



EVPP/BIOL 350 Freshwater Ecosystems

Lecture Syllabus, Fall 2025



Course Content

The course consists of a coupled lecture and lab; both must be taken concurrently and your grade will depend on your performance in both venues. The subject matter of this course is delivered in the form of lectures, lecture outlines, and assigned readings **via asynchronous virtual instruction**; and laboratory exercises **in person**.

Mode of Instruction

Asynchronous virtual instruction will be used for the lectures. Lectures will consist of prerecorded, narrated power point presentations that will be posted to our Course Webs Site on Canvas.

Important Notice: This course will be hosted on Canvas.

Course Web Site: Go to <http://mymason.gmu.edu>, log in to Canvas with your netID (this is your email name without @gmu.edu) and your GMU email password, then go to **Courses** and select **Fall 2025 Freshwater Ecosystems**. All information, both lecture and lab will be posted here weekly.

Please ensure you are familiar with accessing and navigating this platform. Resources and support are available at: <https://lms.gmu.edu/getting-started-students/> to help you get started. If you have any questions, do not hesitate to reach out to me or contact the [ITS Support Center](#) for assistance.

Lecture Instructor

Dr. Rosalina Stancheva Christova

Assistant Professor, Environmental Science and Policy

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Office hours: Thursday 12 pm - 2 pm and by appointment

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Communication

Student drop-in hours: Thursday 12 pm – 2 pm (I will open a Zoom session at noon on Thursday for anyone who has questions). **Please email me first if you want to set up and individual meeting.**

Office hours are your opportunity to meet with me one-on-one (and with others, if you like) and ask questions about the course - or anything else. We can talk about campus resources, majors and minors, recommendation letters, writing your CV, your future plans, or we can just have a chat, a cup of tea, and a bite of comfort food.

Emails are the main mode of communication. I'll try to answer emails within 24 hours (except for the weekends), IF you include EVPP/BIOL 350 in the subject line. It is also our responsibility to contact you if you are absent from **Course Web Site** and lab for more than a week. If that happens, I'll reach out to make sure you are well. **Confidentiality** is important to all of us, so I will protect your privacy. **Please contact me in**

advance if you cannot attend a lab, or you need extended time for your assignments or have any other difficulties.

I understand that life happens and some days are harder than others. Please take care of yourselves, and reach out for support if you need it. I would like to know how you are doing and to help if you need it. If you tell me that you are having trouble, I am not going to judge you or think less of you. I hope you will extend me the same grace.

So, let's lay out some rules:

- You *never* owe me personal information about your health (mental or physical), or anything else
- You are always welcome to talk to me about things that you are going through
- If I cannot help you, I usually know somebody who can
- If you need specific accommodations for test taking or other issues, visit <https://ds.gmu.edu/>. See the paragraph on the last page of this syllabus for details.
- If you need extra help, miss class, or more time with assignments, just ask. ***I promise I will work with you.***

Course Description and Goals

This course focuses on physical, chemical, and biological processes occurring in lakes, streams, and wetlands. This course assumes a basic knowledge of ecology, chemistry and organismal biology. Students will learn about the physical and chemical aspects of aquatic systems and the life cycles and adaptations of aquatic organisms. Topics include watershed hydrology, lake and stream geomorphology, biogeochemical cycling, controls on primary production, community patterns, population dynamics, and food web structure. The course will analyze the importance of freshwater systems to sustaining human populations and provide examples of human impacts and their mitigation.

Prerequisites: CHEM 211/ 213 AND CHEM 212/214 or CHEM 155/156 AND BIOL 308 or EVPP 301

Course Learning Outcomes

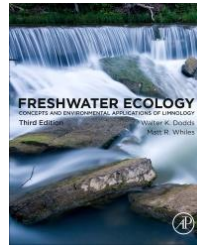
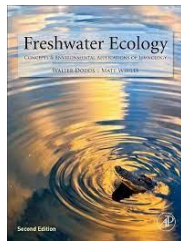
- Understanding of the basic functioning of standing and flowing inland waters in the context of the watershed
- Knowledge of the main groups of autotrophic and heterotrophic organisms in freshwaters
- Ability to discuss the distinguishing characteristics of important planktonic and benthic organisms and their ecological roles
- In-depth appreciation of nutrient and carbon processing in freshwater systems
- Understanding and describing trophic dynamics in freshwater communities
- Ability to discuss the food webs and organism interactions
- Competence to apply ecological concepts to freshwater ecosystems
- Understand the impacts of human activities on aquatic ecosystems and their assessment

Required Textbook

Dodds, W. K. and Whiles, M. R. 2019. *Freshwater Ecology. Concepts and Environmental Applications of Limnology*. 3rd ed. Academic Press, San Diego, 998 pp.

The second edition (Dodds and Whiles 2010) hard copy is available at the GMU libraries.

The third edition hard copy is available for purchase in the bookstore. There is an eTextbook version of the third edition available for purchase online. It is highly recommended that you have regular access to this text since there will be suggested readings from many lectures (see below). Some of these readings will provide important background that can be integrated with the lecture material and will be invaluable for a full understanding of the course content.



Course Culture, Roles and Responsibilities

Scientists collaborate to learn, ask questions, and explain phenomena. The classroom culture, whether in person or online, is designed to engage you in thinking like an environmental scientist. This means cooperative learning and problem solving will be emphasized. The most important aspect of this class, and being a scientist, involves how you show up and contribute in a respectful and collaborative way in all your scientific pursuits. You will self-assess your efforts as a community member throughout this class, and your activities as a community member will be evidenced in your performance in the class.

To further introduce you to the real professional field, we have invited Dr. Sally Entrekin, an aquatic entomologist at Virginia Tech and the president of the Society for Freshwater Science, to teach a guest lecture on aquatic insects. She will present her fascinating research on aquatic ecosystems in person during our lab time on November 8. To introduce you to other course opportunities at PEREC, we have invited Dr. Reid Nelson who is our fish ecologist to teach a guest lecture on freshwater fish. He offers courses in The Diversity of Fishes (EVPP 536) and Estuarine and Coastal Ecology (EVPP 581).

The laboratory course is based on a collaborative approach to learning: students work in teams (pairs or small groups) to explore and develop an understanding of course concepts and to support each other's learning. You will actively engage one another to increase your comprehension. Teams will also review the work of other teams (peer review), to offer feedback and help improve it. We can learn a lot by helping each other to succeed.

The instructor's responsibility is to present course concepts and to facilitate your understanding of them, so please ask questions in class and feel free to stop by during office hours or contact us with any questions that are not adequately addressed in class or in our materials. We will work together to find the best solution to support your success in our class.

How to be successful in this course

- This course will give you flexibility, but will also require discipline. This means that you will need to take responsibility for viewing and taking notes during the lectures on your own schedule. It will be easy to get behind unless you are diligent in scheduling time to view the lectures each week.
- **I plan to record two lectures for each week, each a little over an hour in length.** I recommend that you set aside in advance two periods of one and a half hours per week to view and take notes on these lectures. Scheduling this time on a regular basis each week will make you much more successful in this course.
- Attend every lab in person. **If you cannot attend a lab class, please let us know in advance.** This is particularly true of the field trips.
- Access the **Course Web Site** on **Canvas** and GMU email daily.
- Get familiar with weekly postings and due dates.
- Take good notes and pictures during the field trips.
- Complete exams, assignments and a final presentation.
- Devote at least 4 additional hours per week for these learning activities.
- Computer, web and other problems will happen! No worries, inform me in a timely manner and we will figure it out!

Lecture Course Topics and Schedule

This topic sequence is approximate and may change.

Graded assignments will be provided to help you learn the material.

All lectures and assignments will be posted **on Tuesday at 1:00 pm** and **due following Tuesday at 1:00 pm**.

Week of		Topics	Reading (Dodds and Whiles, 2019)
1	Aug 25	Continental Aquatic Systems: Human Use, Impact, Global Change. Properties of Water. Movement of Light, Heat and Chemicals in Water	1, 2, 3
2	Sept 1	Lake Origins and Morphometry. Light and Physical Structure of Lakes	7
3	Sept 8	Aquatic Chemistry	12, 13, 14
4	Sept 15	Biological Communities of Lakes: Plankton, Food Webs	8, 9, 10, 18, 20
5	Sept 22	Biological Communities of Lakes: Littoral, Benthos	9, 20, 23
6	Sept 29	EXAM 1. Aquatic Insects (Invited lecture by Dr. Amy Fowler)	10
7	Oct 6	Watersheds, Hydrologic Cycle, Stream Flow, Physical Structure, Chemistry	6
8	Oct 13	Biological Communities of Streams: Autotrophic and Heterotrophic organisms	8, 9, 10
9	Oct 20	Biological Communities of Streams: Adaptations to Flowing Water. Food Webs, Microbial Loop	20
10	Oct 27	Large Rivers. Wetlands: Origins, Hydrology, and Physical Structure	4, 5
11	Nov 3	EXAM 2. Freshwater Fish (Invited lecture by Dr. Reid Nelson)	10
12	Nov 10	Invertebrate Microbe Interactions. Predation	16, 19
13	Nov 17	Toxins and Pollutants. Trophic State and Eutrophication	16, 18
14	Nov 24	NO CLASS – Thanksgiving Break	
15	Dec 1	Bioassessment. Management of Aquatic Systems	18
	Dec 10	FINAL EXAM	

Methods of Evaluation

• Laboratory activity (100 points total)

The laboratory assignments and participation will count 100 pts.

• Exams (200 points total)

There will be three exams (one held at the time of the final) each worth 100 points. The term exams will have multiple choice questions, true/false questions and written questions. The final exam will have two parts: 1) multiple choice questions specifically over the material since the second exam, and 2) a cumulative essay question. The cumulative essay question will allow you to demonstrate your creative thinking about subject matter in this course. Examples will be presented in lecture and posted on Canvas. Review sessions will be held via Zoom before each exam.

These are **not** open book exams, so please study for the exams and do your own work without consulting with other class members. Address any questions to one of the instructors. The exams will need to be completed in the available time and will be proctored by **Respondus LockDown Browser**. For information on how to use Respondus LockDown Browser visit <https://its.gmu.edu/knowledge-base/how-to-install-and-use-the-respondus-lockdown-browser/>

• Assignments (30 bonus points total)

There will be six graded assignments for a total of 30 bonus points (5 points each) in a form of quizzes, reading scientific articles and answering related questions, written questions, true/false questions, or interpretation of a figures. They are part of the lecture and designed to help you learn the material, and will be posted on Canvas.

The assignments are optional, and must be turned in on time to receive 5 bonus point for each.

Graded Items	Points
1. Term exams (2 x 100 points each)	200
2. Final exam	100
3. Assignments (bonus points)	30
4. Lab (paper, presentation, other)	100
Total Points	400 (430)

Your final grade will be a letter grade, while your grades in class will be scores (between 0 and 100). In general, your final grade will be translated to a letter grade at the end of the semester as follows:

(Please note that if you make any grade less than C, the course may not count for certain requirements.)

100-98% A+	89-88% B+	79-78% C+	69-60% D
97-92% A	87-82% B	77-72% C	<60% F
91-90% A-	81-80% B-	71-70% C-	

Grading-related Policies:

- **Late Work and Missed Exams.** We all know scholars have responsibilities to their education, on top of their commitments to family, other loved ones, and jobs. In fact, being a scholar is just like having a job. You have to show up on time, stay for your entire shift, do your work, and turn it in by due dates. However, we also know that sometimes one responsibility becomes more important than another, and our plans go awry. **If you have a family, medical, legal, or immigration-related emergency, please let me know so I can support an alternate plan for you to meet your responsibilities to your small group, our class, and yourself.**
- Late work will be subject of **10% deduction** of the grade if not communicated with the instructor in advance.
- All graded materials are subject to the GMU Honor Code and violations must be reported to the Honor Committee. Adherence to the GMU Honor Code is expected of all students (<https://oai.gmu.edu/full-honor-code-document/>)

Common Policies at GMU

Academic Standards

GMU Common Course Policies are available at: <https://stearnscenter.gmu.edu/home/gmu-common-course-policies/>

Academic Standards exist to promote authentic scholarship, support the institution's goal of maintaining high standards of academic excellence, and encourage continued ethical behavior of faculty and students to cultivate an educational community which values integrity and produces graduates who carry this commitment forward into professional practice.

As members of the George Mason University community, we are committed to fostering an environment of trust, respect, and scholarly excellence. Our academic standards are the foundation of this commitment, guiding our behavior and interactions within this academic community. The practices for implementing these standards adapt to modern practices, disciplinary contexts, and technological advancements. Our standards are embodied in our courses, policies, and scholarship, and are upheld in the following principles:

- **Honesty:** Providing accurate information in all academic endeavors, including communications, assignments, and examinations.

- **Acknowledgement:** Giving proper credit for all contributions to one's work. This involves the use of accurate citations and references for any ideas, words, or materials created by others in the style appropriate to the discipline. It also includes acknowledging shared authorship in group projects, co-authored pieces, and project reports.
- **Uniqueness of Work:** Ensuring that all submitted work is the result of one's own effort and is original, including free from self-plagiarism. This principle extends to written assignments, code, presentations, exams, and all other forms of academic work.

Violations of these standards—including but not limited to plagiarism, fabrication, and cheating—are taken seriously and will be addressed in accordance with university policies. The process for reporting, investigating, and adjudicating violations is outlined in the university's procedures. Consequences of violations may include academic sanctions, disciplinary actions, and other measures necessary to uphold the integrity of our academic community.

The principles outlined in these academic standards reflect our collective commitment to upholding the highest standards of honesty, acknowledgement, and uniqueness of work. By adhering to these principles, we ensure the continued excellence and integrity of George Mason University's academic community.

Student responsibility: Students are responsible for understanding how these general expectations regarding academic standards apply to each course, assignment, or exam they participate in; students should ask their instructor for clarification on any aspect that is not clear to them.

Accommodations for Students with Disabilities

Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University. If you are seeking accommodations, please visit <https://ds.gmu.edu/> for detailed information about the Disability Services registration process. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu. Phone: (703) 993-2474.

Student responsibility: Students are responsible for registering with Disability Services and communicating about their approved accommodations with their instructor in advance of any relevant class meeting, assignment, or exam.

FERPA and Use of GMU Email Addresses for Course Communication

The **Family Educational Rights and Privacy Act (FERPA)** governs the disclosure of education records for eligible students and is an essential aspect of any course. **Students must use their GMU email account** to receive important University information, including communications related to this class. Instructors will not respond to messages sent from or send messages regarding course content to a non-GMU email address.

Student responsibility: Students are responsible for checking their GMU email regularly for course-related information, and/or ensuring that GMU email messages are forwarded to an account they do check.

Title IX Resources and Required Reporting

As a part of George Mason University's commitment to providing a safe and non-discriminatory learning, living, and working environment for all members of the University community, the University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities. Accordingly, **all non-confidential employees, including your faculty member, have a legal requirement to**

report to the Title IX Coordinator, all relevant details obtained directly or indirectly about any incident of Prohibited Conduct (such as sexual harassment, sexual assault, gender-based stalking, dating/domestic violence). Upon notifying the Title IX Coordinator of possible Prohibited Conduct, the Title IX Coordinator will assess the report and determine if outreach is required. If outreach is required, the individual the report is about (the “Complainant”) will receive a communication, likely in the form of an email, offering that person the option to meet with a representative of the Title IX office.

For more information about non-confidential employees, resources, and Prohibited Conduct, please see **University Policy 1202: Sexual and Gender-Based Misconduct and Other Forms of Interpersonal Violence**. Questions regarding Title IX can be directed to the Title IX Coordinator via email to TitleIX@gmu.edu, by phone at 703-993-8730, or in person on the Fairfax campus in Aquia 373.

Student opportunity: If you prefer to speak to someone **confidentially**, please contact one of Mason’s confidential employees in Student Support and Advocacy (SSAC), Counseling and Psychological Services (CAPS), Student Health Services (SHS), and/or the **Office of the University Ombudsperson**.

Use of Artificial Intelligence (AI) Tools in EVPP/BIOL 350

In this course, **AI tools may be used only for text editing** (e.g., grammar correction, clarity improvements, and polishing your own writing).

- ☒ **Permitted uses:** You may use AI tools to refine writing you have already produced. This includes correcting grammar, improving sentence flow, and making your text clearer. You may use AI, specifically iNaturalist, to identify aquatic organisms from your pictures, but all identifications must be verified with identification books and all identification resources, including AI must be disclosed.
- ☒ **Prohibited uses:**
 - Generating original text, answers, or content for assignments.
 - Submitting any AI-generated writing, figures, data analysis, or explanations as your own.
 - Copying or pasting AI outputs into lab reports, essays, or exam responses.

All assignments (lab reports, lecture essays, quizzes, and exams) must reflect your own understanding, analysis, and interpretation. **You must disclose when AI tools are used and how they contributed to your work.** Misuse may be treated as a violation of academic standards.

Rationale for This Policy

This policy supports your learning and prepares you for professional expectations in the field of freshwater ecology while protecting the core goals of the course: **developing independent ecological thinking, observation skills, and professional integrity.**

Developing scientific skills. Ecology relies on your ability to observe, analyze, and interpret real-world data. Writing your own reports ensures you develop critical thinking and scientific reasoning skills that AI cannot replace.

Accuracy and integrity in science. Ecology is an evidence-based science. Identifying aquatic organisms and interpreting ecological patterns require specialized training. AI tools are currently unreliable in taxonomic identification and may generate errors that could undermine your professional credibility.

Professional standards. The field of ecology values accurate observation, reproducibility, and original thought. Employers, graduate programs, and scientific journals expect scientists to demonstrate independent analysis and clear communication. Reliance on AI to produce content would be inconsistent with these professional standards.

Writing as a scientific skill. Writing is a central part of being a scientist. Whether you are preparing a monitoring report, a peer-reviewed article, or a management plan, your ability to communicate clearly and accurately is crucial. Editing tools can help you polish your communication, but the substance of your work

must come from you. This mirrors how professional ecologists write papers: they may use editing software for clarity but are responsible for the content and conclusions.

By following this policy, you will strengthen your ability to think critically, write clearly, and communicate ecological science with integrity—skills that are essential in both academic and professional settings.

AI use disclosure: This text was generated by ChatGPT based on detail request and edits from the instructor.

Student Support Resources on Campus

The Stearns Center for Teaching and Learning offers great resources supporting student success, such as

- Student Support and Advocacy Center (SSAC)
- Counseling and Psychological Services
- The Learning Services Office or field-specific tutoring
- The Center for Culture, Equity, and Empowerment
- LBGTQ+ Resources
- University Career Services
- University Writing Center

For full list visit <https://stearnscenter.gmu.edu/knowledge-center/knowning-mason-students/student-support-resources-on-campus/> and <https://wellbeing.gmu.edu/students/>.

