Course Description: An introduction to the principles of ecology at the organismal, population, community, and ecosystem levels. The course integrates lectures and field studies to examine factors controlling the distribution and abundance of plants and animals in native ecosystems. General topics include climate, microclimates, soil, aquatic environments, responses of organisms to environment, life history, population growth and regulation, demography, species interactions, community composition and structure, landscape ecology, trophic structure and productivity, and biogeochemical cycles. There is a strong emphasis on field ecology (what do ecologists do?), meaning that students will conduct many field research projects. These require collection, analysis, and the interpretation of data in short reports.

Pre-requisites: Two semesters of introductory biology or consent of the instructor.

Assignments:

Course Objectives:

- Introduce students to the process of conducting field research projects.
- Introduce students the collection, analysis, and interpretation, of field data.
- Introduce students to general topics in ecology including:
  - climate, microclimates, soil, aquatic environments
  - life history
  - population growth and regulation, demography
  - species interactions, community composition and structure
  - landscape ecology, trophic structure and productivity
  - biogeochemical cycles
  - behavioral ecology

Required Course Materials:

• Elements of Ecology by Smith and Smith is available in the ILL Library as are other ecology texts for your reference; purchase of a text is optional.
• Where the Wild Things Were is required book (not available in the library or for purchase at ILL)

**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. Students should bring a field pack, calculator, a spiral notebook, and at least one flash drive. Optional items (suggested but not necessary) include a camera, field guide, binoculars, a water bottle, and hip or chest waders.

**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.

**Papers:** Please consult sheet regarding cheating and plagiarism. If you have any questions, please do not hesitate to ask. The papers will be worth 100 points each. Papers will be graded for both content (90%) and grammar (10%). Instructions will be given out and explained about the proper format, and that format is to be followed strictly unless you have permission to deviate. For the most part, content grades are determined in how you analyze the data, how you present the data, the logic of your arguments, how you interpret the data, and the soundness of your reasoning. Use of supporting literature is also a factor. It is strongly suggested that you use the Internet to only find resources rather than use web pages as sources of information, but it may become more important at Lakeside. Existing books and journal articles already in the library support all of the projects. Web pages, in general, do not make good resources. There are exceptions, of course, and there are journal articles available on the web. Those are fine.

Independent work is a requirement. While you can work in a small group through the data analysis, you need to work independently during the writing and production of the paper. I will be glad to work with you through drafts of your paper and questions, but those conversations are not to be shared with your classmates (Example: If we decide during a conversation to use a certain graphing technique, you are not to share that information with a classmate. Let them come to the same conclusion on their own or with my help.)

One of the ways to learn how to write scientifically is to produce drafts and re-writes of your material. I will be glad to proof drafts of your material, but you need to do some work before you come to me with a draft. First, you need to edit your own work. I will expect to see your markings on the paper (questions, edits, marks where you re-write something, etc.). Second, because your grade is largely based on Results and Discussion, those sections or outlines of those sections are important. Third, I need adequate time to go over these with you before the paper is due. No drafts will be looked at in any depth within 24 hours of when the paper is due. Fourth, double-space the draft as well as the paper. Fifth, given the requirement to be able to write and edit your own work, I will not review more than 2 drafts of any one section.

Please note policy sheet regarding the necessity of making computer back-ups, as diskette or computer failure will not be an acceptable excuse for a late paper. Plagiarism or receiving outside help on the papers will be considered grounds for failure.

Discussion: There will be assigned readings. On the days that these are to be discussed, you will be expected to turn in a brief paragraph summarizing each reading. On discussion days, there will be no note taking in class
unless I note otherwise. All discussions will be taped and you can refer to the tape if you wish. You will be graded on discussion. If you do not contribute regularly in a significant fashion, your grade will drop. On the other hand, if you make frequent positive and interesting contributions, your grade will rise. There may be readings assigned that are not for discussion. For these, you are responsible to read and understand them. If you have questions, come back to talk to me individually.

The grade for discussion will be up to 50 points at midterm and 50 at the end of the course.

A = extends beyond understanding and application of the material, contributes regularly in a meaningful way.
B = good understanding and sometimes extends, contributes regularly
C = basic understanding with some contributions
D = few contributions and/or little understanding
F = no contributions


We will have two exams (midterm and final) each worth 100 points. We will also have various projects and worksheets that will be worth varying credits. It is strongly recommended that evenings and weekends be used, in part, to complete your work as we have only 4 weeks to accomplish a lot. We will also have the opportunity for graded projects, worksheets, and assignments as the term progresses. The exact point value will be determined at the time of the project.

Participation: I will give a 50 point participation grade at midterm and one at the end of the course. Participation involves punctuality, helping with projects, moving equipment, and general let’s have fun and get it done attitude.

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 following is a sample of topics and themes covered in one four week session. Not every year will be the same:

Lecture topics:

- History of Ecology
- Contrast with environmentalism
- Energy flow/ trophic levels of organization
- Biogeochemical cycling—carbon, phosphorous, nitrogen, oxygen, water, sulfur
• Food webs and ecosystem dynamics
• Levels of ecological organization
• Niche limits and dimensions
• Evolution and natural selection
• Population growth and dynamics
• Competition
• Niche evolution
• Predation
• Other species interactions, coevolutions, and symbioses
• Disturbance, fragmentation, edges and ecotones
• Habitat selection
• Territoriality and home range
• Foraging ecology
• Role of statistics and quantification in ecology/ objective vs. subjective reasoning
• Format of scientific papers
• Coloration in animals/mimicry, etc.
• Island biogeography
• Conservation biology: endangered species, biodiversity, habitat relations, genetic concerns, fragmentation of habitats, political pressures, land use issues, and species preservation issues.
• Pollination biology
• Seed dispersal
• Parasitoids
• Soil classification
• Tropical ecology
• Some topics of mating biology and social animals
• Secondary plant compounds

Scientific papers/worksheets:

1. morphological adaptations in lake and river fish
2. acclimatization to microclimates in sun and shade leaves
3. forest plant community comparisons with microclimates
4. life history tables

Other projects, worksheets, and concepts:

1) population growth of duckweed from different starting populations within different fertilizer concentrations---calculation of r for statistical comparisons
2) spatial dispersion of prairie plants and the use of grid systems for sampling
3) sediment loading of two drainages (comparisons of post and pre rain events and also between drainages of agricultural land and marshes
4) richness, evenness, and diversity of three fish communities
5) dispersion indices: Poisson, variance to mean ratio, goodness of fit, Morisita’s index
6) community similarity indices, importance values
7) mark-recapture indices
8) value of repeated sampling to reduce error
9) use of larger vs. smaller sample size and the role in experimental error
10) soil analyses
11) fish community sampling

**Statistical and analytical procedures:**

- Independent t-test
- Paired t-test
- One-way ANOVA
- Chi-square and goodness of fit tests
- Confidence intervals with z distribution
- Shannon diversity index
- Pielou’s index of evenness
- Species richness
- Lincoln-Peterson and Schnabel mark-recapture studies
- Daubenmire canopy coverage sampling for herbaceous plants
- Grid sampling
- Indices of dispersion (see above)
- Normal, Poisson, and Chi-square distributions

**Habitats visited and discussed:**

- Tallgrass prairie
- Des Moines Lobe glacial history
- Marsh
- Fen
- Western Loess Hills prairie

**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/](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).