



Foundations of Biology: Ecology and Evolution

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Class Meeting Times: Tuesday & Thursday 10:00 – 11:25am

Class Meeting Location: Central King Building Room 303

Section: 003

Office Hours: Wednesday 10:30 – 12:00; Thursday 1:00 – 2:00pm

Course Description: *Why should you want to study Ecology and Evolution?* Ecology and evolutionary biology are fundamental to our understanding how life on earth functions. This course focuses on understanding the major principles in these fields and on how ecology and evolution affect *all* life on earth. Throughout the class we will use current examples to see how evolution and ecology affects our every day lives.

Course Outcomes:

By the end of this course, students are able to:

1. Design an experiment and use statistics to test whether there is a significant difference between two treatment groups.
2. Explain how biological variation is produced and maintained.
3. Explain the mechanisms that lead to evolution within a population and the formation of new species.
4. Analyze a phylogenetic tree, and explain how organisms are related to each other based on this tree.
5. Describe the basic series of events that occurred during the evolutionary history of life.
6. Explain and predict how a population will change in size over time.
7. Assess the importance of a given species interaction and hypothesize why it may have evolved.
8. Describe how energy flows through a community and explain how species influence community structure.
9. Predict how changes to biogeochemical processes may change ecosystems.
10. Describe how humans affect biodiversity and why biodiversity is important.
11. Outline how the environment affects species and species distribution.
12. Justify why the study of ecology and evolution is important to people.

Prerequisite: Concepts in Biology (BIOL 200)

Corequisite: Foundations of Ecology and Evolution Laboratory (BIOL 206)

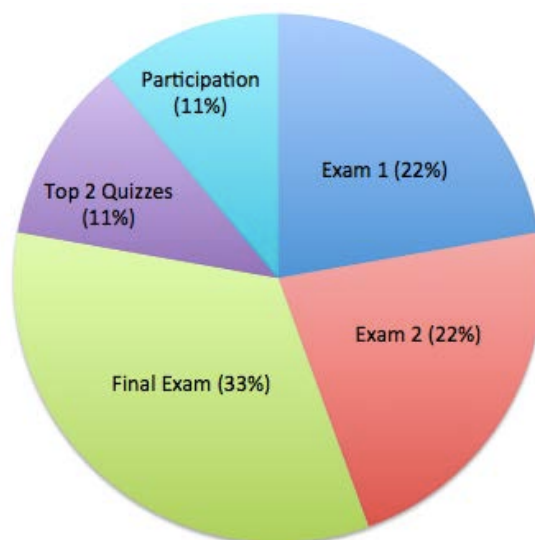
Required Materials:

1) *iClicker*. Since this class is large, I used iClickers to help check in and see how well everyone understands the material. There are a few options for what “type” of iClicker you can use in this class. You can use an iClicker 1, iClicker 2, iClicker +, or the REEF Polling (iClicker App).

2) *Textbook*. I have chosen a textbook that gives a good background on what we will cover in class. We will use this text as a starting point, and I will add in more material that has recently been published and other sources. The book is a custom book, this means that I have chosen only the chapters we use from a larger textbook, and the publisher has printed the text like that. That book is: CP NJIT BIO How Life Works & LP Access Card (ISBN: 1-4641-7316-8). This book can be purchased at the NJIT bookstore, and comes with a paper book as well as access to the online version of the text. However, there are also other options to attain the book. You can purchase an online version here: <http://www.macmillanhighered.com/launchpad/morris1e/1887044>. Or, you can purchase a non-custom version as well. The non-custom version that contains the same material is: Biology: How Life Works Volume 2 (ISBN-13: 978-1464104282)

Grading Policy: Grades will be determined by performance on exams, quizzes, and class participation. There will be three exams, the first two exams will be worth 100 points each, and the final exam will be worth 150 points. There will be three in-class quizzes that will be worth 25 points each and the lowest quiz grade will be dropped.

Grades	Points
Exam 1	100
Exam 2	100
Final Exam	150
Quizzes (25 pts each)	50
Class participation (iClickers, online quizzes, in-class work)	50
Total	450



Letter Grade	Total Number of Points	Percentage
A	405 – 450	90 – 100
B+	382.5 – 405	85 – 90
B	360 - 382.5	80 – 85
C+	337.5 – 360	75 – 80
C	292.5 – 337.5	65 – 75
D	225 – 292.5	50 – 65
F	0 – 225	0 – 50

Participation points: Participation is worth 50 out of 450 points. Participation points are earned by answering iClicker questions (some must be answered correctly, but not all), online moodle assignments, and by completing in-class assignments. To determine how many participation points you have, first figure out the total number of in-class participation points that were available, then calculate the percentage of these that you earned and multiply the result by 50. For instance, if by the end of the semester a total of 150 possible participation points were made available and you earned 125 of them, then you have 41.7 of the possible 50 in your final grade; $(125/150) * 50 = 41.7$ participation points. NOTE: There will be 3 to 7 iClicker questions per lecture. Bringing someone else's clicker to class is cheating. If you are caught clicking in for someone else, both people involved will lose ALL of their clicker points. I will post the grades for participation points three times during the year on: 10/5, 11/9, and 12/9. Each time I post them I will give you 5 extra points, allowing you to miss up to 3 classes (for excused or unexcused reasons) without losing any points.

Make up exams and quizzes: Make up exams will be possible with a doctor's or a dean's letter or with prior approval. If you do miss an exam, make sure to contact me within two days of the missed exam. Because there the lowest of your three quizzes gets dropped, you will not need to take a makeup quiz. Instead, your missed quiz will count as the dropped quiz.

Academic integrity: The university's academic integrity policy can be found here: <http://www.njit.edu/academics/pdf/academic-integrity-code.pdf>. This code will be enforced in this course. If you have any questions about this policy, please come and talk to me about it.

Moodle: We will be using Moodle for our class website (<https://moodle.njit.edu>). If you are a Rutgers student, you will need an NJIT UCID to get access to the site. If you do not already have one, you can request one at http://moodle.njit.edu/rutgers_students.php. Please be sure that you have gone into your profile and changed your preferred e-mail to an account you check regularly. You will automatically be assigned an NJIT e-mail address and this will be the default unless you change it.

TENTATIVE Schedule of topics

DATE	MEETING TOPIC	READING ASSIGNMENTS
T - 9/1	Course Introduction & Pretest	Syllabus
R - 9/3	Scientific Method, Statistics	Sections 1.1 - 1.3; Statistics Primer
R - 9/10	Statistics & Mini-Genetics Review	Online Genetics Primer
T - 9/15	Origin of Genetic Variation, Population Genetics	Sections 21.1 - 21.2
R - 9/17	Population Genetics Hardy Weinberg	Section 21.3
T - 9/22	Quiz 1; Natural Selection	Case Study 4 (Malaria); Section 21.4
R - 9/24	Mechanisms of Evolution: Natural Selection / Altruism	Section 21.4 Section 45.6
T - 9/29	Mechanisms of Evolution: Sexual Selection	Section 45.7
R - 10/1	Mechanisms of Evolution: Genetic Drift / Gene Flow	Section 21.5
T - 10/6	Exam 1	
R - 10/8	What is a Species? Allopatric Speciation	Section 21.6, 22.1, 22.2, 22.3
T - 10/13	Sympatric Speciation	Section 22.3 & 22.4
R - 10/15	Phylogeny	Sections 23.1 - 23.2
T - 10/20	Phylogeny	Sections 23.1 - 23.2
R - 10/22	Quiz 2; Phylogeny	
T - 10/27	History of Life on Earth	Sections 23.3 - 23.4
R - 10/29	Human Evolution	Sections 24.1 - 24.2
T - 11/3	Human Evolution	Sections 24.3 - 24.5
R - 11/5	Evolution of Human Skin Color - Case Study	
T - 11/10	Exam 2	
R - 11/12	Population Ecology	Sections 46.1 - 46.2
T - 11/17	Population Ecology	Sections 46.3
R - 11/19	Community Ecology	Sections 47.1 - 47.4; Case Study 8 (Biodiversity Hotspots)
T - 11/24	Quiz 3: Ecosystems	Sections 47.5, 47.6, 25.1, 25.2
R - 11/26	NO CLASS – THANKSGIVING BREAK	
T - 12/1	Ecosystems & Global Climate Change	Sections 26.3; 48.1 - 48.3
R - 12/3	Global Climate change	Sections 48.1 - 48.3
T - 12/8	Conservation Biology	Sections 48.4 - 48.5
R - 12/10	Disease Ecology	Online Reading
The Final Exam will be during Final Exam Week: Dec. 15 – 21.		