Harmful algal blooms (HABs) are increasing in frequency and intensity worldwide. Despite the ubiquity of blooms, only a handful of algal and Cyanobacteria species are considered “bloom-forming”. This course will investigate ecological mechanisms that trigger and maintain blooms in aquatic ecosystems, as well as the physiological advantages that allow some species to bloom while others do not, with emphasis on Cyanobacteria. This intensive course will combine discussion of primary literature, applied field sampling techniques, species level taxonomic identification and physiological characterization (stable isotope or toxin analyses) of local bloom-forming taxa.

**Pre-requisites:** General Biology, Ecology

**Course Objectives:**

Upon completion of this course, students will:

1. Be familiar with current primary literature on HABs
2. Be able to perform species level identification of dominant local bloom-forming taxa
3. Understand physiological mechanisms that facilitate dominance of bloom-forming taxa
4. Understand ecological mechanisms that trigger and maintain blooms in aquatic ecosystems
5. Be familiar with appropriate field sampling protocols

**Textbook:**

*No textbook required.* Readings will focus on primary literature provided by the instructor.

If you plan to pursue studies in Cyanobacteria ecology or taxonomy, the most current taxonomic texts are listed below. These are pricey and are not required for this course. A limited number of copies will be available for shared use in the laboratory.


**Equipment:**
All laboratory equipment and supplies will be provided. For field activities, quick dry clothing, a sun hat, boots and/or waders, sunscreen, and a re-useable water bottle are suggested but not required.

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.

Course Grade:

Grades will be based on participation in lab and in the field, in class presentations and activities, and a final exam addressing practical and theoretical concepts covered during the course. Students will be responsible for presenting and leading the discussion of two peer reviewed papers assigned by the instructor (one per week). Points will be assigned as follows:

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<tr>
<th>Activity</th>
<th>Possible points</th>
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<tbody>
<tr>
<td>Class and field participation</td>
<td>40</td>
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<tr>
<td>Primary literature presentations (2)</td>
<td>40</td>
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<tr>
<td>In-class activities (2)</td>
<td>40</td>
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<tr>
<td>Final exam (practical + conceptual)</td>
<td>50</td>
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<td><strong>Total</strong></td>
<td><strong>170</strong></td>
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Letter grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
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<tr>
<td>90-100</td>
<td>A</td>
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<td>80-89</td>
<td>B</td>
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<td>70-79</td>
<td>C</td>
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<tr>
<td>60-69</td>
<td>D</td>
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<tr>
<td>&lt;60</td>
<td>F</td>
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The instructor may curve grades as appropriate.

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 effectively meet course goals.

This course will be primarily discussion and activity-based with minimal lectures as necessary. Morning sessions will consist of literature discussions or interactive activities. Afternoon sessions will consist of field collection, sample identification, or sample preparation and analysis.

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](http://uc.uiowa.edu/students/admitted-university-college-programs/academic-standards).