Bi 380 Evolution, Fall 2018
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This course emphasizes patterns and mechanisms of Darwinian evolution. Lectures will generally follow the text but will also include material not in the text. Discussion will generally cover assigned readings from the original literature. Grades are based on a mid-term (25%), discussion participation (25%) and a final exam (50%). Exams will cover material in lecture, from the text, and from discussion, and will be in multiple choice/short answer format. Lectures are in PowerPoint. Lectures for the coming week will be available on Canvas by midnight of the preceding Saturday. We suggest you print out two figures to a page, leaving the margins for taking notes.

Text: Douglas J. Futuyma, *Evolution*, 4th Edition

Week 1. Darwinian evolution & the tree of life (there will be Discussion this week)
Text: Ch 1-2

Week 2. Natural selection and adaptation
Text: Ch 3

Week 3. The origins of genetic variation
Text: Ch 4

Week 4. The genetical theory of evolution
Text Ch 5

Week 5. Monday: Mid-term exam covers weeks 1-4
Lecture: Phenotypic evolution
Text Ch. 6

Week 6. Genetic drift
Text: Ch 7

Week 7. Species and speciation
Text Ch. 9

Week 8.-Mon of Week 10. Biogeography, Macroevolution & Biodiversity
Text Ch. 18, Text pp. 529-542, Text Ch. 19

Week 10. Wed-Fri. The Evolution of Life in 100 minutes

"The power of scientific reasoning derives from the complex interplay between the desire to know, the ability to reason, and the ability to evaluate ideas with data. As scientist, we have learned how to make ideas dance with reality, and we expect them to be transformed in the process. We typically add to what we already know, often showing along the way that old ideas are incomplete or, occasionally, wrong. And so we collectively build an understanding of the world that is accurate, reliable, and useful."

Charles R. Marshall (2013) *Science* **341**:1344-1345.

Expectations: You have to be able to demonstrate mastery of the material and ability to integrate lecture, reading in the text and reading from discussion. Realize that lecture provides an introduction to the concepts and a lot of evolutionary flavor with some nutrition, whereas the text provides a lot of evolutionary nutrition with some flavor. You need to master both to do well in this course.

TRANSLATION: ATTENDING LECTURE AND DISCUSSION AND READING THE ASSIGNED MATERIAL ARE NOT, IN THEMSELVES, SUFFICIENT FOR A PASSING GRADE IN THIS COURSE.

What to know:

Be able to discuss and explain the basic concepts
Be able to define terms and explain their relevance to evolution
Be able to interpret figures and tables and discuss their relevance to evolution
Be able to integrate lecture, text and discussion

Hints to success:

1. Form a study group
2. Make up a term and concept list from
   a. the list at the end of each chapter
   b. terms given in bold in the text
   c. terms & concepts in italic or capitalized in the text
   d. terms and concepts introduced in lecture, discussion or reading from discussion
3. Understand the **concepts** behind figures and tables. Caveat: figures or tables you have not seen before, but should be able to interpret, may appear on exams.
4. A former student (A+ in this course) says that terms & concepts that appear in both discussion and the text, repeatedly in the text, or repeatedly in lecture are particularly important and likely to appear on tests.

MID-TERM: Monday of week 5, covers material through week 4,
FINAL: comprehensive, covers material through all 10 weeks.
If you want your **FINAL EXAM RETURNED TO YOU,** bring a stamped, self-addressed envelope to the final exam.

Learning outcomes: My goals for this course is to extend your General Biology background in basic evolution, emphasizing perspectives of current evolutionary thought, sources of genetic variation that form the grist for the evolutionary mill, and adding "flavor" to lecture and discussion that expands the text with illustrated examples from microbes, plants, and animals. Science needs to be rigorous, but science is a part of life and life ought also to be enjoyable so I also seek to convey my joy and excitement for research and for being an evolutionary biologist.

Course-specific goals for students in this class include and ability to understand and articulate:

1. Darwin, Mendel & the modern synthesis.
2. The tree of life
3. How natural selection works and what constitutes adaptation
4. The genetic basis of evolution.
5. The concept of species, how populations diverge to become new species, and how speciation is the origin of biodiversity.
6. The principals and examples illustrating phenotypic evolution and adaptation
7. There is more to evolution than natural selection, response to selection, & adaptation
8. Geographical variation and the generation of variation as well as similarity
9. Evolution above the species level: macroevolution in space and time
10. Diversity of life on Earth

More general goals for students in the class are increased ability

1. To gain experience in quantitative thinking
2. To evaluate critically graphical and quantitative data
3. To take a stand and defend it!