Ecology and Systematics of Algae
IALL:3109:0EX1 (UI)**, IA LL 501l** (ISU)**, IA LL 3109** (UNI)
Syllabus: Summer 2016

About the Instructor

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Academic Course Home

University College—Iowa Lakeside Laboratory
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Course Description: Biology, ecology and taxonomy of cyanobacteria and eukaryotic freshwater algae based on field collected material. Samples collected from lakes, fens, streams, and rivers will be identified mostly to genus level with some common species identifications within each algal group.

An ecological perspective is used to explore the diversity of photosynthetic microbes that form the energy base of freshwater ecosystems. Environmental and economic concerns caused by excessive algal growth will also be examined. Field collections will be used to identify the common phyla and genera of algae, to study their life histories, and to examine environmental factors that affect algal growth and distribution. A class project will investigate the algal ecology of Lake West Okoboji.

Pre-requisites: Ecology and General Biology classes

Course Objectives:

Upon completion of this class you will be able to:

- Understand algal biodiversity (Assessment of goal: 90 % of students will be able to identify at least 100 algal genera and present 40 genera personal collection)
- Appreciate perspectives and values of phycological research (Assessment: 100% of students will prepare a paper summarizing one current technological use of algae and will peer-review another paper)
- Learn techniques and methods used in algal studies (Assessment: lab grade)
- Develop ability to draw reasonable inferences from observations of microbial organisms and think creatively (Assessment: quizzes and exams)
- Develop ability to synthesize and integrate large amount of information and ideas (Assessment: quizzes and exams)

Faculty Goals:

- As facilitator I will encourage and create a learning environment in which all students are actively engaged in the process of scientific thought and reasoning.
- I shall guide your development toward higher-order thinking and reasoning skills so you can successfully explore and demonstrate achievement of each of the objectives above.

Required Course Materials:

Textbook required: Algae by L.E. Graham, J.M. Graham, and L.W. Wilcox, 2nd edition, 2009 (ISBN-13: 978-0-321-55965-4).

Students choosing a career in aquatic ecology, phycology or botany are strongly encouraged to bring a copy of Freshwater Algae of North America, Second Edition: Ecology and Classification; J. D. Wehr, R. G. Sheath, J. P. Kociolek (Editors), 2015 (ISBN ISBN-10: 0123858763). This book may be ordered from the vendor of your choice or from a local bookstore. Exact editions are recommended.

Equipment: None

Course Requirements: Courses at Iowa Lakeside Laboratory are inquiry-based in structure, typically consisting of a mix of lectures, exercises, field trips, and projects designed to teach students essential aspects of a particular topic and the process of forming and answering scientific questions about that topic. Teaching is often by the Socratic Method with an emphasis on interaction between student and teacher.

Required Additional Equipment/Supplies: Appropriate field clothes, hat, sunscreen and insect repellent will be needed. Either old tennis shoes, hip boots or chest waders will be needed for sampling aquatic habitats.

Course Grade:

Examinations are both formal and informal. Formal written examinations typically consist of a mix of essay questions and/or multiple choice questions. Laboratory and field examinations occur in most courses.

Grading:	Algae assignment 25
	Peer review 25
	Midterm exam 100
	Final exam 200
Lab activities	
Lakeside algal image collection contribution 25	
	Terminology contribution 25
	40 algal genera collection 200
	10 Unknown genera 100
Total	**700 points**

Please keep in mind, grades are not given, but earned based on your performance. Make sure you know the requirements for earning the grade you desire, and act accordingly throughout the semester. The grading system is based on cumulative points possible and calculated percent of maximum points as follows: A= 90-100; B= 80-89.5; C= 70-79.5; D= 60-69.5; F<60 %.

Course Schedule: All Lakeside courses are immersion-based; students take one course at a time and meet or have assignments from 8 am to 5 pm, five days per week. Activities each day for all courses are determined by a combination of weather, topic, general understanding of the subject matter, and other considerations, but are ultimately designed to most effective meet course goals.

The midterm and final exams are close book examination of theory, terminology, processes and taxonomic examples covered mainly in lectures, but may include field and/or lab information. Those exams will contain essay questions, true/false answers, filling information on a diagram, and multiple choice/matching questions.

You will write an essay paper (1 page single space) as an algae assignment and you will provide a peer review on a classmate work from the same assignment. If you choose to write about technological applications of algae you will review a paper on endosymbiosis. Rubric will be provided.

Lab activities (350 point total):

Algal identification: We will spend at least 3 hours on the scope every day; at the end of class you need to have a minimum of 40 genera (collection) you have to present as your collection (use up to 4 hours combined lab time, present not more than 20 diatom genera both live and on permanent slides); in lab you will be able to take images of algae to aid in the process and contribute to the Lakeside image algal collation. Spelling of genera and species is important. For the unknown 10 genera/species final lab exam you might have seen or not seen the algae prior to the exam. To be able to identify the new to you genera or species you will be given the required information during lectures and microscope time. You will have to apply and practice your algal knowledge. During final algal identification you can use any available literature in the lab and notes (not web- there are a lot of misidentifications there). Correct spelling of the Latin name is part of the identification.

	LECTURE TOPICS	Lab Activities
Week 1	Introduction to phycology, Ch.1	Intro lab, field and lab methods, use of microscope, collection
	Algal diversity (Ch.5) and Cyanophyta (Ch.6)	Algal keys and approaches to identification
	Cyanophyta taxonomy and identification	Cyanophyta taxonomy and identification
Week 2	Euglenoids (Ch.8) and Cryptomonads (Ch.9)	lab work - Algal identification
	Haptophytes (Ch.10) and Dinoflagellates (Ch.11)	
	Bacillariophycea (Ch.12) general biology	Bacillariophyceae taxonomy and identification
	Bacillariophyceae Centric diatoms	
	Bacillariophyceae Pennate diatoms	
	Midterm exam (100 points)	
Week 3	Photosynthetic Stramenopiles- part 2 (Ch.13)	lab work - Algal identification
	Photosynthetic Stramenopiles- part 3 (Ch.14)	
	Red algae (Ch.15) and Green algae (Ch.16)	
	Red algae (Ch.15) and Green algae (Ch.16)	
Week 4	Green algae (Ch.16)	lab work - Algal identification
	Green algae (Ch.17 and 18)	
	Green algae (Ch.19 and 20)	
	Algal Ecology (parts Ch 21-23)	
	Final exam, collections and unknown identification	

Lecture outlines, short genus characteristic and a drawing or micrograph of most genera will be given to you.

Planned techniques to be presented to you and given an opportunity to practice in the Lab:

1. Sample collection and cataloging
2. Sample processing
3. Sample preservation
4. Algal culturing techniques

5. Live algae observation and identification
6. Diatom digestion
7. Permanent slide preparation
8. Algal enumeration
9. Microscopy
10. Algal taxonomy and systematics
11. Biovolume measurement
12. Taking digital images
13. Working with phycological references in the Library

Anticipated field trips:

1. Little Millers Bay
2. Silver Lake Fen
3. Excelsior Fen
4. Fairy Shrimp Ponds
5. Kettle Hole
6. West Okoboji Boat trip
7. West Okoboji Bays (Lazy Lagoon, Emerson Bay)
8. Big Spirit (Mini-Wakan State Park, Hale Slough Access)
9. Upper West Okoboji
10. Spring Run Wetlands
11. Spring run Lakes (Pleasant, Lili, Prairie)
12. Christopherson Slough and Swan Lake Complex

This list is subject to changes. We might visit 1 place twice or visit several at a time. Field trips will depend on weather conditions. In bad weather everyone is expected to be in the lab and work on algal identification, processing, and culturing.

We will spend at least half a day getting familiar with the algal literature in the lab and in the library. We will keep 1 class field notebook (binder) with filled in sampling sheets, consecutive sample numbering and field identification. On regular bases we will record every genus observed by anyone in class (i.e. we will keep this as a group record for each sample). In preparation of the Final algal identification you can use the information related to the sample number for your own field collections.

A personal composition type notebook is recommended for drawings of everything you see for the first time and special notes on the unique algal identifiers. This notebook will not be graded.

Policies and Instructions:

As a registered student in a Distance Education course through The University of Iowa, you are responsible for the policies and instructions posted below.

Special Modifications: If you are a person with a disability who requires an accommodation in order to participate in University of Iowa Continuing Education courses or programs, please contact Student Disability Services: 3015 Burge Hall, (319) 335.1462, or sds-information@uiowa.edu, or fax: (319) 335.3973. Reasonable accommodations for students with physical, mental, or learning disabilities will be made. The Division of Continuing Education is committed to both Section 504 of the Rehabilitation Act of 1973 and Section 508 of the Workforce Investment Act of 1998.

Academic Misconduct: All forms of plagiarism and any other activities that result in a student presenting work that is not his or her own are academic fraud. All academic fraud is reported to the departmental DEO and the Associate Dean of Continuing Education. All incidents of academic misconduct (plagiarism and cheating) will be subject to the rules and regulations of the College of Liberal Arts and Sciences as defined and stated in the Academic Policies Handbook (http://clas.uiowa.edu/students/handbook).

In this class, students are not allowed to collaborate with others on assignments. Do not share your work with others or ask others to see their completed assignments since both are considered academic misconduct. If you need help, please contact the instructor by email. Students are responsible for understanding this policy; if you have questions, ask for clarification.

Understanding Sexual Harassment: Sexual harassment is reprehensible and will not be tolerated by the University. It subverts the mission of the University and threatens the well-being of students, faculty, and staff. Visit this site (http://www.sexualharassment.uiowa.edu/) for definitions, assistance, and the full University policy.

Complaint Procedures: If at any time you have concerns about this class or your performance in it, please do not hesitate to contact me. If you do not feel that your concern has been resolved satisfactorily, you may contact the Department Chair (contact information provided at the top of page one of this syllabus). If you still do not feel that your concern has been resolved satisfactorily, you may contact University College, 310 Calvin Hall, (319) 335-1497, uc-academics@uiowa.edu. All complaints must be made within six months of the incident.

Administrative Home of the Course: The administrative home of this course is the University College (UC), which governs academic matters relating to the course such as the add/drop deadlines, the second-grade-only option, issues concerning academic fraud or academic probation, and how credits are applied for various graduation requirements. Different colleges might have different policies. If you have questions about these or other UC policies, contact your academic advisor or the Division of Continuing Education, 250 Continuing Education Facility, (319) 335-2575, dce-registration@uiowa.edu. As a registered student in a Distance Education course through The University of Iowa, you are responsible for the policies and instructions as posted online: http://uc.uiowa.edu/students/admitted-university-college-programs/academic-standards.