BIOL 4400: EVOLUTION, SPRING 2018

Professor:	Dr. Jennifer Cooper	Office:	N256
Office hours:	M 9-11 am	Email:	jcooper3@csustan.edu
	Th 2-3 pm	Write BIOL 4400 in the subject line of all emails	
Tutor:	Britiel Bethishou, Tutoring Center		

"*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 and sexual selection, mutation, recombination, genetic drift, gene flow).

PREREQUISITES
BIOL 3350 (Introductory Genetics) with a grade of C- or better.
Because Introductory Genetics is a pre-requisite for this class, you are expected to be very familiar with the concepts and facts presented therein. My lectures and exam questions will add to this foundational knowledge. I strongly suggest that you spend the first week of class reviewing BIOL 3350 material, even if you took recently.

COURSE REQUIREMENTS
An integral goal of this course is your continued development of critical thinking, written and verbal communication, and quantitative reasoning. Lectures, assignments and videos will guide you in the development of these skills. The rigors of this course demand regular attendance, commitment and hard work on the readings and assignments. **If you are not willing to devote 15 hours a week outside the classroom to this course, you should reconsider your enrollment.**

REQUIRED TEXTS/MATERIALS
Evolution, by D.J. Futuyma, 4th ed. ISBN: 978-1-60535-696-9
Use of a laptop to take lecture notes is forbidden…take notes by hand. I will **not** be making PowerPoint lectures available for student download. You are welcome to voice record my lecture.

CENSUS DATE
Students must attend the first 3 class sessions or they will be dropped from the course.
This course cannot be taken for credit. It can only be taken for a letter grade. Students can only drop this course prior to the census date of February 21.

GRADING

In-class exams	
Exam 1	175 points
Exam 2	225 points
Exam 3	250 points
Study group activities:	
Article summaries (2, 50 points each)	100 points
Homework assignments (2, 50 points each)	100 points
Poster (participation 50 pts, presentation 100 pts)	150 points
Total	1000 points

No +/- grading will be applied to your final grade.

EXAMS

The exams will be given in a mixed format (multiple choice, short answer/essay, graph interpretation). Exams 2 and 3 will assume deep understanding of material from earlier exams. I do not recycle exam questions. **Do not make the mistake of underestimating the difficulty of exams.** As you progress through the course, your study skills and work ethic will likely improve, which is why I have allotted an increasing number of points to be earned through each exam.

Students who arrive after the first exam of the day has been turned in will not be allowed to take the exam, and will receive a zero grade for the exam. If you must leave the room for personal reasons, you will not be allowed to finish the in-class exam. If you plan to miss an exam for any reason, you must take an alternate exam before the in-class exam is scheduled. If you miss an exam unexpectedly, you must provide documentation of a legitimate reason for doing so; otherwise, you will not be allowed to take the alternate exam, and you will receive a zero grade for the missed exam.

STUDY GROUPS

You will be assigned to a study group at the beginning of the semester. Study groups will consist of 4 students. You will work very closely with your study group members throughout the semester… you will sit as a group in lecture, and you will work as a team to write article summaries, perform data analysis homework assignments, and create a scientific poster. Part of your grade is dependent on your teamwork, thus every group member must do their share of the work! To ensure that each group member is contributing, I will be using online submission platforms and co-authorship grading (see the relevant sections below). **You will also evaluate your group members at the end of the semester.**

ARTICLE SUMMARIES (SUBMITTED VIA TURN-IT-IN ON BB)

I will post PDFs of the articles on the course BlackBoard site (Documents & Content page) several days before the assignment is due.

1. Each group member will read the entire article, and think deeply about how the hypotheses are being tested, the analytical approaches, and the emerging conclusions. Each member will take responsibility for writing a summary of one of the sections within the article (Introduction, Materials and Methods, Results, Discussion) **in their own words**, for a total of 1 single-spaced page. **Include all article headers and sub-headers in your summary (these should be identical to the original article, and will not count as plagiarism).**

2. You will post this draft summary on to BlackBoard at least 48 hours before the assignment due date, using the Wiki specific to your assigned study group. Other group members will also post their section summaries to the assignment wiki, placing their text above or below yours to maintain the order found within the original article. Include your name in bold font above your section, so it is easy for me to give you credit for your work. **Once your rough draft is posted, do not modify it in any way.** Incomplete drafts will receive only partial credit.

3. All group members will then use the COMMENT button below to provide **very explicit instructions** on how their partners can improve their draft summary, **focusing on conceptual and analytical aspects (not just editorial aspects**). You must offer at least 1 substantive conceptual/analytical comment to receive full credit. "Substantive" means you write an explanation which clearly demonstrates to me your deep understanding of an evolutionary concept, or an analytical approach used in the article. It helps if you also write a few sentences which your group member can cut and paste within their own summary, to improve their draft. You must offer a novel comment; do not reiterate suggestions made by another group member. These comments are due 24 hours before the assignment due date.

4. The group member who wrote the Introduction section will then submit the complete, final draft via TurnItIn on BB. This link will appear on the BlackBoard Assignments page 24 hours before the final due date.

You can earn a maximum of 40 points for your summarized section, and 10 points for your commentary. There are 2 article summary assignments, so the total points you can earn sums to 100. Your two summaries must include either an Introduction or a Discussion, and either a Materials/Methods or a Results. Late submissions will have 20% deducted for each day the assignment is overdue.

HOMEWORK EXERCISES (SUBMITTED VIA TURN-IT-IN ON BB)

The 4th edition Futuyma textbook has a set of end-of-chapter questions sets associated with it, which I may assign as homework (see textbook link on Blackboard). Alternatively, I may write a set of new questions for some assignments. Each assignment will consist of 4 questions.

1. Each group member will read the entire homework assignment, and think deeply about all the questions and how they should be answered. Each member will take responsibility for answering one of the questions **in their own words**, for a minimum of 1/2 single-spaced page. **Your answer should be extensive, thoughtful, and include novel examples.** Students who search the scientific literature for supporting examples and materials typically earn more points (but you must cite your sources).

2. You will post this draft answer on to BlackBoard at least 48 hours before the assignment due date, using the Wiki specific to your assigned study group. Other group members will also post their section summaries to the assignment wiki, placing their text above or below yours to maintain the order of questions. Include your name in bold font above your section, so it is easy for me to give you credit for your work. **Once your rough draft is posted, do not modify it in any way.** Incomplete drafts will receive only partial credit.

3. All group members will then use the COMMENT button below to provide **very explicit instructions** on how their partners can improve their draft answer, **focusing on conceptual and analytical aspects (not just editorial aspects**). You must offer at least 1 substantive conceptual/analytical comment to receive full credit. "Substantive" means you write an explanation which clearly demonstrates to me your deep understanding of an evolutionary concept. It helps if you also write a few sentences which your group member can cut and paste within their own answer, to improve their draft. You must offer a novel comment; do not reiterate suggestions made by another group member. These comments are due 24 hours before the assignment due date.

4. The group member who answer Question #1 will then submit the complete, final draft via TurnItIn on BB. This link will appear on the BlackBoard Assignments page 24 hours before the final due date.

PLAGIARISM

Be very careful to avoid plagiarism on article summaries and homework assignments, because the TurnItIn software is very good at detecting even a single plagiarized sentence. You may be tempted to lift phrases directly out of the article, or use wording lifted directly from my slides…resist this temptation, because such phrases are highlighted by the software, and **if there are more than a few phrases (6-8 words in a row) used verbatim within a single summary, I will award every group member 0 points for the assignment (group members will not be penalized if they warned the section author about specific examples of plagiarism in the draft summary).**

POSTER PRESENTATION

Poster presentations will be created using the Wiki specific to your assigned study group. Each study group will select a topic relevant to evolutionary biology, and perform a small literature review which includes **exactly** 4 recent (no older than 2000) primary literature articles. Each student will focus on reading one of the 4 articles, become intimately familiar with the work, and incorporate the most important aspects of the article within the larger, conceptual poster. The poster will be presented in the Poster Session (during the Final Exam period).

Participation points (50) can only be earned by documenting your contributions on Blackboard:

1. Each group member chooses an article to summarize.
2. Each group member creates a new wiki page for their poster contribution, titled like "Poster, Betsy Ross,".
3. Group members will post their article summary on their wiki (see schedule for due date), and other group members will use the "Comments" tab to make suggestions and revisions.
4. More lengthy discussions can be documented on the group's Discussion Board (use the Board only for the poster project, please…don't use it for homework assignments, etc.).
5. To earn full points, a group member must:
    a. post their own work on their own wiki
    b. make constructive comments regarding **every other** group member's work on member wikis
    c. discuss the formatting, organization, and printing of the poster on the Discussion Board

Any contributions which are documented in other ways (texting, Google Docs, etc.) won't be considered for credit.
To find primary literature articles relevant for your topic:

- Go to the CSU Stanislaus library website (link on University homepage).
- Choose "Find Books and Articles", then choose "Databases A-Z", then choose "Biological Abstracts." You will be taken to the Web of Science hub.
- Search on a combination of terms to find articles about the topic your group finds most interesting. Read the abstracts, and choose the article that the entire group feels is interesting and understandable.
- Click the "FIND IT!" link to access the full-text PDF. **Email me the 4 article PDFs for my approval; a single email with your group name in the subject line is desirable.**

Use Microsoft PowerPoint to prepare the poster presentation, by adding components (text boxes, images) to a single slide. You must format the slide as a custom size, with the minimum dimensions of (36" wide X 32" tall). I have posted a couple of **example posters** on Blackboard for you to use as a guideline for formatting and level of scientific rigor.

Currently, the best place to get your poster printed is Staples or Office Max, but you should call around and comparison shop. A color print job should cost ~$40. Talk to the print shop ahead of time to find out how long it will take, and build this into your preparation schedule. **If the print shop makes a mistake, it is their responsibility to print a second perfect copy for free.**

- 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.
- Use a suitable font size (can be read from about four feet away).
- Include a Title and a list of student presenters on the poster, and a Literature Cited section can be a separate letter-sized sheet pinned next to your poster.
- Graphics are required (figures, special equations, photos). Graphics should be high resolution, and should convey the most important ideas in the poster. Don't add images just for "pizzazz".
- Clearly explain the ideas with short, concise sentence fragments. **Use bullet points with informative but brief sentence fragments, instead of paragraphs!**
- For each figure, use an explanatory caption. You can outline each figures with a colored box, and outline the relevant paragraph/list in the Results or Discussion with the same color…this will help readers associate figures with text.
- Specific facts, data or images taken from the 4 articles must be cited within the poster text, using APA format.

STUDENT LEARNING OBJECTIVES:

1. Students will be able to distinguish between different processes (with evidence and examples of these 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 the relevance of evolution to health, agriculture, forensic science, conservation, human origins, & even thoughtful consumerism.
3. Students will be able to communicate examples of evidence for evolution from genetics, biogeography, paleontology, comparative anatomy, biochemistry, molecular biology & physical anthropology.
4. 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.
5. 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.
6. 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.

PERSONAL BEHAVIOR

It is assumed that you have read and understood the university's position on academic integrity and student discipline. Inappropriate behavior (including, but not limited to, cheating and/or plagiarism) will be dealt with as severely as university and state regulations allow. **This includes receiving an F in the course, and being reported to University Judicial Affairs.**

Do not text in my class. It is rude. Believe it or not, I can see you. I may ask you to leave.

TUTORING ON CAMPUS

Free tutoring services are available to assist you in most disciplines, including in biology!
Library 112; Phone (209) 667-3642; Web http://www.csustan.edu/Tutoring
The tutor for BIOL 4400 in Spring 2018 is Britiel Bethishou.

CAMPUS COUNSELING SERVICES

Overwhelmed by the stress of juggling classes and your home life? Our campus offers excellent counseling services to help support you!
Library 185; Phone (209) 667-3381; Web http://www.csustan.edu/Counseling

STUDENT HEALTH CENTER

You have already paid for access to health care on campus. Services include: birth control, flu shots, immunizations, pharmacy, check-ups, HIV testing, TB tests, and doctor's notes for when you are sick!
Phone (209) 667-3396; Web http://healthcenter.csustan.edu

Week of	Lecture topic	Reading	Assignments
1/26	Introduction		
1/29 - 2/2	Natural Selection & Adaptation	Ch 3	Begin using the Study Recipe
2/5 – 2/9	Mutation and Variation	Ch 4	
2/12 – 2/16	Phenotypic Evolution **EXAM 1 on Friday**	Ch 6	
2/19 – 2/23	Genetic Drift	Ch 7	***CENSUS DATE 2/21*** Join a group by 2/22
2/26 – 3/2	Evolution in Space: Gene Flow The Geography of Evolution	Ch 8 Ch 18	Article summary 1 due 3/2
3/5 – 3/9	Species and Speciation	Ch 9	
3/12 – 3/16	All About Sex	Ch 10	Homework 1 due 3/16
3/19 – 3/23	How To Be Fit	Ch 11	
3/26 – 3/30	**EXAM 2 on Monday** Cooperation and Conflict **3/30 CESAR CHAVEZ DAY NO CLASS**	Ch 12	Poster topic sign up 3/26 Article summary 2 due 3/30
4/2 – 4/6	**SPRING BREAK ENJOY YOUR HOLIDAY!**		
4/9 – 4/13	Interactions among Species Evolution of Genes and Genomes	Ch 13 Ch 14	Poster PDFs due 4/9
4/16 – 4/20	Evolution and Development	Ch 15	Poster article summary due 4/16
4/23 – 4/27	The Tree of Life	Ch 2	Homework 2 due 4/27
4/30 – 5/4	Phylogeny	Ch 16	
5/7 – 5/11	The History of Life Macroevolution	Ch 17 Ch 20	In-office poster rough draft review by 5/11
5/14 – 5/16	**EXAM 3 on Wednesday**		
5/23	**POSTER SESSION 11:15 am-1:15 pm**		