



EVPP/BIOL 350 Freshwater Ecosystems Lab Syllabus, Fall 2025

Mode of Instruction and Location

In person: Friday, 12:10 - 3:30 pm
Potomac Science Center, Woodbridge, Lab L005

Potomac Science Center is located at 650 Mason Ferry Avenue, Woodbridge, VA 22191 and there is free parking on-site. **Lab will meet there for the first time on August 29.** It is **especially important that you attend the first lab** as the entire course team will be present to greet you and answer any questions. We will also start talking about assignments as we will be coming your way. Unfortunately, the university does not provide a shuttle to Potomac Science Center so you will have to use your own vehicle or make other arrangements. The lab includes several field trips when we may meet at alternative locations. Driving directions and instructions for the field trips will be provided during the lab.

Instructor: Dr. Rosalina Christova

Teaching Assistant: Jacob Mormando

MS Student in Environmental Science and Policy

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Teaching Support: Laura Birsá

Jones Lab Manager in PEREC

Lab Learning Outcomes

- Examine and be able to recognize representative common members of each major group of freshwater organisms and some marine organisms, from prokaryotes to eukaryotes, from protozoa to vertebrates and angiosperms.
- Learn current field methods for collecting physicochemical parameters and benthic and planktonic organisms from a local stream, lake and wetland.
- Learn current laboratory methods for identification and quantification of species composition of freshwater planktonic and benthic algal and invertebrate populations from a local lake and stream.
- Develop ability to synthesize and integrate large amounts of information and ideas related to aquatic systems, and report field collections and laboratory results.
- Attain the ability to discuss aquatic food webs and organism trophic interactions.
- Understand and be able to discuss human impacts on aquatic systems, such as eutrophication and its environmental impacts.

Instructional Methods

Students are expected to read and review assigned lab materials before attending the laboratory session. This information will be posted on Canvas.

During the first two labs we will meet at PSC and will collect and analyze samples from a pond and Potomac River at the PSC. There will be three field trips to Burke Lake, Daniels Run, and wetland in Mason Neck State Park during the early part of the semester. On these trips numerous observations and measurements will be made in the field and samples will be collected for analysis in the lab in later laboratory sessions. Students will be exposed to a variety of field and analytical methods, but will specialize in one topic. They will carry this specialization forward as a research topic, complete analysis of all samples collected by the class related to that specialization, and prepare a laboratory report and an oral presentation which will serve as the basis for their grade in the laboratory.

Field trips will start at the scheduled lab time – we will meet at the sampling location. The field trips may extend for slightly longer than the 3 hr scheduled period. ***Students who arrive at field sites more than 10 minutes after the scheduled start time will not be accommodated.*** It is advised that students not schedule other classes immediately before or after the lab. Students should wear appropriate clothing depending on the lab activities for a given day. For example, when field work is scheduled, students should wear clothing and shoes that can be gotten dirty or/or wet. In warm weather old sneakers are good and in cooler weather boots may be useful. Lab work may also be dirty so dress appropriately for all lab sessions. Long pants are required for both field trips and in lab sessions. Never show up in open toes shoes, flipflops or high heels.

Methods of Evaluation

The laboratory is an integral part of the course. The laboratory assignments and participation will count 100 pts, which 25% of the final combined grade.

Graded Items	Points
Final group presentation	25
Individual lab term report	40
Problem set	15
Participation (Lab assignments)	20
Total Points	100

• Field and lab work

During the first lab, students will form three groups (4-5 students each). Each group will select one of the three water bodies sampled (e.g., lake, stream, or wetland) for the **final group lab presentation**. However, during field collections, students will participate in all aspects of the work. It is essential that each student develop proficiency in collecting all types of biotic samples and in taking a range of environmental measurements. During laboratory sessions, every student is expected to practice each analytical method across all sample types and water bodies. While the final data set may be compiled through teamwork, individual mastery of each method is required.

• Final group presentation and individual lab term paper

Students will work in groups on sample analysis, data consolidation, and doing the group presentation, **each student must develop their own lab term paper working independently, in addition to the group final presentation**. Each lab team will develop one presentation to summarize all data obtained from the selected water body (including field methods, lab methods, water environmental variables, pigment and nutrient measurements, and biota composition). The final group presentation will consist of a 20-minute talk with PowerPoint slides using the standard scientific paper format of Introduction, Methods, Results and Discussion, and Conclusions. The **individual lab term report** will follow a similar format, but each student must write their own lab paper using the data jointly collected. More details will be forthcoming on all of these assignments.

- **Problem set**

The Problem Set will consist of a series of problems/exercises using the data collected in the Burke Lake field trip to illustrate how limnological data is presented and analyzed.

- **Participation**

Participation will be judged by the instructors based on your attendance and active involvement in the lab and your **lab assignments (see the lab schedule for details)**. If you are unable to attend any the labs for health reasons or personal emergencies, please let Dr. Christova know by email ahead of time.

Otherwise, lab absences will be considered unexcused. **More than one unexcused absence will cause a 10% deduction in your final lab score per additional unexcused absence.**

Lab Topics and Schedule

Week	Activity	Reading	Assignment due date (points)
Aug 29	Overview of sampling freshwater ecosystems and demonstration at PSC pond. Measuring field water quality parameters, collecting phytoplankton and zooplankton); Assignment of student groups and project topics.	Ch. 1-3 Lab manual	
Sept 5	Collecting aquatic plants and algal samples from the tidal Occoquan “Kelso Learning Barge”. Introduction to microscope sample analysis and field data organization. <i>Receive PROBLEM SET ASSIGNMENT – Burke Lake Thermal Stratification Profile</i>	Lab manual	Oct 6 (15 pt.)
Sept 12	Trip to stratified lake (Burke Lake): measuring field water quality parameters, collecting water samples, phytoplankton and zooplankton at various depths for chemistry and biota analyses.	Ch. 1-3 Lab manual	
Sept 19	Trip to wetland (Mason Neck State Park): measuring field water quality parameters, collecting water samples, phytoplankton, zooplankton, and periphyton for chemistry and biota analyses. <i>A Naturalist with a Camera Assignment</i>	Lab manual	Sept 29 (5 pt.)
Sept 26	Meet in Lab: briefly examine aquatic plants and periphyton collected in the wetland; phytoplankton samples analysis. <i>Phytoplankton Data Report Assignment</i>	Lab manual	Oct 13 (5 pt.)
Oct 3	Macrozooplankton analysis.	Ch. 5 Lab manual	
Oct 10	Trip to Daniels Run: measuring water quality parameters, collecting water samples and benthos at various locations for chemistry and biota analyses.	Ch. 10	
Oct 17	Microzooplankton analysis. <i>Zooplankton Data Report Assignment</i>	Ch. 10	Oct 27 (5 pt.)
Oct 24	Stream zoobenthos analysis.	Ch. 11	
Oct 31	Stream algae analysis.	Lab manual	
Nov 07	Pigment analysis. <i>Chl a Data Report Assignment</i>	Ch. 13	Nov 17 (5 pt.)
Nov 14	Nutrient analysis.	Ch. 7	
Nov 21	Presentation and lab report preparation.	Lab manual	
Nov 28	NO CLASS – Thanksgiving Break		
Dec 5	<i>Final group presentations.</i>		Dec 5 (25 pt.)
	<i>Final Individual Lab Report is due by E-mail. Late papers will be subject of 5- points deduction.</i>		Dec 8 (40 pt.)

Suggested Textbook

Wetzel, R.G. & Likens, G.E., 2000. Limnological Analyses. Springer. There are three editions. Any edition is fine. The second edition (1991) hard copy is available at the GMU libraries. There is an eTextbook version of the third edition (2000) available for purchase online. Suggested reading from this textbook for each lab is provided in the lab schedule above.

EVPP/BIOL 350 Lab Manual will be provided

Identification Books

Wehr, J. D., Sheath, R. G. & Kociolek, P. 2015. Freshwater Algae of North America: Ecology and Classification. Academic Press, San Diego, 2nd Edition.

Thorp, J. H. & Roger, D. C. 2011. Field Guide to Freshwater Invertebrates of North America. Academic Press, San Diego.

Thorp, J. H. & Covic, A. P. (Eds.). 2010. Ecology and Classification of North American Freshwater Invertebrates. Academic Press, San Diego.

Online access is available for all three books at the library site: library.gmu.edu and hard copies can be used at PEREC.

Online Identification Resources

Diatoms: <https://diatoms.org/>

Soft-bodied algae: <https://data.sccwrp.org/sbsac/index.php> (user/password will be provided upon request)

Aquatic invertebrates: <https://www.macroinvertebrates.org/>

Aquatic and invasive plants: <https://plant-directory.ifas.ufl.edu/plant-directory>

Common Policies at GMU

Check the Lecture Syllabus