

**BIO 321A
ECOLOGY
FALL 2013**

Instructor: Dr. Bill P. Stark

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Credit, 4 semester hours; Prerequisites, Biology 111-112 or equivalents.

Lecture Schedule: MWF 12-12:50 H 105; Lab Schedule: M 1:30-4:30, H 107

Course Description: "A study of the interactions of organisms and their environments."
Lecture three hours per week. Laboratory three hours per week."

Rationale for Course: An understanding of the basic principles of Ecology is essential for students in order that they might arrive at informed opinions on the complex environmental issues impinging on human life. The course provides background information and research skills needed for teaching, graduate study and professional school, and it satisfies requirements for an elective for Biology majors in the General Biology and Research Degree Tracks.

Learning Objectives: In this course we will examine the characteristics and interactions of natural populations and the characteristics of a model ecosystem, the freshwater stream.

1. Students will analyze a natural population with appropriate sampling methodology and basic statistics.
2. Students will describe and manipulate exponential and logistic growth curves.
3. Students will describe mating systems and life tables.
4. Students will describe the interactions of sympatric populations including predation, competition, mutualism and parasitism.
5. Students will describe the characteristics and biota of lotic ecosystems.
6. Students will develop testable hypotheses for at least one field study.
7. Students will conduct original research as part of a research team, and prepare posters suitable for presentation at professional scientific meetings.
8. Students will write scientific articles similar to journal articles published in the journal, Ecology.

Academic Integrity: Students are expected to be honest and to submit their own work on exams and research projects. The Mississippi College Honesty Policy will be followed.

Course Outline

- I. An Introduction to the Primary Ecological Literature.
- II. Properties of Populations (Chapters 7-10)
 - A. Density, sampling, and statistical analysis of data
 - B. Dispersion and dispersal
 - C. Life tables
 - D. Growth curves
 - E. Population fluctuation
 - F. Mate selection and mating systems
 - G. r- and K- selection
 - H. Life histories
- III. Interactions among Sympatric Populations (Chapters 11-14)
 - A. Predation strategies and prey defenses
 - B. Parasitoidism
 - C. Ectoparasitism
 - D. Parasitism
 - E. Social Parasitism
 - F. Mutualism and proto cooperation
 - G. Commensalism
 - H. Competition and resource partitioning
- IV. Communities and Ecosystems (Chapters 15-18)
 - A. Physical characteristics of lotic systems
 - B. Biotic components of lotic systems
 - C. Adaptations for current
 - D. Adaptations for respiration
 - E. Adaptations for osmoregulation
 - F. Trophic relationships and food webs
 - G. Nutrient cycling
 - H. Perturbations
 - I. Biotic and abiotic components of lentic systems
 - J. Species diversity
- V. Paleoecology and Geographic Ecology
 - A. Present ecoregions and biotic provinces
 - B. Continental drift
 - C. Glacial influences

Typical Field Studies: Topics selected for field studies may vary

- I. Population Attributes and Prey of the Green Lynx Spider (3 lab periods)
- II. Fecundity and Role of Maternal Guarding in the Green Lynx Spider (3 lab periods)
- III. Life History and Growth of a Stonefly (3 lab periods)
- IV. Diversity and Bio-monitoring of a Lotic Ecosystem (2 lab periods)
- V. Migration phenomena of the Monarch Butterfly
- VI. Attributes of an Aquatic Hemipteran Predatory Guild

Methods of Instruction: Presentations of illustrated lectures on course outline topics will be given and some class time will be devoted to problem solving for Topic II. The laboratory exercises consist of a series of field studies with the class acting as a research team for data collection. Each study will require two or more field days. Students will read background material presented, develop testable hypotheses, and design a suitable sampling strategy for the second field study.

Individualized Accommodation Plan: If you need special accommodations due to learning, physical, psychological or other disabilities, please contact the Student Counseling Services in Alumni Hall, Room 4. They may be reached by phone at 601 925-7791 or by email at mbryant@mc.edu or rward@mc.edu. If this applies to you it is imperative that you contact the counseling center immediately upon recognition of the disability, or if the disability is already diagnosed you should contact the SCS as soon as classes begin each semester.

Required Practices: Class data from field studies will be utilized by each student to prepare **individual** research papers written in the style of a recent paper **published in the journal Ecology**. Pay particular attention to the format and style of bibliographic citations. Students are expected to use BioAbstracts and other resources to find suitable literature references for each study. All papers should be prepared on a word processor. The first paper will be submitted as a first draft for review, and editing. The first manuscript will be returned to the authors for revision before it is submitted again and given a final grade.

Exam Schedule: Exam 1- September 20, 2013; Exam 2 – October 25, 2013; Exam 3 – During Final Exams.

Instructional Materials: Text- Ecology, Cain, Bowman & Hacker

Evaluation Methods: Three discussion style objective exams will be given with the last one given during the final exam period. **The average on these exams will comprise 60% of the course grade.** Three or four research projects based on class data collected during field exercises will be evaluated by the instructor. **The average on these papers will comprise 40% of the course grade.**

Final grades will be assigned based on this scale:

A= 90-100

B= 80-89

C= 70-79

D= 60-69

F= 0-59

Attendance and Make-up Policy: The Mississippi College attendance policy will be followed: “Any student will receive an F in a class immediately when absences, whether excused or unexcused, exceed 25% of the class meetings.’’

The student is responsible for work missed during an absence and for any MC emails received. Exams should be made up promptly, usually within one week after the student has returned. Field work missed cannot be made up, but it may be possible for a student to participate with another lab section.

Research projects should be submitted to the instructor by 5pm on the due date. Late papers will be penalized at the rate of 5% per day.

Tuition Refunds for Dropped Classes: Deadlines for dropped classes are published on the university calendar. At the end of the 2nd week of classes the refund level is reduced to 75%, the third week to 50%, 4th week to 25%. **Subsequently there is no refund.**

Some Important Dates:

September 2- Labor Day, no classes meet

October 7-8- Fall Break, no classes meet

October - Drop deadline, last day to drop a class

November 27-29- Thanksgiving, Classes meet Monday, November 25, and day classes meet on Tuesday, November 26

December 11 – Last day of classes, night exams begin

December 13-18 – Final Exam period

December 20 - Graduation