

# BIO 235 Ecology, Evolution and Genetics Laboratory

## FALL 2009

ALL LABS MEET IN SC 106 UNTIL OCTOBER BREAK  
ALL LABS MEET IN MB 22 AFTER OCTOBER BREAK

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<b>Instructor:</b>	Dr. John Cigliano	Dr. André Walther	Dr. Richard Kliman
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<b>Office Hours:</b>	T 11-12, W 10-11	T 11-12, WF 10-11	MW 3-4
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<b>Sections:</b>	Monday 1-4	Tuesday 8-11	Thursday 8-11, 1-4

**Prerequisites:** BIO 121 & 122, C- or better in lecture and lab

**Credits:** 1.0

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### Course Description:

The laboratory portion of BIO 235 will reinforce and expand upon lecture material in the areas of community ecology, assessment of abiotic and biotic factors on community structure, microevolution and evolutionary genetics, speciation, and phylogenetic tree building.

**Course Objectives:** You will participate in 4 semester research projects and will report your findings in several formats, including a scientific paper and an oral presentation. By the end of the semester, you will be able to:

- evaluate & use basic ecological research techniques.
- design & implement ecological studies.
- analyze & interpret data collected from such studies.
- design a hypothesis to test evolutionary mechanisms on a population, test it, and orally present the results
- use molecular data and tree-building software to reconstruct a phylogenetic tree
- maintain a professional field/lab notebook.
- write a scientific paper in a format suitable for publication in a professional scientific journal.

**Learning Outcomes/Assessment:** The following is a list of the learning outcomes for this course and how each will be assessed:

- **Outcome:** Students will develop critical thinking, scientific reasoning, and quantitative reasoning skills in the design, analysis, and interpretation of ecological and evolutionary studies. **Assessment:** Students will report the findings of their research in a written report, scientific paper, figure, and oral presentation.
- **Outcome:** Students will develop the ability to communicate clearly and effectively through the written word by reporting the results of their research. **Assessment:** Scientific research papers.
- **Outcome:** Students will develop the ability to communicate clearly and effectively orally by reporting the results of their research. **Assessment:** Oral presentation.

**Required Materials:** Bound notebook suitable for fieldwork, pen with waterproof ink or pencil.

**Class Attendance:** In accordance with the policy of the Department of Biological Sciences, regular attendance is **mandatory**, as well as arriving to lab on time. Your final grade will be reduced **10% (one full letter grade) for each missed lab**. If you must miss class for a Cedar Crest-sanctioned activity, provide appropriate proof in advance, using the official form available from Student Affairs; this should be done as soon as you are aware of the conflict. Otherwise, your absence will be considered unexcused. Unless your class schedule makes this impossible, you must arrange to attend another lab section. This may require you to travel on your own to the site, since the vans have a capacity of 14 students. Arrangements must be made with both your regular instructor and the instructor of the lab section you plan to attend.

If you must miss class for a legitimate, but unforeseen, reason, let us know as soon as possible; your absence will be considered unexcused until we receive notification from the Dean of Student Affairs that the absence was judged to be unavoidable due to serious illness/medical emergency or family emergency. *Please note that the Dean of Student Affairs only certifies that the absence was unavoidable and due to one of the above reasons. This is to maintain student confidentiality. It is solely up to the instructors to excuse an absence.*

**Class Correspondence and Handing in Assignments:** Recall that all communication regarding this course that is conducted by email must be done using your Cedar Crest College email account. Any assignments handed in electronically must be done so from a Cedar Crest College email account. Messages sent to course instructors from non-Cedar Crest College accounts will not be read or responded to, and assignments sent via non-Cedar Crest College accounts will not be accepted due to privacy issues.

**Late Assignments:** All assignments are due on or before their due dates at the scheduled lab time. The grades for an assignment turned in late will be lowered by **5 percentage points** of the original value for each day the assignment is late. No assignment will be accepted once it has been returned to the rest of the class.

**Overview of Assignments & Grading** – specific assignments will come with additional detailed instructions:

- Laboratory exercises will consist of both lab and field research projects. These projects are designed to introduce ecological and evolutionary techniques and concepts while answering specific research questions. Some weeks will be dedicated to data analysis or reading a paper from the primary literature.
- Written reports will be required for the first two research projects. Papers will follow the format of the journal *Ecology*. It is strongly suggested that you refer to the sections of *Written Report Format* to be handed out in class for instructions on the proper format for each. The first written assignment (Wildlands study) will include only title, name, affiliation, results, discussion, and literature cited. The second paper (Trexler Park Aquatics study) will consist of a complete scientific paper. Your research will be a group effort, each paper will be based on the same data, and you should work together on the analysis and interpretation of your data, but each student must write her own paper. For the two written assignments, you must (a) provide a hard copy to your instructor, and (b) email an electronic file (MS Word or PDF) to your instructor.
- An Oral presentation will be required for the third research project. Students will work in groups to design a population genetics hypothesis to test with the use of the *EvolGenius* v5.1 program. Students will have scheduled meetings with their laboratory instructor to discuss their projects, and will present their projects and results during the final week of lab.

A Figure and Figure Legend will be required for the fourth research project. Students will work with phylogenetic tree-building software to reconstruct a phylogeny. A figure of each tree and a legend with necessary tree-building information will be handed in by each student.

- Field/lab notebook. You will keep a field/lab notebook and will submit the notebook halfway through and at the end of the semester. **REFER TO THE NOTEBOOK GUIDELINES HANDOUT.**

**Grading:**

Assignment	Points
Wildlands Paper	100
Trexler Park Aquatics Paper	200
Population Genetics Project/Presentation	200
Phylogenetics Figure	75
Field/Lab Notebook	50
<b>Total</b>	<b>625</b>

**Extra-credit Policy:** No extra credit assignments will be given.

**Final Grade:** Final grades will be calculated as follows:

93.0-100%		90.0-92.9%	87.0-89.9%	83.0-86.9%	80.0-82.9%
A		A-	B+	B	B-
77.0-79.9%	73.0-76.9%	70.0-72.9%	67.0-69.9%	60.0-66.9%	<60.0%
C+	C	C-	D+	D	F

**Honor Code:** The instructors fully support the Cedar Crest College Honor Code and the Classroom Protocol Code as stated in the Student Handbook.

**Plagiarism:** Plagiarism is a serious offense. In academia, few offenses are considered more serious. As such, we fully support the College's policy on plagiarism. **Please see the Student Handbook for a definition of plagiarism and the College's policy on plagiarism.** The minimum penalty for plagiarism will be an F on the assignment; severe offenses may result in a grade of F in the course. Under certain situations, those who have committed plagiarism may be suspended or expelled from the College. All cases will be reported to the Provost.

Students who are enrolled in BIO 235 lecture are required to complete a plagiarism tutorial (Indiana University). If you are not taking the lecture this year, you must complete the tutorial and take the test; you must submit the signed confirmation certificate to one of the instructors by 28 September 2009. In the box, cross out "my academic advisor" and replace it with the names of your instructor where it states, "If I had questions after finishing the tutorial, this document confirms that I have sought help from my academic advisor..." The tutorial home page is <http://www.indiana.edu/~istd/>.

**College Accommodations Policy:** Students with documented disabilities who may need academic accommodations should discuss these needs with their professors during the first two weeks of class. Students with disabilities who wish to request accommodations should contact the Advising Center.

## Lab/Field Schedule

Week*	Study
Aug 24	Introduction / Dominant Vegetation Identification at the Wildlands Conservancy**
Aug 31	Wildlands Vegetation and Insect Surveys**
Sep 7	<i>NO LAB</i>
Sep 14	Wildlands Vegetation and Insect Surveys continued**
Sep 21	Paper Reading/Weather Day <b>Lab/Field Notebooks Due at the end of Lab (once data has been entered if it is a Weather Day)</b>
Sep 28	Biotic and Abiotic Factors of Stream Quality** <b>Wildlands Paper Due at the beginning of lab; electronic files due by 9:00 PM on the day of the lab</b>
Oct 5	Biotic and Abiotic Factors of Stream Quality**
Oct 12	<i>NO LAB</i>
Oct 19	Introduction to Population Genetics
Oct 26	Population Genetics Project Meetings
Nov 2	Phylogenetics and Systematics, Bioinformatics <b>Trexler Park Paper Due at the beginning of lab; electronic files due by 9:00 PM on the day of the lab</b>
Nov 9	Population Genetics Progress Meetings
Nov 16	Phylogenetics and Systematics, Phylogeny Reconstruction
Nov 23	<i>NO LAB</i>
Nov 30	<b><u>Population Genetics Project Presentations</u></b> <b>Phylogenetics and Systematics Assignment Due at the beginning of Lab</b> <b>Lab/Field Notebooks Due at the beginning of Lab</b>
<b>Final Exam Period</b>	If we have a snow day during the <b>Population Genetics Project Presentations</b> – the presentations will be given during the final exam period on a reserved day. <b>DO NOT</b> schedule travel plans before the completion of the final exam week. We will let you know the day that has been reserved, as soon as we know.

\* Note: dates may change to take into account weather conditions. We will announce any corresponding changes in due dates.

\*\* Outdoor labs, dress appropriately.