Biology 235 - Ecology, Evolution and Genetics
Fall 2009 - Lecture Syllabus

PROFESSOR INFORMATION

Lecture: Dr. Richard Kliman & Dr. John Cigliano

Professor	Office	Ext.	Email	Office Hours
Dr. Kliman	MB 24	3501	rmkliman@cedarcrest.edu	M 3-4, W 3-4
Dr. Cigliano	SC 119	3702	jaciglia@cedarcrest.edu	T 11-12, W 10-11

Optional Review Session: Monday 7-9 PM in SC 106 (*starting August 31*)

GENERAL COURSE INFORMATION

Course: Biology 235, Ecology, Evolution and Genetics; Fall 2009
Number of credits: 3 cr lecture and 1 cr lab (must be taken concurrently)
Prerequisites: Biology 121 and BIO 122 (lecture and lab), grades of C- or better
Required materials: (1) P.H. Raven et al., *Evolution*, *Diversity and Ecology* (*Biology*, Vol. 3), 8th ed., ISBN: 9780073337494. (2) R.M. Kliman, *Genetics Supplement to BIO 235*. (3) A non-programmable calculator for exams*. (4) A standard classroom "clicker" (sold at the bookstore).

*You will need to use a calculator on all four exams. You are only permitted to use a non-programmable calculator. The calculator cannot store information, and it cannot be part of another device (for example, a cell phone). You cannot share a calculator during an exam. *The first exam is scheduled for September 21*.

Outside readings: To be selected.
Course description (from catalog): This course covers material beyond the introductory level in the areas of ecology, evolution and classical genetics. Topics include population, community and ecosystem ecology; extensions of Mendelian genetics; microevolution and evolutionary genetics; speciation; and macroevolution. The associated lab includes a field component. Lecture three hours, laboratory three hours.
Format of course: Lecture (3 hours) and lab (3 hours)
Course objectives: The purpose of this course is to provide you with an opportunity to develop an understanding of ecology (the interactions of organisms with other organisms and abiotic components of the environment), evolution (the change of organisms over time) and genetics (the inheritance of traits). As you will learn, these areas are highly integrated.

COURSE OUTCOMES/ASSESSMENT

At the completion of the course, you will understand essential concepts of modern evolutionary, ecological and genetic theory and be able to effectively communicate this understanding. You will demonstrate critical thinking, quantitative reasoning and the ability to apply genetic theory. The instructors will monitor your progress in classroom discussions; the instructors will also evaluate your performance on formal exams related to the course material.

STUDENT ASSESSMENT/EVALUATION

Grading: The final course grade is based on percentage of points earned:

≥ 93% = A	≥ 90% = A-	≥ 87% = B+	≥ 83% = B	≥ 80% = B-
≥ 77% = C+	≥ 73% = C	≥ 70% = C-	≥ 67% = D+	≥ 60% = D

Lecture Exams 1, 2, 3, and Final Exam: 150 pts. each. The exams are not explicitly comprehensive, though understanding some material covered on a previous exam may be required to answer certain questions. The final exam will be taken during the scheduled final exam time.

Plagiarism Assignment: 50 pts. All students are required to take the plagiarism tutorial and test developed by Indiana University and to 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/.

Class Participation. This course will be concept based. To support the learning of these concepts, you will engage in group discussions and activities. Many of the discussions will be selected from the challenge questions at the end of each chapter. However, when appropriate, we will assign our own questions. Activities will consist of in-class, group mini-projects and discussions. PARTICIPATION BY EACH CLASS MEMBER IS EXPECTED. Some of these review questions and activities will be used as exam questions. No grade will be given for participation, but students who are actively engaged in classroom discussions will have their final grade rounded up if their grade is near or at the upper range of a grade (*e.g.*, 89/B+ changed to A-). Students who are not actively engaged *in all aspects of class participation* will not have their grades rounded up.

STUDENT RESPONSIBILITIES

Lecture attendance: Attendance in lecture is strongly recommended. Attendance on exam days is required.

- 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.
- 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.*

Policy on make-up exams: If we agree that you missed an exam for a legitimate reason, we will prepare a makeup exam if the exam has already been returned. You should expect the exam to be essay-format.

CEDAR CREST COLLEGE HONOR CODE (INCLUDING THE CLASSROOM PROTOCOL)

The Department of Biological Sciences fully supports the Cedar Crest College Honor Code. The Honor Code is explained in the Student Handbook; we recommend that you review it.

Disruptive behavior will not be tolerated. Any incidents will be noted and you will be penalized 1/3 of your final letter grade for each incident (e.g., B to a B-). Generally, disruptive behavior in the classroom is any behavior that interferes with the process of learning. At Cedar Crest College, it is the right of every student and faculty member to engage in a classroom experience free from disruptive behavior. What is disruptive to one person might not be disruptive to another, so the final authority on disruptive behavior is the faculty member. Faculty members have the authority to address disruptive behavior in the manner they see fit under the guidelines set forth in the College Catalog (please see the section on "Classroom Protocol").

Disruptive behavior may be viewed on a continuum ranging from the isolated incidents of mildly annoying or irritating behavior to more clearly disruptive, dangerous, and/or violent behavior. Examples of disruptive behavior may include (but are not limited to) the following:

- Persistent speaking without permission
- Use of electronic devices, cell phones, or pagers during class
- Threats or harassment of any kind
- Poor personal hygiene
- Revealing dress
- Working on homework for other classes
- Inappropriate personal disclosures during class (sharing too much information)
- Sleeping in class
- Entering class late or leaving early (without permission)
- Eating/drinking in class without permission
- Disputing authority and arguing with faculty and other students
- Physical disruptions or physical altercations

POLICY REGARDING LEARNING DISABILITIES

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.

LECTURE TOPICS

	Topic	Reading (before class!)
Topic 1	Science and Pseudoscience	What is Science? [pp. 01-13] http://undsci.berkeley.edu/article/0_0_0/whatisscience_01 Science, Evolution, and Creationism [pp. 10-12] http://www.nap.edu/catalog/11876.html
Topic 2	Physical Ecology	Raven et al., Chapter 58 Raven et al., Chapter 56 [p. 1170] Raven et al., Chapter 55.1
Topic 3	Biomes	Raven et al., Chapter 58
Topic 4	Biogeochemical Cycles/Energy Flow	Raven et al., Chapter 57.1-2
Topic 5	Mendelian Genetics	Genetics Supplement, Section I
	EXAM 1: Topics 1-5	
Topic 6	Genetic Linkage	Genetics Supplement, Section II
Topic 7	Hardy-Weinberg Equilibrium	Genetics Supplement, Section III
Topic 8	Departures from HWE	Genetics Supplement, Section IV
Topic 9	Other Genetic Equilibria	Genetics Supplement, Section V
Topic 10	Quantitative Genetics	Genetics Supplement, Section VI
	EXAM 2: Topics 6-10	
Topic 11	Population Dispersal, Dynamics & Demography	Raven et al., Chapter 55
Topic 12	Life Histories	Raven et al., Chapter 55
Topic 13	Population Growth	Raven et al., Chapter 55
Topic 14	Competition & Predation	Raven et al., Chapter 56
Topic 15	Other Interspecific Interactions	Raven et al., Chapter 56
	EXAM 3: Topics 11-15	
Topic 16	Ecosystem Ecology	Raven et al., Chapter 57.3-5; Myers et al., 2007
Topic 17	Natural Selection	Raven et al., Chapter 20; Anderson et al. 2009
Topic 18	Speciation/Extinction	Raven et al., Chapter 22; Forbes et al. 2009
Topic 19	Phylogeny	Raven et al., Chapter 23
	FINAL EXAM: Topics 16-19	

Your obligations for this course include attendance at the final exam, on the day and time scheduled by the Registrar's Office. You should not make travel arrangements until the final exam schedule is published; if you must make plans early, you should schedule your travel after the last final exam day.

OUR PHILOSOPHY REGARDING THIS COURSE

The material covered in this course is highly conceptual and will present a difficult, but ultimately rewarding, intellectual challenge. Having taught this material for many years, we are aware of the challenges, and have developed (and continue to develop) a variety of approaches that help motivated students achieve a high level of understanding. We want to see every student succeed, and would gladly assign a grade of 'A' to every student in the class if every student earned it. Many students have earned that grade in the previously offered sophomore-level "core" courses (including BIO 235). Unfortunately, many others have failed or withdrawn from a course after investing significant time and effort. We know no college professors who gain satisfaction from assigning a low grade to a student, especially one who is making a sincere effort. However, one of the duties of college professors is to assess your understanding and assign an appropriate grade. We believe it is well worth your time to carefully read the following paragraphs that describe our philosophy regarding the teaching of Ecology, Evolution and Genetics to college undergraduates.

1. **We will not teach an inadequate course.** We cannot, in good conscience, teach a course that will leave conscientious students at a disadvantage upon graduation. We know what is being taught in equivalent courses at many other colleges and universities. [We don't just know other ecologists, geneticists and evolutionary biologists; many of our good friends are ecologists, geneticists and evolutionary biologists!] You should expect a comparable course at Cedar Crest. You should be pleased to realize that we firmly believe you can handle this course if you apply yourself and if you enter the course with the proper preparation (see #4).
2. **We are not generally in favor of the "spoon-feeding" approach.** We will use the class lecture time to lay out the fundamentals and to go into detail on some of the subject matter. We will assume that you come to class having reviewed the related review questions and having read the related material in the textbook (ideally in this order). We expect you to be prepared to ask questions on concepts that require clarification. Unless we say otherwise, all material in the assigned readings is fair game on an exam. Expect to be tested on material that is not explicitly discussed in class.
3. **Exams are intended to assess your mastery of the subject material, not your familiarity with it.** You should be prepared to think and to work efficiently when you take an exam in this course. We do not award credit for nonsense answers that use terminology in ludicrous ways. Some students inevitably complain that a given exam is too long. This is probably true in one obvious sense: the exam is too long for the students who complain. However, the reason the exam seems too long is that the students are not truly prepared to take it. You should not expect to be able to do something on an exam that you could not do beforehand. If you are not comfortable with the material (and be honest with yourself), you will almost certainly have difficulty demonstrating mastery on an exam.

   There is a good deal of math in this course. Ecology, evolution, and genetics are among the most math-heavy areas of study in biology. You are being provided with many practice problems, and we expect you to do all of them. Some of these will be used in lecture, and you are expected to work on them before we discuss them in class.
4. **We assume that, having registered for the course, you are ready for it.** We expect that, having passed the prerequisites for the course, you have an adequate understanding of basic Mendelian genetics, as well as basic ecology and evolutionary biology. We also assume that you are able to handle the math. If you took a freshman biology course at another institution, you should familiarize yourself with the material covered in BIO 121/122 at Cedar Crest; syllabi can be found on the Biology Department web site.
5. **We assume that you are willing to accept personal responsibility for your success in the course.** If you are having difficulty with the course, you need to be proactive, not reactive. If you do poorly on the first exam, do not assume it was bad luck. You are encouraged to seek our advice at any time during the course, but the earlier you do this, the more likely we can help you develop an appropriate strategy.

Knowing that you must earn a particular grade in this course to maintain your GPA at a desired level, we expect that you will do what is necessary (and ethical) from Day One of the course to achieve your goal.

ANTICIPATED SCHEDULE (TOPICS AND INSTRUCTOR)

Monday	Wednesday	Friday
Aug 24 Intro/Safety Cigliano/Kliman	**Aug 26** Science & Pseudoscience Cigliano	**Aug 28** Physical Ecology Cigliano
Aug 31 Physical Ecology Cigliano	**Sep 2** Biomes Cigliano	**Sep 4** Biomes; Biogeochemical Cycles Cigliano
Sep 7 No class - Labor Day	**Sep 9** Biogeochemical Cycles/Energy Flow Cigliano	**Sep 11** Mendelian Genetics Kliman
Sep 14 Mendelian Genetics Kliman	**Sep 16** Mendelian Genetics Kliman	**Sep 18** Genetic Linkage Kliman
Sep 21 EXAM 1	**Sep 23** Genetic Linkage Kliman	**Sep 25** Hardy-Weinberg Equilibrium Kliman
Sep 28 Hardy-Weinberg Equilibrium Kliman	**Sep 30** Departures from HWE Kliman	**Oct 2** Other Genetic Equilibria Kliman
Oct 5 Other Genetic Equilibria Kliman	**Oct 7** Quantitative Genetics Kliman	**Oct 9** Quantitative Genetics Kliman
Oct 12 No class - Fall Break	**Oct 14** Dispersal, Dynamics &Demography Cigliano	**Oct 16** EXAM 2
Oct 19 Dispersal, Dynamics &Demography Cigliano	**Oct 21** Life Histories Cigliano	**Oct 23** No class - Inauguration
Oct 26 Life Histories Cigliano	**Oct 28** Population Growth Cigliano	**Oct 30** Population Growth Cigliano
Nov 2 Competition & Predation Cigliano	**Nov 4** Competition & Predation Cigliano	**Nov 6** Competition & Predation Cigliano
Nov 9 Other Interspecific Interactions Cigliano	**Nov 11** Other Interspecific Interactions Cigliano	**Nov 13** EXAM 3
Nov 16 Ecosystem Ecology Cigliano	**Nov 18** Ecosystem Ecology Cigliano	**Nov 20** Ecosystem Ecology Kliman
Nov 23 Natural Selection Kliman	**Nov 25** No Class - Thanksgiving	**Nov 27** No class - Thanksgiving
Nov 30 Natural Selection Kliman	**Dec 2** Speciation/Extinction Kliman	**Dec 4** Speciation/Extinction Kliman
Dec 7 Phylogeny Kliman	**Dec 8 (Friday Schedule)** Phylogeny Kliman	