

Fundamentals of Evolution (11:216:251)

SYLLABUS

Instructors:

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Webpage: The course webpage is available by logging in at <http://onlinelearning.rutgers.edu/ecollege> (see separate handout on website use). The website will contain the lectures for review (uploaded AFTER class), the grade book where you can check your current grade, web resources for easier learning (podcasts, online videos, websites, etc.), downloadable documents, the current syllabus and schedule, and the dropbox for submission of the poster project and take-home assignments. MAKE SURE THE E-MAIL LISTED ON THE COURSE WEBSITE UNDER 'MY PROFILE' IS YOUR CURRENT E-MAIL, so you get all information and updates sent to your e-mail.

Course content: Evolution is the study of changes in living things through time. It is interconnected with all other branches of biology, and serves as the unifying force among them. It is impossible to understand the current life on Earth without understanding how life changed in the recent and distant past. It is also connected to scientific areas such as geology, climatology, environmental science, chemistry and statistics. This course will be a survey of evolutionary ideas, principles and applications, and will use examples from tiny microbes to giant mammals.

Learning goals:

- Understand and apply basic principles and concept in evolutionary biology: how organisms have changed and continue to change in response to the environment and other organisms, different mechanisms of evolution including natural selection, and the relationship between microevolution and macroevolution.
- Explain and be able to assess the relationship among assumptions, method, evidence, arguments and theory in evolutionary biology.
- Understand and being able to exemplify how evolution is an ongoing process that affects our everyday life.

Prerequisites: Two semesters of General Biology (01:119:101/102 or 01:119: 116/117) or equivalent. It will be very difficult to keep up with the pace of this course without already having a basic introduction to ecological and evolutionary concepts.

Course textbook: Evolution – Making Sense of Life, by Carl Zimmer and Douglas Emlen, 2012, Roberts & Company. Available as hardcover, paperback, ebook and iPad app on Amazon, Barnes & Noble, iTunes, and at the campus bookstore. Any edition of the book is acceptable, and be sure to check on the publisher website for any errata.

Evaluation and Grading: There will be three midterms and one poster presentation in the class. The third midterm will be given during the final exam period for W3F4 (TBA). While the third midterm is not explicitly cumulative, the topics covered later in the course build on those discussed earlier.

One take-home assignment must be handed in in class. Late assignments will not be accepted. Ten activities will be offered in class and require submission the same day during class. These in-class activities will be unannounced and will only be available to those in attendance.

<u>Course component</u>	<u>Grade points</u>
Exam 1	45
Exam 2	45
Exam 3	45
Evolutionary poster	45
Take home assignment, Tree-thinking	10
<u>In class assignments (10, worth 2 pts each)</u>	<u>20</u>
Total points	210

Poster project: About 20% of the course grade will come from the preparation and public presentation of a poster in the lobby of Foran Hall during the last class of the semester. The poster must address a concept, problem, or experiment in evolution that you wish to present, discuss, and share with the class and with the larger SEBS community. You need to research and then summarize the topic (all written in your own words!), and provide suitable references and illustrations to convey your topic to the audience. Feel free to discuss poster topic choice with the instructors before you start your research for the poster.

Some examples of topics: Sexual dimorphism in whales Island biogeography and Darwin's finches
 How did hummingbird-pollination evolve? Where did HIV come from? What is sexual selection?
 Did domestic dogs originate once or many times? Plant breeding, mutation, and artificial selection created broccoli
 Ear evolution in bats The evolution of tastebuds in humans The evolution of mimicry in butterflies

Format and Instructions: The file must be formatted as a print-ready large-format size poster in Powerpoint (one foot wide and three feet tall, 12" x 36", no exceptions!). You should submit this as a Microsoft PowerPoint file (.ppt) *AND* a portable document format (.pdf) file (see instructions below). Start with the PPT template available on the course website; it includes basic instructions on formatting and has the right size. Files in other formats or sizes will not be accepted. All facts should be referenced with original sources and images should include source and copyright information (see separate handouts).

Optional opportunity for draft review: In order to ensure that the poster assignments are on the right track, there is an opportunity to bring two printed versions of your rough draft (scaled to fit a regular piece of paper) for the instructors to review (see schedule).

Referencing and sources: Citations of sources and images **MUST** follow scientific standards (see separate handout). All instances of plagiarism or other academic integrity will be reported, so do not copy anything written by others and do not use copyrighted images without permission. (See Academic Integrity Policy at Rutgers for details and other handouts.)

Deadline and Submission of posters: Your final version of the poster must be submitted to the Dropbox on the course website as a properly sized PPT AND PDF before **11:59PM on the assigned date. Late submissions will not be accepted (and we mean it!).** We will have the posters printed for you at no cost, and you get to keep your poster after the class is over. A rubric will be provided to explain our poster grading. *Please note, you need to upload BOTH A PPT version and PDF version of your file.* When you create the pdf version from your file, make sure the final file includes your whole poster (select letter size paper and then Scale to Fit Size), so the whole poster fits on one regular page. We will use the PPT file to print your posters, the PDF file is used for plagiarism checking using turnitin.com. If you have a large file to upload, be very patient, since this sometimes takes a long time, and make sure you are on a fast internet connection if you try to upload large files. You can check if your poster files are properly uploaded by checking if they are in your OUTBOX in Dropbox. It is your responsibility to make sure the files have been properly uploaded.

Poster review: All posters will be reviewed by your peer students and you will provide written reviews of ca. 5 posters during our public poster session on May 1st. All faculty, staff, and students at the college will be invited to view your posters in the lobby of Foran Hall during the 1-day poster session. Peer

review and attendance at the poster session is mandatory. Peers will not grade posters, only provide constructive criticism as part of learning and evaluation.

Rutgers Academic Integrity Policy: You are personally responsible for adhering to the entire policy. This means, for example - DO NOT CHEAT, DO NOT COPY TEXT FROM THE INTERNET (= write everything in your own words), AND CITE SOURCES OF INFORMATION. Do not use any images from the internet or other sources unless you have specific permission or they are in the public domain (see handout on the course website). We report all instances of improper Student Conduct to the Student Conduct Office. We use turnitin.com to track plagiarism. See Doc Sharing for a copy of the Academic Integrity policy (<http://academicintegrity.rutgers.edu/>) and for a 1-page summary of it. This applies also to IMAGES used in the poster – *not only should they be cited properly you must have proper permission to use the image in a non-commercial presentation.*

Advice for efficient learning: Read each chapter before each lecture. Bring paper and pen to class, take copious notes. Ask questions, participate in discussions. Use learning resources such as quizzes, web resources (videos, interactive websites, etc. – available on the course website) and focus on understanding the big concepts and how they are connected, instead of focusing on tiny facts about specific species or case studies. If you are struggling, come to office hours, form a study group, ask us questions – look for help before exams rather than afterwards.

Not written in stone: This syllabus is not a contract. It is the planned course outline. Items may be added, subtracted, or changed at the discretion of the professors. The on-line version of the syllabus takes precedence over any printed copies.

Note: Texting/cellphone/smartphone/internet use is not permitted in the classroom during lectures, unless specifically permitted by the teacher for specific assignments. Laptops/tablets are permitted (but not at all required), but can only be used for activities that are relevant to this class (taking notes, hands-on projects, etc.). The lecturers might ask students that do not adhere to this policy to leave the classroom.

All bags and backpacks, cellphones, and coats will be stored at the front of the room for exams, away from where all students are sitting. No calculators are allowed during exam. If you are worried about potentially receiving an emergency phone call during an exam session, please give your cell phone to the instructors at the front of the room, and you will be allowed to come to the front of the room to take the call.

LECTURE TOPICS AND SCHEDULE

Course overview

What evolution is and what it isn't (chapter 1)

The history of evolutionary thought to Darwin (chapter 2)

Geology and the fossil record (chapter 3)

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Tree of life (chapter 4)

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Genetic variation (chapter 5)

DEADLINE: Take home assignment 'Tree-thinking' due in class.

Drift and selection (chapter 6)

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Genotypes and phenotypes (chapter 7)

Exam 1 (chapters 1-6)

Examples of natural selection (chapter 8)

Gene histories and phylogeny (chapter 9)

Adaptation (chapter 10)

Scientific communication: how to prepare a poster

SPRING BREAK

The evolution of sex (chapter 11)

Life histories and parental care (chapter 12)

Posters rough draft review (optional draft review)

Exam 2 (chapters 7-12)

The origin of species (chapter 13)

Macroevolution (chapter 14)

Coevolution (chapter 15)

DEADLINE: Posters due in course dropbox by 11:59PM.

Behavioral evolution (chapter 16)

Human Evolution (chapter 17)

Evolutionary medicine (chapter 18)

Household evolution

Poster presentation, mandatory attendance, Foran Hall lobby

Exam 3 (chapter 13-18), time and place TBA