article
1	7-Jan	Stream Structure and Function	Ch. 1
	9-Jan	Dimensions of Rivers	Ward 1989
2	14-Jan	Stream Flow	Ch. 2
	16-Jan	Water Cycle	Poff et al. 1997



3	21-Jan	Hydrology	Ch. 3
	23-Jan	Fluvial Geomorphology	
4	28-Jan	Stream Chemistry	Ch. 4
	30-Jan	Abiotic Components	
5	4-Feb	Nutrient Dynamics	Ch. 5
	6-Feb	Exam 1	
6	11-Feb	Coldwater Streams and Biotic Integrity	Vannote et al. 1980
	13-Feb	River Continuum Concept and Primary Productivity	Ch. 6
7	18-Feb	Aquatic Macroinvertebrates	Ch. 7
	20-Feb	Aquatic Consumers	Jelks et al. 2008
8	25-Feb	Feeding Guilds – Herbivory and Predation	Ch. 8
	27-Feb	Fishes, Drift and Dispersal	
9	4-Mar	Instream Barriers and Fragmentation	Ch. 9 - 10
	6-Mar	OAFS	Rahel and McLaughlin 2018
10	11-Mar	Spring Break	Junk et al. 1989
	13-Mar	Spring Break	
11	18-Mar	Stream Theories	
	20-Mar	Exam 2-Ecological Metrics	Ch. 11
12	25-Mar	Nutrient Dynamics	Ch. 12
	27-Mar	Freshwater Biodiversity: Importance, Threats, Status, and Conservation	Ch. 13 <i>Journal Article Critique Due</i>
13	1-Apr	Management of Lotic Systems	Ch. 14 and Dudgeon et al. 2006
	3-Apr	Anthropogenic Issues	
14	8-Apr	Biogeography/Ecology	Malmqvist and Rundle 2002
	10-Apr	Environmental Justice and Endocrine Disruptors	Ch. 15
15	15-Apr	Poster Presentations	
	17-Apr	Poster Presentations	
16	22-Apr	No Class- Reading Day	
	24-Apr	Exam 3	Final Exam 8:15 – 9:35 AM

**Laboratory Schedule – Subject to change based on stream flow conditions**

(<https://waterdata.usgs.gov/nwis/rt>)

Week	Date	Lab	Location	Lab	Quiz
1	10-Jan	No Lab			
2	17-Jan	Habitat and Hydrology	Wetlands (ORWRP)	1	1



3	24-Jan	Stream Classification	Waterman Farm	2	2
4	31-Jan	HHEI	Rush Run Park	3	3
5	7-Feb	Fish Family ID Lab	Wetlands (ORWRP)	4	No quiz
6	14-Feb	Index of Biotic Integrity	Wetlands (ORWRP)	5	No quiz
7	21-Feb	Macroinvertebrate Sampling Lab	Big Darby Creek	6	4
8	28-Feb	Macroinvertebrate ID/Fish Sampling	Wetlands (ORWRP)		5
9	7-Mar	Poster Groups Meeting- OAFS	Wetlands (ORWRP)	7	No quiz
10	14-Mar	No Lab	Spring Break	8	No Quiz
11	21-Mar	Data Collection	Alum Creek	9	No quiz
12	28-Mar	Data Collection	Walnut Creek	10	No quiz
13	4-Apr	Data Collection	Wetlands (ORWRP)	11	No quiz
14	11-Apr	Open Lab	Wetlands (ORWRP)	12	
15	18-Apr	No Lab			



## **Quizzes**

There will be a pre-laboratory quizzes based primarily on the readings/book chapters and lectures. These will be short (around 5 questions) and be in person at the start of lab. If you do not show up or are late to lab, you may not take the quiz. I will drop your lowest quiz grade, only if you complete all quizzes and attend all labs in person during the semester (i.e. If you are absent from a lab, you cannot drop that quiz grade of 0%).

## **Journal Article Assignment**

Each student must do a 2–3-page (single-spaced, 12 pt. font, Times New Roman, 1-inch margins) critique on a peer reviewed journal article related to Stream Ecology. Note, to maintain a culture of integrity and respect, I do not permit generative AI tools (e.g. ChatGPT, etc.) to be used in the completion of course assignments or journal article critiques.

## **Poster Presentations**

Students will work in small groups to analyze and present data collected during lab. Projects must be Stream Ecology focused but can also be diverse and applied to other streams, watersheds, or areas. Rubric will be uploaded to Carmen. I will work with each group to come up with a project early in the semester.

## **Textbook**

Recommended/Required: Allan, J.D., M.M. Castillo, and K. A. Capps. 2021. Stream Ecology: Structure and Function of Running Waters. Third Edition. Springer. This is also available as a PDF (<https://link.springer.com/book/10.1007/978-3-030-61286-3>) through Ohio State University.

## **Literature References:**

Ward, J. V. (1989). The four-dimensional nature of lotic ecosystems. *Journal of the North American Benthological Society*, 8(1), 2-8.

Strahler, A. N. (1957). Quantitative analysis of watershed geomorphology. *EOS, Transactions American Geophysical Union*, 38(6), 913-920.

Wolman, M. G. (1954). A method of sampling coarse river-bed material. *EOS, Transactions American Geophysical Union*, 35(6), 951-956.

Vannote, R. L., Minshall, G. W., Cummins, K. W., Sedell, J. R., & Cushing, C. E. (1980). The river continuum concept. *Canadian journal of fisheries and aquatic sciences*, 37(1), 130-137.

Pusey, B. J., & Arthington, A. H. (2003). Importance of the riparian zone to the conservation and management of freshwater fish: a review. *Marine and freshwater Research*, 54(1), 1-16.

Rahel, F. J., & McLaughlin, R. L. (2018). Selective fragmentation and the management of fish movement across anthropogenic barriers. *Ecological Applications*, 28(8), 2066-2081.

Merritt, R. W., Cummins, K. W., & Berg, M. B. (2017). Trophic relationships of macroinvertebrates. In *Methods in Stream Ecology, Volume 1* (pp. 413-433). Academic Press.

Jelks, H. L., Walsh, S. J., Burkhead, N. M., Contreras-Balderas, S., Diaz-Pardo, E., Hendrickson, D. A., ... & Warren Jr, M. L. (2008). Conservation status of imperiled North American freshwater and diadromous fishes. *Fisheries*, 33(8), 372-407.



Platania, S. P., & Altenbach, C. S. (1998). Reproductive strategies and egg types of seven Rio Grande basin cyprinids. *Copeia*, 559-569.

Fausch, K. D., Karr, J. R., & Yant, P. R. (1984). Regional application of an index of biotic integrity based on stream fish communities. *Transactions of the American Fisheries Society*, 113(1), 39-55.

### **Late Work Policy**

The penalty for late assignments is 20% of the assignment total per day. I will not extend the due date without a valid reason. There should be extenuating circumstances for missing a scheduled activity, quiz or exam. In these cases, early arrangements will need to be coordinated.

**\*\*IMPORTANT:** You must contact the instructor PRIOR TO a planned conflict to make arrangements for modified deadlines. Otherwise, no arrangements will be made. If you are ill the day of an assignment/exam, you must reach out to the instructors with verification of your absence on the day of the missed deadline, otherwise no accommodations will be made. If you would like any clarification on this, don't hesitate to reach out.

### **Lecture Attendance Policy**

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

### **Lab Attendance Policy**

Missing labs will result in a 0 on the quiz and attendance for that week. However, to get points for that lab (assuming a valid excuse **AND** you email me ahead of time [Steffensmeier.7@osu.edu](mailto:Steffensmeier.7@osu.edu)).

You must write a 1-page paper critiquing a peer reviewed journal article based on the lab topic missed for that week. This must be completed and submitted to me and the teaching assistant no later than 1-week from the initial laboratory date. The paper must be single spaced, 12-pt font, times new roman with 1-inch margins. If you have a valid excuse, you still are required to reschedule (with the TA) and take a makeup quiz within 1 week of absence. You may do this a maximum of two times with permission from me.

### **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*, 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 we suspect that a student has committed academic misconduct in this course, we are 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 us.

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

- The Committee on Academic Misconduct web pages ([COAM Home](#))
- *Ten Suggestions for Preserving Academic Integrity* ([Ten Suggestions](#))
- *Eight Cardinal Rules of Academic Integrity* ([www.northwestern.edu/uacc/8cards.htm](http://www.northwestern.edu/uacc/8cards.htm))

## **Copyright disclaimer**

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.

## **Statement on title IX**

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](http://equity.osu.edu),
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email [equity@osu.edu](mailto: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>.

### **Counseling & 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](https://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](https://suicidepreventionlifeline.org).

David Wirt, [wirt.9@osu.edu](mailto: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.

### **Religious Accommodations**

It is Ohio State's policy to reasonably accommodate the sincerely held religious beliefs and practices of all students. The policy permits a student to be absent for up to three days each academic semester for reasons of faith or religious or spiritual belief.

Students planning to use religious beliefs or practices accommodations for course requirements must inform the instructor in writing no later than 14 days after the course begins. The instructor is then responsible for scheduling an alternative time and date for the course requirement, which may be before or after the original time and date of the course requirement. These alternative accommodations will remain confidential. It is the student's responsibility to ensure that all course assignments are completed.

### **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](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](https://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue.

Go to <http://ods.osu.edu> for more information.