

BIO310-001: Evolution Syllabus

Fall Semester 2012

Instructor:

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Class Meeting time:

TWF 8:30 PM - 9:20 PM. Room: Albertus Magnus 103

Required Text:

- Futuyma, D. *Evolution*. 2nd Edition. Sinauer Associates, Inc. MA. 2009.
- Simbio Virtual labs packet
- There will be additional assigned readings from the scientific literature.

Description:

This course is designed as an introduction to the most important principles and concepts of evolutionary theories. Ever since Darwin, the theory of Evolution has been the main unifying idea in Biology. It is natural selection that has made biological systems different from physical or chemical ones. The theory of evolution is, by far, the most important theory in biology. Topics include the rise of evolutionary biology, molecular and Mendelian genetics, the evidence for evolution, Natural Selection, molecular evolution, the analysis of adaptation and, macroevolutionary change, formation of new species, the fossil record, biogeography, and principles of classification. This course is intended for Biology majors and minors. Prerequisites: BIO 103-104.

This course intends to introduce students to the most important theories in evolution. Understand that evolutionary change has been the central and unifying feature of life. Biologists can study evolution at completely different levels, from the molecular and cellular level, to the population and community level. This course intends to contrast and understand the differences among Darwin's original Theory of Evolution by means of Natural Selection, to what is now known as the modern "Synthetic Theory of Evolution". To learn how fields like molecular genetics, paleontology, biogeography, and plate tectonics have increased our knowledge of evolution.

Lectures meet three times a week. Lecture information (prepared from textbook materials) will be a main source for quizzes. It will be very important to attend lectures, and to complete your text reading assignments in order to do your best in the course.

Attendance to lectures is expected. Students can miss three classes without penalty. For each absence after three absences, three (3) points will be subtracted from the final point total. Attendance to article discussion is **mandatory**. If two article discussions are missed without an extreme circumstance such as serious illness or family emergency, the student will receive an F for that portion of the grade.

Most of the lectures will be presented using **Microsoft PowerPoint**, and the slides presented in class will be available on the Sakai's page for the course (sakai.providence.edu). You may find it useful to view the presentation BEFORE class and even to print copies of the slides

that will be presented to facilitate your note taking and to study from after class. However, the powerpoint notes will not replace the assigned readings from the textbook, they are only to assist me on the lecture.

Office Hours:

I will be available Mondays and Fridays from 2 – 5PM, in my office (Sowa 221) or in my lab Hickey 174, and accessible by e-mail. Please email and make an appointment if you need to meet with me at a different time.

Grading Policy:

The grade for the course is based upon your combined performance on (see description below):

Quizzes	50%
Class Assignments	10%
Class Participation	10%
Final Research Presentations	20%
Article Discussions	10%

Quizzes: Quizzes including 5-6 questions related to the past lectures, to be completed at the end of each chapter. Readings for class materials (according to schedule) will be included on each quiz. Some of these quizzes will be completed individually; some in pairs and some will be take home quizzes.

Assignments: Different assignments based on material covered in class. They may be of different kinds. Some may involve working problems, or a computer lab. Others may involve writing a short essay, a chance to show what you know without the time pressure of a timed quiz. Some may be graded and others may receive credit just for completion.

Final Research Presentation: During the semester we will cover several chapters from our textbook and read articles from the scientific literature (i.e. Evolution of Sociality in wasps). We will study different theories (i.e. Hamilton’s Inclusive Fitness) and see how these theories apply through different examples where Evolution has an important role (i.e. paper wasps reproductive structure). The final presentation will focus on one of those themes from one of those chapters, applied to a specific animal or plant model. The student presentations will take place during the last two weeks in the semester, and should be no longer than 25 minutes per student (two presentations per class). More information about the specifics for the final project will be provided later in the semester. Please make an appointment with me if you want an early start on your project.

Article Discussions: About every other Friday, different articles from primary literature will be assigned. Articles will be discussed in class. Students will be randomly selected to make different groups and to present, critique or comment on different sections of the article selected and to involve the rest of the class to participate in the discussion. Participation in discussion will be considered as part of the Article Discussions grade and as part of your grade for class participation. A one-page critique of the article will be due **before** the class discussion starts, by dropping the critique into the corresponding dropbox of your course Sakai’s page. **Note: If you submit your critique but do not attend class, you’ll receive half the grade for this assignment. In order to ‘discuss’ the contents of the article, you need to be present.**

Lecture Schedule

Each chapter will be completed approximately one per week. Quizzes are per chapter; they will take place one class after each chapter is completed (i.e. if a chapter is completed on a Wednesday, the quiz will be following Friday). We might not be able to cover all the chapters listed on the schedule. We will cover as many chapters as possible.

Article Discussions will be every other Friday class, starting on September 16th. Topics and articles will be selected during the previous week and will be related to the materials for that week's chapter.

Please read the chapters **BEFORE** the relevant class, for two reasons. First, you will be able to discuss the material intelligently. Second, lecture material sometimes builds from the readings, and parts will be harder to understand if you haven't read the chapter.

Topic	Chapter (pages)
Introduction to Course	-
Evolutionary Biology.	Chp. 1 (1-14)
The Tree of Life: Classification and Phylogeny	Chp. 2 (17-42)
Patterns of Evolution	Chp. 3 (45-69)
Evolution in the Fossil Record	Chp. 4 (73-98)
The Geography of Evolution	Chp. 6 (133-157)
Species	Chp. 17 (445-467)
Speciation	Chp. 18 (471-497)
The Evolution of Life Histories	Chp. 14 (369-384)
Sex and Reproductive Success	Chp. 15 (387-409)
Conflict and Cooperation	Chp. 16 (413-440)
The Origin of Genetic Variation	Chp. 8 (187-211)
Variation	Chp. 9 (215-251)
Genetic Drift: Evolution at Random	Chp. 10 (255-275)
Natural Selection and Adaptation	Chp. 11 (279-300)
The Genetical Theory of Natural Selection	Chp. 12 (303-333)
Student Presentations	Last two weeks

Potential Journals to use for Article Discussions and for your Final Research Presentations:

American Journal of Science	American Museum of Natural History, Bulletin
American Naturalist	Annual Review of Ecology and Systematics
Annual Review of Genetics	Auk
BMC Journal of Evolutionary Biology	Cladistics
COPEIA	Conservation Biology
Current Opinion in Biotechnology	Evolution
Evolutionary Computation	Geology
Herpetologica	Journal of Evolutionary Biology
Journal of Heredity	Journal of Herpetology
Journal of Mammalian Evolution	Journal of Mammalogy
Journal of Molecular Evolution	Journal of Paleontology
Journal of Theoretical Biology	Molecular Biology and Evolution
Molecular Ecology	Molecular Phylogenetics and Evolution
Nature	Nature Bio/Technology
Oikos	Palaeogeography, Palaeoclimatology, Palaeoecology
Paleobiology	Proceedings of the National Academy of Sciences, USA
Proceedings of the Royal Society of London B Biol. Sci.	Quarterly Review of Biology
Science	Systematic Biology
Trends in Ecology & Evolution	

Academic Integrity

As a student at Providence College, you are expected to understand and follow standards of intellectual and academic integrity. The College and the professors in the Department of Biology assume that you will be honest and that you will submit only your own work. The faculty requires that you adhere to the level of honesty as outlined below and refrain from dishonorable or unethical behavior.

A. Plagiarism: Plagiarism is taking another person's work and calling it your own. Plagiarism includes any paraphrasing or summarizing of the works of another person without recognition, including the submitting of another student's work as your own. Plagiarism can involve a failure to reference a source of information in a paper or report the quotation of the paragraphs, sentences, or phrases written by someone else. Any information taken from the Internet without properly referencing the source (i.e., the URL) is considered plagiarism. You are responsible for understanding the rules of use for sources, the appropriate ways to reference sources, and the consequences of plagiarism.

B. Cheating on Quizzes: Cheating on quizzes involves giving or receiving help during the quiz. Examples of such help include the use of notes, computer based resources, books, or "crib sheets" during an examination (unless specifically approved by a faculty member), or sharing answers with another student during a quiz. Other examples include allowing another student to view your own quiz.

C. Unauthorized Collaboration: Submission for credit of a paper as your own work, which has been written in collaboration with another individual is not allowed. It is also a violation of academic honesty knowingly to provide such help. Collaborative work specifically authorized by a faculty member is allowed.

D. Multiple Submissions: It is a violation of academic honesty to submit the same or substantial portions of the same work for credit more than once unless the faculty member(s) to whom the material is submitted for additional credit allows it. In cases in which there is a progression of research in a lab or course, use of prior work may be allowed or required; however the student is responsible for indicating in writing that the new work is cumulative.

Penalties for failure to adhere to academic policy:

Quizzes: For the first offense, the student will receive a zero for the assignment. If a student aids another student during the quiz, both parties will receive a zero. For the second offense, the student will receive an F for the course.

As required by the Dean of Undergraduate Students, all offenses will be reported to the Dean. In addition, all offenses will be recorded in the Department of Biology for future reference. Providence College Policy on Academic Honesty: "Acts of academic dishonesty (plagiarism, collusion, cheating, etc.) are subject to an appropriate penalty. The grade of "F" may be assigned to students found guilty of such acts. The professor of the course in which the infraction occurred will inform the Office of the Dean of Undergraduate Studies of the offense and the action taken. Students who earn a failing grade may petition a review by the Academic Appeals Committee. In addition, the Dean of Undergraduate Studies may refer any case of academic dishonesty to the Office of the Vice President of Student Services, which will judge whether further penalties should be assessed. A second offense against academic honesty renders students liable to automatic dismissal from the college."