



BIOL/EVPP 350 Freshwater Ecosystems
 Lecture Syllabus
 Fall 2019
 F 8:50 – 11:20 am
 Potomac Science Center 3208



Instructor: **Dr. Amy E. Fowler**, afowler6@gmu.edu
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 (703) 993-5956
 Office: Potomac Science Center 3117
 Office hours: F 3:30 – 6pm

Course Web Site: Go to <http://mymason.gmu.edu>, log in with your email name and your GMU email password, then select Freshwater Ecosystems Fall 2019. All information, both lecture and lab, will be in this location.

Course Description and Goals: This course is an overview of the ecology of freshwater ecosystems including lakes, streams, and wetlands. It will examine the physical, chemical, and biological processes and their interrelationships. Students will learn basic concepts in limnology, biological assessment, and trophic ecology, and become familiar with freshwater flora and fauna. After completion of the course, students should have a broad knowledge of the physical, chemical, and biological processes operating in freshwater ecosystems. In addition, students should understand that anthropogenic factors affect these systems, and that water management and ecosystem restoration are practiced to mitigate these problems. Students will be trained in the ability to present and report research results. Through such capability, each student should be relatively well prepared to contribute to freshwater ecology research and management projects.

Course Content and Instructional Methods: 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. Below is a list of lecture topics by week. Lectures will consist of power point presentations that will be posted to our course on the day of the lecture. Attached below is schedule of topics and assignments, including readings from our text. Check the course web site every week for additional readings that are part of the course material.

Reading and interpreting scientific papers, and presenting results in reports and oral presentations is part of the course. Scientific papers selected from scholarly peer-reviewed journals will be presented in groups in class (15 minute presentations), after which a class discussion will follow. The groups will decide on a paper within their topic (Lakes, Freshwater Tidal, Streams, or Wetlands) to present. The dates that homework assignments and lab reports should be handed in are listed in the lab syllabus. At the end of the semester, students will present their lab projects as part of the lab.

Weighting of grades (lecture and lab):	2 mid term exams:	75 pts each
	Cumulative Final:	115 pts
	Lab Participation:	50 pts
	Homework Assignments:	60 pts
	Student Presentations (2):	25 pts each
	Lab Paper:	75 pts

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

Score	Letter grade
73-76	C
77-79	C+
80-82	B-
83-86	B
87-89	B+
90-92	A-
93-96	A
97-100	A+

Honor Code: Adherence to the *GMU Honor Code* is expected of all students, specifically:

Members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.

In all assignments and communications, **plagiarism** will not be tolerated. This applies equally to oral and written communications in the context of any evaluated (graded) course assignments. In presenting quotes, paraphrasing statements or logical arguments from others in any medium (on-line, oral or written), students should properly cite their source. Results of teamwork should only be attributed to those who directly contribute to the final product (even if more than those people were designated as being part of the team). Any or all members of a student team may be held accountable for any Honor Code violations in their shared work. Any public usage of original material from this course (e.g., presentations, images, etc.) without explicit permission of its creator shall be construed as stealing. As stated in the Honor Code, infractions may result in invalidated credit for dishonorable work and lowered grade, including failure from the class, suspension or dismissal. Inquiries for clarification from the professor are welcome. Thank you in advance for your conscious attention to these issues.

Disability Accommodations: If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474, <http://ods.gmu.edu>. All academic accommodations must be arranged through the ODS.

Diversity: George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

When you are unable to attend: Please let your professor know as soon as possible when you are unable to attend a lecture or a lab. This is especially important for field trips, because we want to leave campus on time. Provide a doctor's note when you are unable to attend for health reason.



BIOL/EVPP 350-201 Freshwater Ecosystems Lab

Lab Syllabus

Fall 2019

F 11:30-3:30

Potomac Science Center 3208



Instructors: **Dr. Amy E. Fowler**, afowler6@gmu.edu
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Suzanne Dee, sdee@masonlive.gmu.edu
Teaching Assistant
Office: Potomac Science Center 3208
Hours: F 3:30-6pm, by appointment

Jennifer Lewis, jlewis33@gmu.edu
Teaching Assistant
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Hours: F 3:30-6pm, by appointment

Course Web Site: Go to <http://mymason.gmu.edu>, log in with your email name and your GMU email password, then select Freshwater Ecosystems Fall 2019. All information, both lecture and lab, will be in this location.

This laboratory is a required and integral part of BIOL/EVPP 350. You will take the virtual experience of the lecture part of the course and learn how to apply it in the real world through collection of samples in the field, processing in the lab, culminating in analysis and reporting on results. Field collection trips to four different freshwater habitats (i.e., lakes, freshwater tidal, streams, and wetlands) are planned in September/October and may extend for slightly longer than the 4-hour scheduled period. Students should wear appropriate clothing depending on the lab activities for a given day. For example, when fieldwork is scheduled, students should wear clothing and shoes (e.g., old sneakers, water shoes, hiking sandals, or rubber boots) that can take exposure to hot sun, water, slime, and mud. For field trips, bring snacks, water, sunscreen and/or insect repellent, and rain gear, as appropriate. Lab work may also result in exposure to samples or test chemicals so please dress appropriately for all lab sessions (e.g., close-toed shoes and long pants at all times). During chemical analyses students will wear lab coats, gloves and goggles.

Students are expected to read and review assigned lab materials, as appropriate, before attending the laboratory session. The free lab manual can be found on the class Blackboard page. Homework assignments designed to assist students in data analysis and report writing will be due via Blackboard before lab on the dates indicated in the schedule below. Home work will be graded and incorporated into your final grade as indicated in the lab syllabus, report drafts will be graded and incorporated in your report grade. **Hand in materials on time.**

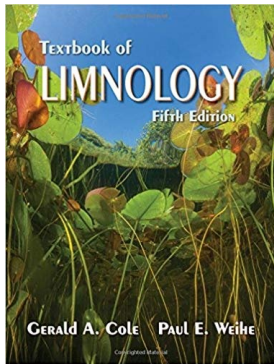
During field collection and lab sessions, students will participate in all aspects of the work. Freshwater samples collected and processed will include water, zooplankton, benthic organisms, soil, vegetative biomass, and fish. Students will process and analyze samples collected at each of the field sites, and will present a 20-minute group presentation in addition to writing a research paper based on one of the habitats. Students will be placed in groups (a lake, freshwater tidal, streams, and wetland group) for lab processing of field samples and presentation of data/results, but each student must develop their own project report, working independently.

Your project report will be double-spaced, font size 11, a minimum of 8 pages and a maximum of 15 pages. The report should include a title, introduction, methods, results/discussion, conclusion and a references section. References should follow a standard format; look at the references in a journal of choice, and look up the instructions for authors of that journal (i.e. you can choose an existing format, but make sure to consistently stick to one format). The references section should include at least five peer-reviewed journal articles. You can use information from the lab manual for your report (and refer to the lab manual), however **copying and pasting from the lab manual is not acceptable**. Per lecture syllabus, GMU Honor Code is also in effect for lab.

Your first points of contact for lab-related questions should be the teaching assistants, Ms. Suzanne Dee, Ms. Jennifer Lewis, then your professor, Dr. Amy Fowler.

On field days, we will depart from the lab to the field destination. If you “miss the bus” on field days, you will not be able to receive credit for work missed. **Please be on time!** Field day execution is dependent on weather (e.g., storms), so expect to adapt as needed. You are also welcome to bring a bag lunch with you to the field sites as long as you leave no trace (i.e., leave nothing behind) in the natural areas we visit. When the field work is over, we will process the samples. If you are unable to attend a lab for health or other urgent reasons, please email all instructors as soon as feasible.

Primary Text:



Cole, Gerald and Paul Weihe. 2016. Textbook of Limnology, Fifth Edition.
Waveland Press, Inc. ISBN-10: 1478623071 | ISBN-13: 978-1478623076

To obtain the hardcopy textbook, compare options and costs via directtextbook.com OR
Purchase directly from GMU Bookstore or amazon.com OR
Rent for the term of this course from chegg.com

Lecture and Laboratory Topics and Assignments Schedule

# Week	Lecture Topics and Readings	Lab topics and Readings
<u>Physical and Chemical Characteristics</u>		
1	Intro, Hydrologic Cycle, Properties of Water Reading: Ch. 9 and Bb postings	Lab introduction, technique info Reading: Lab manual 1-21
2	Light in Lakes, Vertical Structure Reading: Ch. 2 and Ch. 10	Field sampling: Burke Lake Reading: Lab manual 1-17
3	Lake Morphometry, Lake Origins Reading: Ch. 5 and Ch. 6	Field sampling: Local streams (Cub Run, Bull Run) Reading: Lab manual 18-19 HOMEWORK DUE: Light Profile (9/13)
4	Stream and Watershed Characteristics, Chemistry in Lakes Reading: Ch. 8, Ch. 11, Ch. 12, Ch. 13, Ch. 14 and Ch.15	Field sampling: Potomac River Reading: Lab manual 9-17 HOMEWORK DUE: Temp & Oxygen Profile (9/20)
5	Wetland Plants, Soils, Characteristics, and Biogeochemistry Reading: Ch. 7 and Bb postings	Field sampling: Local wetland Reading: Lab manual 10-21 HOMEWORK DUE: Alkalinity & Conductivity (9/27)
6	EXAM 1 (10/4): Everything from 8/30-9/27	Lab processing Reading: Lab manual 22-48 HOMEWORK DUE: Draft field methods (10/7)
<u>Aquatic Biology and Ecology</u>		
7	Biomonitoring, Diversity indices, Phytoplankton, Single-celled organisms Reading: Ch. 2, Ch. 3 and Bb postings	Lab processing Reading: Lab manual 49-60 HOMEWORK DUE: Biotic Index (10/11)
8	Freshwater Organisms Readings: Ch. 3 and Bb postings	Lab processing Reading: Lab manual 61-63 HOMEWORK DUE: Analyses and Graphing (10/18)
9	Video: Freshwater Bb postings	Lab processing HOMEWORK DUE: Draft introduction (10/25)
10	Population Dynamics, Community Ecology Readings: Readings: Ch. 4 and Bb postings	Lab processing HOMEWORK DUE: Group spreadsheets (11/1) Extra credit assignment (Redo opportunity) (11/1)

Ecosystem Science and Restoration

11 Ecosystem Ecology, Energy Flow, and Services; Management and Restoration
Readings: Ch. 4 and Bb postings

Data analysis in student teams

HOMEWORK DUE: Draft lab methods and data analysis (11/8)

12 **Paper presentations by each group (11/15)**
Bb postings

Data analysis in student teams

HOMEWORK DUE: Methods update and draft data analysis (11/15)

HOMEWORK DUE: 2 questions per group paper brought to class (11/15)

13 **EXAM 2 (11/22):** Everything from 10/11-11/11

Drop in for Project Report Help

HOMEWORK DUE: Draft results and discussion (11/29)

14 NO CLASS – THANKSGIVING

15 **Presentation of Projects by Student Teams (12/7)**

INDIVIDUAL PROJECT REPORT DUE 12/9

Cumulative Final Exam (Study everything offered in this class): 12/13 8:50 AM in PSC 3208