

BIOL 3020: Evolution, Spring 2014

Professor: Dr. Jennifer Cooper
Office: N256
Office hours: Wednesday 10-12
Friday 11-12
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"Nothing in biology makes sense except in light of evolution." -- Theodosius Dobzhansky (1973), geneticist & zoologist

The quotation above is one that is known to every biologist. Evolution is **the** central and unifying principle of modern biology and is an experimental, observational, mathematical and correlative science. In this course we will explore major concepts, hypotheses, experiments and case studies to understand and investigate mechanisms of evolutionary change (e.g., natural & sexual selection, mutation, recombination, genetic drift, gene flow).

COURSE REQUIREMENTS

Satisfies G.E. area F1. Students must have a Junior standing to take this course.

Biology Majors: Note this class does not fulfill your undergraduate G.E. requirement, and if your catalog year is 2009 or more recent, it will not count as a Biology elective. Consult with your advisor to make sure you should be in this course.

An integral goal of this course is your continued development of critical thinking skills. Lectures, videos and reading your text will guide you in the development of these skills. **I will assume you have read the associated material listed in the schedule prior to coming to class and I may call on you to answer questions and participate in discussions.** The rigors of this course demand regular attendance, commitment and concentration to the readings and lectures.

REQUIRED TEXTS/MATERIALS

- *The Tangled Bank: An Introduction to Evolution*, 2nd edition, by Carl Zimmer. I will not be making PowerPoint lectures available for student download.
- Iclicker

CENSUS DATE

Students must attend **all** of the first three class sessions or they will be dropped from the course.

This course can be taken for a letter grade, or it can be taken on a credit/no credit basis. Students can only drop this course prior to the census date of February 21. Before the census date they can change their grading option without my permission, but after the census date it requires my signature on the "Registration Options" form to do so. I am willing to sign this form up to the last class meeting (May 16).

GRADING PROCEDURE

Blackboard quizzes	150	
Iclicker	100	
NOVA video summary	50	
Poster presentation	100	
Total	400 points	No +/- grading will be applied to your final grade.

PERSONAL INTEGRITY

It is assumed that you have read and understood the university's position on academic integrity and student discipline. Students are expected to conduct themselves responsibly and will treat instructors, their fellow students, the facilities, and course materials with courtesy and respect. Inappropriate behavior (including, but not limited to, cheating and/or plagiarism) will be dealt with as severely as university and state regulations allow.

Turn your cell phones to vibrate when you arrive each day, and **do not text in class. It is rude.**

Use of laptops to take notes is forbidden; take notes by hand. I will not be making PowerPoint lectures available for student download. You are responsible for taking notes during lecture.

BLACKBOARD QUIZZES

There will be a quiz over each general topic, for a total of 10 quizzes. Quizzes will be timed (~30 minutes), and will typically consist of ~15 multiple choice or true/false questions. Questions can come from lecture, BB items, and in-class videos listed for that week.

i>CLICKER

Questions and quizzes will be given during lecture using the i>Clicker system. i>Clicker is a response system that allows you to respond to questions posed during class. We will start using this system by Wednesday, February 7, and to receive credit for your responses you must register the i>Clicker at <http://www.iclicker.com> by that date. When you register your i>Clicker, use the name *exactly* shown on your university identification card and the serial number on the back of your i>Clicker unit. **If you forget to bring your remote to class, or if the remote malfunctions, then you will not receive credit for responses that day.** Questions may come from current or previous material.

NOVA VIDEO SUMMARY

There is a link to the NOVA special "What Darwin Never Knew" posted on the Blackboard site for this course. This is a 2-hour special aired in 2011, and it is very entertaining. It should help you understand much of the material we discuss in this course. I suggest that you watch it in the first week or two of the semester, and then return to it again at the end of the semester with a more in-depth understanding of the topic that you have gained through your work in the course. You must write a summary of the topics discussed in the video (3-5 pages, 12 pt font, double spaced). A written transcript of the narration within the NOVA special is provided on the PBS site, directly below the video itself. You may refer to this transcript when you are writing the summary, but avoid plagiarism. **Every sentence within your summary must be in your own words. Plagiarism is very easy to detect using Google and specialized software, and if I detect plagiarism in your work I will regretfully give you an F in the course.**

POSTER PRESENTATION (GROUP ASSIGNMENT)

Each student in the class will select a topic relating directly to evolution, from a list of available topics provided by the instructor. All students who have chosen the same topic will work together to search for material on this topic, and create a **single** poster to present as a group at the end of semester Poster Session. Poster presentations are common at scientific conferences, because they allow for a personalized interaction between the presenter and the individual audience members, as conference attendees walk through the poster session browsing the selections. Posters have the added advantage of being less intimidating to present, since the audience has something to read and the presenter can mainly clarify points and field questions.

It is easy to use Microsoft PowerPoint to prepare a poster presentation, simply by adding components (text boxes, images) to a single slide. You must format the slide as a custom size and indicate how large a print you want your final poster to be. **Your poster must be a minimum of 36 x 48 inches in size.** It must be printed on a large format printer at a professional printing service (Kinko's, Staples, etc). You can also contact ASI on campus, as their Marketing Department also prints posters, and their color printing service is often **much cheaper** than off-campus. However, their turn-around time may be longer. Although I provide some rough guidelines for pricing below, talk to your print shop ahead of time to find out at what size they print posters, cost, and how long it takes.

- The main goal of a poster is to relate the main points of your topic with as little effort as possible on the part of the audience to read, interpret, and understand. Only present the main points.
- Use a suitable font size (can be read from about four feet away).
- Sections should have appropriate labels.
- Include a Title, and the list of student authors.
- Graphics are required (figures, special equations, photos).
- Include a short list of the sources you used (the Ebstein *et al* paper, OMIM, NCBI, Center for Evolutionary Psychology, new media).
- Present as clearly as possible, and used bulleted lists instead of paragraphs when you can.
- Use graphics to explain sections when possible.
- **Do NOT plagiarize sources. Re-write everything in your own words.**

Although I will allow you to use reputable online sources, I expect you to also review some articles from the scientific literature on your chosen topic. To find an article:

- Go to the CSU Stanislaus library website (link on University homepage).
- Click "Articles" tab.
- Down at the bottom, click "Databases by title."
- Choose "Biological Abstracts."
- Search on a combination of keywords to find an article. Include the keyword "review" to find articles that include a broad discussion from many sources regarding your topic.
- Once you have located the abstract, click the "FIND IT!" link to access the full-text PDF.

USEFUL WEBSITES ON POSTER PRESENTATION

Purrington, C. 2007. Advice on designing scientific posters.

<<http://www.swarthmore.edu/NatSci/cpurrin1/posteradvice.htm>>.

Stoss, F. 2008. Designing Effective Poster Presentations by The University of Buffalo's Art And Sciences Libraries.

<<http://ublib.buffalo.edu/libraries/asl/guides/bio/posters.html>>.

PRINTING YOUR POSTER

ASI/USU Marketing Services (on campus) (209) 667-3815

<http://www.csustan.edu/asi-usu/pages/MarketingServices.php>

FedEx Kinkos www.kinkos.com (800) 463---3339 1451 Geer Rd, Turlock, CA 2225 Plaza Pkwy # C11, Modesto, CA

Services:

Black and white or full color, several paper types, online print orders

Time to print:

Approximately 2 hours for black and white, 24 hours for color. Send your file by e---mail and it will be ready for pick up when you arrive.

Cost:

30" x 36" Color \$58, B&W \$6

Staples (209) 632---2209 1850 Countryside Dr, Turlock, CA

Services:

Black and white or full color, several paper types, online print orders and mail delivery

Time to print:

2---3 hours for color, black and white 1 hour

Cost:

36" x 48" Color \$84, B&W 7

24" x 36" Color \$45, B&W \$4

STUDENT LEARNING OBJECTIVES:

1. Students will be able to distinguish between different processes that lead to evolutionary change in organisms (i.e., natural selection, mutation, recombination, gene flow, genetic drift, sexual selection).
2. Students will be able to communicate examples of evidence for evolution from genetics, biogeography, paleontology, comparative anatomy, biochemistry, molecular biology & physical anthropology.
3. Students will be able to construct an historical timeline of people, places & events that shaped understanding & development of the modern theory of evolution & its processes.
4. Students will be able to demonstrate knowledge of relationships between evolution & biological diversity through scientific understanding of common ancestors & phylogenetic relationships of fossils & living organisms (i.e., “tree thinking”) and speciation events.
5. Students will have enhanced understanding of the peer-reviewed literature in science, its decentralized, cumulative, self-correcting, & hypothesis-testing features, & be able to distinguish it from pseudoscience, such as “creation science” & intelligent design.

Week	Lectures	Text	Homework
1/27 - 1/31	Introducing Evolution	Ch 1	In-class video: Understanding Evolution BB video: How do we know evolution happens?
2/3 - 2/7	History of Evolutionary Biology	Ch 2	BB module: Science and Faith
2/10 - 2/14	Geology, Paleontology, History of Life	Ch 3	In-class video: Great Transformations BB module: What Killed the Dinosaurs?
2/17 - 2/21	Phylogenetics	Ch 4	BB module: Who’s Who in Human Evolution
2/24 - 2/28	Genes and Mutations	Ch 5	BB video: Epigenetics
3/3 - 3/7	Genetic Drift and Natural Selection	Ch 6	BB video: How does evolution really work?
3/10 - 3/14	Molecular Evolution	Ch 7	
3/17 - 3/21	Adaptation	Ch 8	BB Poll: Is Intelligent Life Inevitable?
3/24 - 3/28	Sex, Sexual Selection and Family	Ch 9	In-class video: Why Sex? BB article: The Evolution of Motherhood
3/31 – 4/4	March 31: Cesar Chavez Day, NO CLASS Speciation	Ch 10	BB video: Evolution in Action: Salamanders
4/7 - 4/11	Macroevolution	Ch 11	
4/14 - 4/18	Co-Evolution	Ch 12	In-class video: Evolutionary Arms Race
4/21 - 4/25	SPRING BREAK		
4/28 - 5/2	Evolution of Behavior	Ch 13	BB article: The Nurture of Nature
5/5 - 5/9	Human Evolution	Ch 14	BB video: Did humans evolve? BB Poll: Babies by Design
5/12 - 5/16	Evolutionary Medicine	Ch 15	Guest lecture: “Pharmacogenetics”
5/22	Poster session 11:15 a.m.-1:15 p.m. in the regular classroom		