

BIO SCI 501: PLANT AND AQUATIC ECOPHYSIOLOGY LABORATORY

Graduate/undergraduate course worth **3 credits**. Fulfills a laboratory course requirement.

Class Meets in Lapham Hall south 386

Mondays 2 – 2.50 pm (Lecture), Wednesdays 2 – 4.50 pm (Lab and discussion)

Instructors: Erica Young - ebyoung@uwm.edu

John Berges - berges@uwm.edu

Office Hours: Erica: email to set up a time to meet (in person or online)

John: Monday 12 – 1pm or email



Learning Objectives: This course will involve hands-on examination of terrestrial and aquatic plant and algal community ecophysiology using diverse experimental methods.

The course builds upon basic understanding of plant and aquatic biology from other courses (e.g. Biosci 152, 310, 406, 500, 512). The course will involve work in the field and laboratory and data analysis, integrated across the semester.

Pre-requisites: The course requires completion of Bio Sci 310 General Ecology *or* 325 Genetics.

During the course and with adequate revision, students should develop the skills and understanding to be able to:

- Explain, using examples, how to practically examine core ecophysiological processes in plants and aquatic algal communities including photosynthesis, activity of key enzymes, nutrient uptake and assimilation and stress
- Identify and explain applications of different methods to examining plant and algal functions
- Use computer-based analysis to derive key ecophysiological parameters from raw data

Essential Resources: A course textbook is not required. Background readings will be available via the Canvas website: <https://uwm.edu/canvas/>. The web site provides essential learning resources and study tools. Please check it frequently (a few times per week) because you are responsible for being aware of all announcements and any changes to the syllabus posted there. All assignments will need to be submitted via Canvas.

Student Needs: Students with special needs should email the instructors as soon as possible (during the first week of classes) so we can discuss how to best accommodate your learning style. See also link to Accessibility Resource Center: <http://uwm.edu/arc/>



Class Schedule – You are *required* to attend all Monday and Wednesday classes (see attendance policy)

Week	Date	Topic and exercises for Lecture (Mon) and Discussion/Lab (Wed)	Pre-lab assignment Upload to Canvas <i>before</i> class	Post-lab assignment Upload to Canvas before <i>next</i> class
2	09/08	Overview of course Literature search techniques		
3	09/13	Introduction to field techniques	Lit search assignment	
	09/15	Field work at Estabrook Park Lagoon		
4	09/20	Background to pigments	Pigments and solvents	
	09/22	Chlorophyll extractions – plants, algae		Pigment calculations
5	09/27	Chlorophyll fluorescence	Chl fluorescence	
	09/29	Chl fluorescence – plants in field, algae in culture		Fv/Fm comparisons
6	10/04	Background to production estimates and parameters	Primary production – units, ecosystem estimates	
	10/06	P v I curves –PAM-ETR on plants, oxygen electrode setup		Plotting P v I curve data, key parameters
7	10/11	Background to Light acclimation, P v I models	Light units; High light and low light environments	
	10/13	P v I curves on High Light and Low Light acclimated algae		Modelling, analysis of P vs I curve for HL, LL plants in excel
8	10/18	Background to grazing and flow cytometry	Grazers in freshwater ecosystems	
	10/20	Grazing experiment with <i>Daphnia</i> and algae		Grazing rate calculations
9	10/25	Analysis and modelling	Modelling in ecology	
	10/27	Follow-up from grazing expt. Modelling in Netlogo		Analysis of grazing relationships in excel
10	11/01	Nutrients in aquatic and terrestrial ecosystems	Key forms of bio-available nutrients in freshwater ecosystems	
	11/03	Chemical measurements of nutrients		Standard curves and sample calculations
11	11/08	Background to nutrient uptake and assimilation	Nutrient uptake rates in freshwaters	
	11/10	Nutrient uptake experiments		Nutrient uptake calculations
12	11/15	Background to enzymes	Enzyme names	
	11/17	Enzyme measurements – Nitrate Reductase		Enzyme activity calcs
13	11/22	Drop in class – help with assignments and reviewing material for final exam		
	11/24	No class – thanksgiving recess		
14	11/29	Enzyme regulation, nutrient stress	Enzymes and nutrient stress	
	12/01	Visualization of enzyme activity in cells and communities		Alkaline phosphatase activity and nutrient stress
15	12/06	Graduate student presentations		Presentation feedback
	12/08	Final practical exam		

Weekly Assignments

Each week, there will be *short pre-lab and post-lab assignments*. The pre-lab assignments involve reading background materials provided and/or find relevant information about lab topics. The details for both will be posted on Canvas, and students will be required to submit assignments to Canvas. The pre-lab assignments include literature research on methods used in published research articles, extracting information such as apparatus used, units reported and commentary on comparisons between different methods. **Post-lab assignments** involve work to complete lab analysis of lab data and information. This includes finishing calculations on data gathered in class, plotting data, commenting on interpretation and making some comparisons with the scientific literature. Pre-lab and post-lab assignments must be submitted on time to Canvas. Late assignments will not be accepted without explanation or discussion with the instructors.

All weekly assignments will be **graded** using the following rubric, on a scale of 1 – 5:

5. Complete and accurate with correct formatting
4. Complete with only minor inaccuracies or errors in formatting
3. Incomplete or major inaccuracies or formatting errors
2. Substantially incomplete and inaccurate
1. Only evidence of minimal effort

Aside from these scores, only brief feedback will be provided with each assessment. However, if students want more detailed feedback or help, please let us know and we'd be happy to discuss!

Final Practical Exam

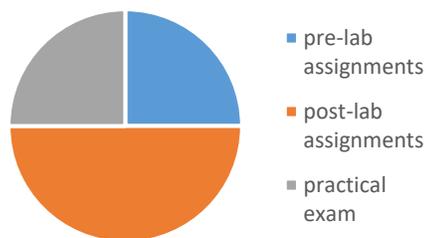
The final exam (worth 25% of total grade) at the end of the class will be a hands-on, in-person review of your understanding and memory of key ideas and applications from *each* lab class. In the timed exam, you will have different 'stations' in which you will be required to make measurements, complete calculations, or provide some explanation and interpretation of provided values for parameters we have covered in the class. More details and review materials will be provided before the end of semester.

Course grading for undergraduate students: Course grades are based on completion and submission of ~ 22 short pre-lab and lab assignments as well as the final practical exam:

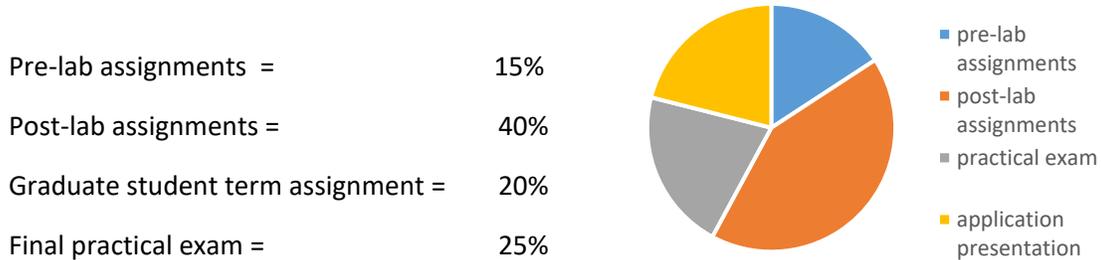
Pre-lab assignments (11) = 25%

Post-lab assignments (11) = 50%

Final practical exam = 25%



Course grading for graduate students: The components above will be worth 80% and the remaining 20% will be a written report and presentation/demonstration to the class of a method/instrument you use (or intend to use) in your own research related to plant and algal or aquatic ecophysiology. Consult with instructors to agree on an appropriate topic and resources.



Attendance Policy

This is a face-to-face, hands-on lab course. **You must attend both Monday and Wednesday classes** and be engaged with class material during the entirety of those sessions. If you need to miss a class, you must contact one of the instructors to let us know why and so we can discuss how you can catch up on the lab material. You are responsible for understanding **all** material discussed in class and must complete all assignment exercises. If a class is missed without consultation, the lab assignment for that week will not be accepted and the student will score 0 on that assignment. **Missing two or more classes without contacting the instructor will result in failure in the class.**

Expected Time Investment (Workload Statement)

All students are required to attend the 4 hours of class each week. Field trips and sample analysis associated with the lab may require some time beyond the strict time limits of the course. In order to achieve the learning objectives, students will typically need to spend 6 hours per week outside of class completing the assignments and studying for the practical exam (depending on your background, more time may be needed).

Missed Exam Policy: There are no make-up exams except for extreme emergencies which require official documentation. In such an event, contact the instructor soon as possible to discuss the problem. An un-excused absence will result in lost points for that exam.

Academic Misconduct: Academic Misconduct: In this course, you are expected to perform to the best of your ability in an honest manner. Cheating, plagiarism, or other acts of misconduct will result in a severe penalty to you, as per University of Wisconsin System Chapter 1. Student academic misconduct procedures are specified in Chapter UWS 14 and Faculty Document No. 1686 and can be found [here](#)

Diversity, Equity and Inclusion: The Department of Biological Sciences at UWM is committed to supporting our students and fostering an inclusive environment that is respectful of diversity and is free of bias, discrimination, and harassment, in the classroom and in the broader university community. In this class, we will strive to model reflection, advocacy, and care for community and work toward a diverse, equitable, democratic, and sustainable society. If you feel that our course, or Department falls short of this commitment, we encourage you to engage in dialogue with us and help us make things better.

We acknowledge that in Milwaukee that we are on traditional Potawatomi, Ho-Chunk and Menominee homeland along the southwest shores of Michigami, North America's largest system of freshwater lakes where the people of Wisconsin's sovereign Anishinaabe, Ho-Chunk, Menominee, Oneida and Mohican nations remain resident.

COVID-19 SYLLABUS STATEMENTS, FALL 2021

1. Panther Community Health and Safety Standards

UWM has implemented reasonable health and safety protocols, taking into account recommendations by local, state and national public health authorities, in response to the COVID-19 pandemic. As a member of our campus community you are expected to abide by the [Panther Interim COVID- Related Health & Safety Rules](#). These standards apply to anyone who is physically present on campus, in UWM-controlled facilities, or participating in a UWM-sponsored activity.

2. With respect to indoors spaces on UWM facilities (classrooms, labs, performance spaces, etc.):

- Masks are always required while indoors on UWM campuses and in UWM controlled facilities, with limited exceptions – environments where hazards exist that create a greater risk by wearing a mask (for example, when operating equipment in a lab with the risk of a mask strap getting caught in machinery, or when flammable materials are being used). Such exceptions must be approved in advance.
- A student who comes to class without wearing a mask will be asked to put on a mask or to leave to get one at a mask handout station. Failure to do so could result in student discipline.
- You should check daily for COVID symptoms by completing the self-check at [COVID-19 Symptom Monitor](#) Symptoms may appear 2-14 days after exposure to the virus and include fever, cough, or shortness of breath or difficulty breathing. See the CDC's Website for more information about [COVID-19 symptoms](#).
- If you test positive for or are diagnosed with COVID-19 based on symptoms, you should complete this Dean of Students Office [COVID-19 reporting form](#) By doing so, you will get information on resources, help UWM identify individuals you may have come into contact with on campus so that UWM can work with the local health department, and allow UWM to clean campus areas you visited as appropriate.

3. Attendance Policy

Do not attend your in-person class if you have COVID-19, if you are experiencing symptoms consistent with COVID-19, if you have been in close contact with others who have symptoms, if you need to care for an individual with COVID-19, or have other health concerns related to COVID-19.

- You should be aware of each of this course's attendance policies. In case of illness, you should contact the instructor via email immediately to discuss options for completing course work while ill.
- Notify the instructors in advance of the absence or inability to participate, if possible.
- Participate in class activities online and submit assignments electronically, to the extent possible.

- Reach out to the instructors if illness will require late submission or other modifications to deadlines.
- If remaining in a class and fulfilling the necessary requirements becomes impossible due to illness, contact me to discuss other options.

As your instructor, we will trust your word when you say you are ill, and in turn, I expect that you will report the reason for your absences truthfully.

4. Potential for Reversion to Fully Online Instruction

Changing public health circumstances for COVID-19 may cause UWM to move to fully online instruction at some point during the semester. UWM will communicate with students about moving to fully online instruction if the situation develops. Our options for this lab course are limited but will be communicated if needed.

5. Navigate Student Success Platform and Mobile App

Students are encouraged to use a tool called Navigate. This tool can help you learn about academic resources, set up study groups in your courses, make appointments with your academic advisor, get reminders on important dates, and much more. In addition, Navigate allows instructors to send Progress Reports to students throughout the term, allowing for updates on your academic progress in a course in addition to your grade. You can log into the platform here: <https://uwmilwaukee.campus.eab.com/> or by finding the Navigate link under the Current Students tab on the UWM home page. More information on how you can use Navigate and the app, including tutorials, can be found on UWM's Navigate website.

Additional links to all University policies can be found [here](#)

No weapons are permitted in any building on the UWM campus.