

FAS6176: ALGAE BIOLOGY AND ECOLOGY – Spring 2024

Instructor: Professor Edward Phlips

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Office Hours: Thursday 8-10 AM

Course Description: The biology and ecology of aquatic algae, including evolution, classification, structure, photosynthesis, growth, and reproduction. Emphasis on the ecological role of algae in different aquatic ecosystems (e.g. open ocean, estuaries, coral reefs, rocky intertidal), their impacts (e.g. harmful algae blooms, food webs), and their applications (e.g. food, biochemical).

Prerequisites: Foundational biology coursework, as determined by instructor

Time and Place:

Lectures (Online): Lecture modules will be posted on the e-Learning web site for the course on Monday of each week, along with required reading and supplemental information. Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See <http://distance.ufl.edu/student-complaints> for more details.

Course Objectives: After completing the course, students will:

- be able to describe the basic concepts of algal biology and ecology, and how they apply to different aquatic environments,
- be able to apply the principles of algal biology and ecology to solve problems, or identify opportunities,
- be able to identify algae management schemes which will address environmental issues, such as eutrophication, human health, and global climate change.

Course Communication: This course will take advantage of e-Learning support to post course information and to allow you day-to-day access to your grades. Please visit <http://lss.at.ufl.edu> to access the course via the e-Learning link and for information on how use the e-Learning site (Please use the help desk as your first course of action if you have any difficulties). Lectures are based on PowerPoint presentations to facilitate the use of figures and visual aids. Not all the information for the class will be on the PowerPoint slides, therefore it is your responsibility to take notes and complete reading assignments.

Participation and Attendance: Participation and attendance is expected for all lectures, discussions, and special project presentations. Contact me as early as possible if you must legitimately miss a scheduled exam. If an emergency situation arises immediately before an

exam, notify me as soon as the emergency is resolved. Make-up exams will not be given except for an excused absence with written substantiation (e.g., official University event, illness, family emergency, etc.).

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Required Readings: Course reading material will be composed of several foundational scientific papers, as well as recently published scientific and technical papers. These are five examples:

Cloern, J.E. 2001. Our evolving conceptual model of the coastal eutrophication problem. *Marine Ecology Progress Series* 210:223-253.

Litchman, E., and C.A. Klausmeier. 2008. Trait-based community ecology of phytoplankton. *Annual Reviews Ecology Evolution and Systematics* 39:615-639.

O'Neil, J.M., T.W. Davis, M.A. Burford and C.J. Gobler. 2012. The rise of harmful cyanobacteria blooms: The potential roles of eutrophication and climate change. *Harmful Algae* 14: 313-334.

Szmant, A. 2002. Nutrient enrichment on coral reefs: Is it a major cause of coral reef decline? *Estuaries* 25:743-766.

Course Format and Grading: This course is offered for three (3) credits in the spring semester. Exams will be based on material presented in the lectures and the required readings. Required readings will be provided online for each major topical area.

Twelve weekly 'Special Assignments' will consist of 12 short quizzes that will be administered during the term. The online quizzes will involve five multiple choice questions related to that week's lecture and/or reading material, some of which may contain multiple correct answers. Each question will be worth a maximum of 0.4 points, for a total of 2 points/quiz. Persons which get >1.2 points on a quiz will receive the full 2 points for the quiz.

The course will also involve a Special Project during the semester. The final product of the project will be a short voice-over Power Point presentation (i.e., around 8-12 minutes) on a topic of your choice. Three parts of the project will be due during the semester:

Part 1: Selection of project topic. Possible topical areas include - algae species of particular ecological importance (e.g., harmful algae bloom species, unique structure and/or function, major habitat component, important food web species), important processes associated with algae (e.g., primary production, nitrogen fixation), the role of algae in specific ecosystems (e.g., kelp forests, Atlantic Sargassum communities, Lake Okeechobee, Florida Bay), or algal biotechnology (biofuel production, aquaculture). On time submission of topics will be associated with 2 points.

Part 2: Submission of an outline of the main elements of their project, including some examples of references that will be used for major topical areas. On time submission of outlines will be associated with 6 points.

Part 3: The PowerPoint presentation should include a list of at least ten references from the primary literature (e.g., journal articles, reference books, published agency reports). The

presentations will be placed online for viewing by all students in Week 15 of the course. Grading - 25 points for the presentation. Each student will be assigned to do an evaluation of another student's presentation (3 points). The evaluation (e.g., strong point and/or weak point) should be attached to the presentation.

Detailed instructions on how to submit projects and participate in grading will be provided on the e-Learning web site at the beginning of the semester.

Two exams will be administered online during the course. Each will be worth up to 20% of the grade. The exams will not be cumulative in terms of the material covered. Exam questions will emphasize lecture materials but may also include general concepts presented in the required reading. The exams will be one hour in length and will be available online: Exam 1 February 26 - March 2, Exam 2 April 22 – April 27. Exam questions will include short answers and short essays.

The overall grade point allocation - A (90-100%), B+ (86-89%), B (82-85%), B- (78-81 %), C+ (74-77%), C (67-73%), C- (63-66%), D+ (59-62%), D (55-58%), D- (51-54%), and E «50%).

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

Basis for grade:

Quizzes (12)	24%
Exam 1	20%
Exam 2	20%
Special Project Part 1	2%
Special Project Part 1	2%
Special Project Part 2	6%
Special Project Part 3	25%
Participation in Project review	3%

Course Outline

<u>Week</u>	<u>Topical Areas, Tests and Assignments</u>
Week 1	Introduction & course description
Week 2	Origins of algae Environmental changes and evolution of algae Phylogeny of algae Systematic basics Reading assignments Online Assignment 1

- Week 3 Algae structure & function – by division
Reading assignments
Online Assignment 2
- Week 4 Algae structure & function – by division – continued
Reading assignments
Online Assignment 3
- Week 5 Freshwater algae toxins
Reading assignments
Online Assignment 4
- Week 6 Marine algae toxins
Other harmful effects of algae
Reading assignments
Online Assignment 5
- Week 7 Algal sampling methods
Taxonomic methods
Reading assignments
Online Assignment 6
- Week 8 **Exam 1 – February 26 to March 2, 2023**
- Week 9 Photosynthesis – Structures, processes, methodologies
Growth – Dynamics, physical limiting factors, methodologies
Reading assignments
Online Assignment 7
Special Project Part 1 due by March 8
- Week 10 Spring Break
- Week 11 Growth – Chemical limiting factors, methodologies
Reading assignments
Online Assignment 8
- Week 12 Ecological principles – e.g., eutrophication, hydrologic factors,

food webs, climatic factors

Reading assignments
Online Assignment 9

Special Project Part 2 due by March 29, 2023

Week 13 Examples of ecosystem types

Reading assignments
Online Assignment 10

Week 14 Examples of ecosystem types - continued

Reading assignments
Online Assignment 11

Week 15 Algal applications

Reading assignments
Online Assignment 12

Special project Part 3 due: Power Point presentations by April 19, 2023

Week 16-17 Exam 2 – April 22 to April 29, 2023.

Peer Evaluations for Special Project due by April 26, 2023.

Online Course Evaluation Process: Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Academic Honesty: As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

Campus Helping Resources: Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Wellness Coaching
- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*

Services for Students with Disabilities: The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Software Use: All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.