

Instructor: Dr. Lisa Belden

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Office hours: Monday 1130am-130pm, or by appointment

Email: belden@vt.edu [please type "Evolution" in the subject so I know the message is class related]

Course prerequisites: Biol. 1105, 1106 (or equivalent)

Required text: Evolution: Making Sense of Life (2012) by Carl Zimmer and Douglas J. Emlen

For class, you can use either the textbook or the ipad app.

Other course materials: You will be able to download the lecture outline for each class from Scholar, under the Resources tab, prior to the lecture [access Scholar via <http://learn.vt.edu>]. I will post the outlines at least the day before the lecture (ie, Monday's lecture available Sunday night). It is your responsibility to print the outline and bring it to class so you can fill it in during lecture. All information on grading and other class policies is also posted on the course website- *you are responsible for all the information on the course website!*

What you should learn in this class:

CONCEPTS:

This course will provide an overview of the current field of evolutionary biology. By the end of this course you should have a basic understanding of the major topics in evolutionary biology, including: the theory of evolution by natural selection, the history of evolutionary thought, population genetics, sexual and kin selection, evolutionary trees/ phylogenies, how new species arise, and how scientists explain the origin of life on earth and human evolution. By "basic understanding", I mean that you should be able to explain the concepts correctly to your peers, even those with little or no scientific background. In addition, you should be able to see how evolution provides a framework for the broader field of biology and how evolutionary theory can be used to address some social issues.

SKILLS:

Read and interpret scientific figures/graphs

Distinguish primary scientific literature from secondary literature

Understand the structure of a scientific paper

Student evaluation:

EXAMS (~84% of your final grade)

Three midterms (100 pts each) and a comprehensive final exam (200 pts) will be used to evaluate your mastery of the concepts and skills taught in this course. That is a total of 500 points, which is approximately 84% of your final grade in this class.

You are responsible for all the information covered in lecture and assigned readings. The majority of information on exams will come from lectures, but I will also pull in important topics from the text and other readings that we may not have had time to cover in class. It is your responsibility to learn as much as you can in this course. If you are working very hard and still having problems, please come talk to me and we will discuss how you might be able to study more effectively.

Exam scores will be posted on Scholar as soon as they are available. If you think that an error has been made in grading your exam, you must come to my office hours and talk to me prior to the next exam. For example, I will only make changes to the assigned grades for midterm #1 until midterm #2. You need to review all material carefully and punctually.

IN-CLASS QUIZZES AND ADDITIONAL ASSIGNMENTS (~16% of your final grade)

There will be over 100 points worth of in-class quizzes/participation points and additional assignments this semester. Of these, a maximum of 95 will be counted toward your grade. We will be using i>clickers extensively in class (see information below). At the beginning of class, there will generally be a quiz question based on the prior lecture or assigned reading material. These quizzes will be worth 1 point for the correct answer and 0.5 points for any other answer (participation). Additional i>clicker

questions presented during lecture will be worth 0.5 points each (participation). No make-ups will be allowed for in-class points-- for any reason. Additional assignments are described in Scholar, along with due dates.

MISSING EXAMS AND ADDITIONAL ASSIGNMENTS

You must take exams and turn in the additional assignments as scheduled, unless you have an official excuse or a documented medical emergency. Make-up exams will likely be in an essay format. If you have more than 3 exams scheduled in your courses in a 24-hour period, you may reschedule provided you bring in your course syllabi showing the conflicts, or provide letters from your other instructors. This applies for mid-terms only. Requests to reschedule a final exam MUST be made through the Dean's Office. Please note that no in-class quizzes or participation points can be made up, regardless of the reason for missing class.

ASSIGNMENT OF FINAL GRADES

The following point cut-offs will be used to determine final grades: A \geq 535.50, B \geq 476.00, C \geq 416.50, D \geq 357.00, F $<$ 356.99. These cut-offs may be adjusted downward depending on class performance, but will not be adjusted upward. All individual grades (e.g. midterm 1, assignment 1) will be rounded to two decimal places before being entered in the final grade book for grade calculations, although they may not always appear this way in scholar.

i>clicker information and registration: You are required to purchase an i>clicker remote for in-class participation. The i-clicker, i-clicker+ or i-clicker2 can be used. They are available in the bookstore. i>clicker is a response system that allows you to respond to questions I pose during class, and you will be graded on that feedback and/or your in-class participation. To receive this credit, you will need to register your i>clicker online by January 28th. You must come to class at least once and vote on at least one question to complete this registration. Once you have voted on a question in my class, go to <http://www.iclicker.com/support/registeryourclicker/>. Complete the fields with your first name, last name, student ID, and remote ID. Your student ID is your 9-digit hokie passport number. The remote ID is the series of numbers and sometimes letters found on the bottom of the back of your i>clicker remote. i>clicker will be used every day in class, and you are responsible for bringing your remote daily. If you forget your remote, or miss class, you will not be able to make-up the in-class points.

Honor code: The University honor code is in effect for all exams and quizzes. Any attempt to give or receive information to/from another student on an exam or to use unauthorized material during an exam will be reported to the University Honor System. If you are having problems with the material or need help studying, please come and talk to me or start a study group with other class members. Sharing class information and helping each other learn is strongly encouraged at all times **except during exams and quizzes**. Please note that the use of another student's i>clicker during class is considered a violation of the honor code by both the student to whom the i>clicker is registered and by the student using it in class, and will be treated as such.

Evolution and religion: This is a science course. The content of the course is based on information currently accepted by the scientific community. This course is not designed to challenge your personal belief system in any way and you should not feel threatened by the information presented if it does not mesh with your system of beliefs. Regardless of your beliefs, you are responsible for learning the material presented in the course and for understanding why scientists have arrived at the conclusions they have in the field of evolutionary biology, even if you personally disagree with those conclusions.

Special Accommodation:

If you need any special accommodations in class, please contact me as soon as possible.

Honors credit:

If you are in the honors program and would like to receive honors credit for the course, please contact me as soon as possible.

TENTATIVE SYLLABUS

DATE	TOPIC	RELATED READINGS; specific required text pages will be assigned in lecture
23 Jan	Intro to the course, how science works	
25	Communication in science	Readings #1 and #2
28	Influenza: how scientists study evolution	Chapter 1
30	Influenza cont.	Chapter 1
1 Feb	History of evolutionary thought	Chapter 2, Reading #3
4	Introduction to phylogenies	Chapter 4 (p.83-91)
6	Raw material of evolution: mutation and genetic variation	Chapter 5
8	Population genetics 1: Hardy-Weinberg	Chapter 6
11	MIDTERM #1	
13	Population genetics 2: Genetic drift	Chapter 6
15	Population genetics 3: Natural selection	Chapter 6
18	Population genetics 4: Inbreeding and migration	Chapter 6
20	Current Topics: Crop selection and food resources	Reading #4
22	Current Topics: Crop selection and food resources, cont.	
25	Introduction to quantitative genetics	Chapter 7
27	In-class problem solving	
1 March	Studying natural selection in the wild	Chapter 8
4	Current topics: evolution and conservation	Reading #5
6	MIDTERM #2	
8	Mid semester review- what have we learned so far?	
9-17	SPRING BREAK	
18	Current topics: evolution and human/wildlife health	Chapter 18
20	Current topics: evolution and human/wildlife health, cont.	Chapter 18
22	Current topics: evolution and human/wildlife health, cont	Chapter 18
25	Studying adaptation	Reading #6
27	Challenges in studying adaptation	
29	Evolution of sexual reproduction	Chapter 11
1 April	Sexual selection	Chapter 11
3	Trade-offs in life history characteristics	Chapter 12
5	Co-evolution	Chapter 15
8	Social evolution: Kin selection, social behavior and altruism	Chapter 16
10	MIDTERM #3	
12	Whale evolution: how scientists study evolution	Chapter 1
15	Species and speciation	Chapter 13
17	Species and speciation, cont.	Chapter 13
19	Molecular phylogenetics	Chapter 9
22	Molecular evolution and genomics	Chapter 9
24	Origins of life on earth/Precambrian evolution	Chapter 3
26	Cambrian explosion	Chapter 3, Chapter 10
29	Patterns in macroevolution	Chapter 14
1 May	Human evolution	Chapter 17
3	Human evolution, cont.	Chapter 17
6	Current topics: Evolution of language	
8	Current topics: Evolution of language	
13 MAY	745-945am... yes, 745 AM.	

IMPORTANT DATES:

25 January	Assignment #1 due in class
28 January	i-clicker registration must be completed
~18-20 February	Assignment #2 online assessment must be completed
11 February	Midterm 1
13 February	Assignment #3 due date for full credit (5 points)
~27 Feb-1 March	Assignment #4 online assessment must be completed
27 February	Assignment #3 due date for partial credit (4 points)
6 March	Midterm 2
20 March	Assignment #3 due date for partial credit (2 points)
18 March-8 April	Assignment #5 handouts available--due 2 weeks after picked up
10 April	Midterm 3
13 May	Midterm 4 and Comprehensive Final exam

Additional readings (more may be added as we move through the semester):

Reading #1. Smith, G.J.D. et al. 2009. Origins and evolutionary genomics of the 2009 swine-origin H1N1 influenza A epidemic. *Nature* 459: 1122-25.

Reading #2. Zimmer, C. 2012. The Evolution of Bird Flu, and the Race to Keep Up. *New York Times*, June 25, 2012.

Reading #3. Darwin, C. 1859. "Introduction" from *On the Origin of Species*, p.27-30.

Reading #4. Diamond, J. 2002. Evolution, consequences and future of plant and animal domestication. *Nature* 418: 700-707.

Reading #5. Stockwell, C.A., A.P. Hendry and M.T. Kinnison. 2003. Contemporary evolution meets conservation biology. *Trends in Ecology and Evolution* 18: 94-101.

Reading #6. TBA