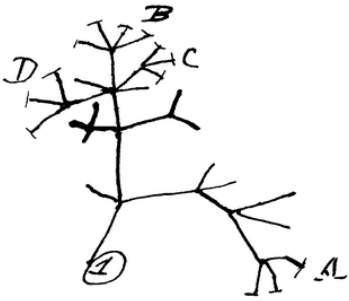


I think



Instructor information

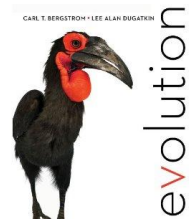
Dr. Ross A. McCauley
Office: 447 Berndt Hall
Office phone: 970-247-7338
E-mail: mccauley_r@fortlewis.edu
Webpage: http://faculty.fortlewis.edu/mccauley_r/index.html
Office hours: MWF 10:10 a.m. -12:20 p.m. and by appointment

Course information

Meeting time and place: MWF 12:20-1:15 pm, Berndt Hall 310

Required text:

Bergstrom, C. T. and L. A. Dugatkin. 2012. Evolution. W. W. Norton & Company, New York.



Course Website: <http://moodle.fortlewis.edu>

All readings and pertinent lecture material will be posted on Moodle. Some assignments and datasets will also be made available here as well.

Prerequisite: BIO 260 (Genetics)

Course Description

Evolution is recognized as providing an underlying foundation for all other branches of biology. Thus a full understanding of modern biological science requires an understanding of the basic principles of evolution. The goal of this course is to examine the basic evolutionary processes at scales ranging from the molecular to the ecological and understand the patterns resulting from these processes. This course will draw on and use information you have learned in other biology classes and should allow you to make connections between things learned in your other courses. Unlike some other courses the goal of this course is not the accumulation of facts regarding a biological group or specific set of information. The study of evolution tends to be more conceptual than most other areas of biology and thus we will focus on these conceptual aspects of the field. It is not the goal of this course to learn everything about evolution – the topic is much too large. Rather we will work as scientists to think in a more evolutionary context.

Course Evaluation

Grades will be determined roughly according to the following percentages:

Exams (2 @ 100 pts. each)	45%
Phylogeny construction	10%
Peer Teaching	20%
Other (Assignments, Class participation)	25%

Exams: We will have two exams during the semester, a midterm and a final. Both of these will be take home exams in which you will have to examine data, read original research papers and consult outside literature to fully answer the problems. You will have approximately one week to complete each of the exams.

Assignments: There will be various small assignments during the semester which could vary from performing a genetic simulation to taking “quizzes” to generating a phylogeny.

Peer Teaching:

Your single largest assignment will be the preparation of a lecture of approximately 50 min on an advanced topic in evolutionary biology. My goal with this assignment is to allow you to go further into depth with a topic than is typically available with a short class presentation and to allow you to develop your public speaking and abilities to explain complex

topics, all of which are essential for a professional scientist. You will prepare a lecture on one of the topics below. You need to start thinking of what topic would interest you and we will distribute the topics by the end of the fourth week. Once you have your topic you will begin preparing your lecture. The one requirement regarding content for the lecture is that you must present original data in support of the topic. You may make one article available before time for the class to read to initiate a discussion. Otherwise you may lecture from slides, include video clips etc. to fully present the topic.

I will want you to work closely with me as you develop your lecture so I can comment on the methods used and level of detail. You will need to meet with me one week before your scheduled lecture to look over your presentation and make suggestions or assist you with technical issues. Following the lecture you will need to make available to me a copy of your presentation for posting on Moodle for access by the entire class.

Peer Teaching Topics (in no particular order)

- Origin of complex traits (eg. the eye)
- Co-evolution of genes and culture
- Co-evolution as a driver of evolutionary diversity (eg. Angiosperms and Insects)
- Disease as a result of evolutionary mismatch
- Endosymbiosis
- Horizontal gene transfer
- Sexual selection
- Adaptive Radiation
- Neutral Theory
- Evolution and conservation planning
- Heterochrony (ex. Axolotl)
- Homeotic Genes
- The species problem
- Modes of speciation
- Mass extinctions
- Phyletic gradualism vs. punctuated equilibrium
- Sex (costs and benefits)
- Burgess Shale and the Cambrian Explosion
- Evolution of virulence (eg. The 1918 flu)
- Host shifts and the evolution of disease
- Cryptic speciation
- Mobile genetic elements
- Evolutionary tradeoffs

Other Course policies

Academic Integrity:

The Biology Department upholds College policy on Academic Integrity. Therefore, students who commit acts of academic dishonesty (a.k.a. cheating, copying, plagiarizing):

1) on homework or other less major assignments, will receive a ZERO on the assignment in question, and will be reported to Academic Affairs.

2) on exams, major papers or reports will earn a ZERO and be automatically removed from the COURSE, and will be reported to Academic Affairs.

Any student who accumulates two reported incidents of dishonesty with the Academic Affairs office will have a formal hearing with the Academic Standards Committee and faces academic dismissal from the College.

Attendance:

While I do not take a daily role, regular attendance is expected – particularly if you want to do well. If you know you are going to miss class please let me know beforehand. If your absence results in your missing an exam, you can make up an exam within 5 days of the original exam date ONLY in the case of a legitimate absence. If you miss an exam for a legitimate reason and are unable to make up the exam within 5 days the score on the final exam will be substituted for the missed exam score. Legitimate absences will include any absence with a letter documenting that absence from the appropriate college official, be a documented medical excuse, or be a documented religious observance. If you miss for an illegitimate reason then you will receive a zero for that particular exam.

Classroom conduct:

While I hope it goes without saying, please respect the rights of myself and your fellow classmates. If you are late try not to disturb everyone else. Additionally please leave mobile phones, pagers, iPods, etc. at home or turn them off and keep them stowed during class. I will not allow texting or checking of messages on any electronic device during class time. If this becomes a problem you will be asked to forfeit your device. Such activity is not only very disrespectful both to me and your fellow students but also interferes with your ability to learn.

Add/Drop policy:

The last day to add the class is census date, January 28. Prior to this date you may drop the course at anytime with no grade being recorded. College policy states that not attending the first two class meetings will result in automatic disenrollment.

The last day to withdraw from FLC classes with a grade of "CW" (course withdrawal) is 4 pm Friday, March 7, 2014. This is a college-wide deadline that is not negotiable.

To withdraw from this course, go to the Registrar's Office, Room 160, Miller Student Services Building before the course withdrawal deadline. They will help you through the process. You do not need my signature on the course withdrawal request form.

Starting Fall 2013, students have a life-time limit of three individual course withdrawals from FLC courses. If you have withdrawn from classes before Fall 2013, these will not count towards your lifetime limit. Also, withdrawing entirely from a semester (all classes) does not count against your lifetime "CW" limit. Semester withdrawal is handled under a different policy and procedure. Please refer to the Academic Policies section of the Fort Lewis College Catalog of Courses for more information about course and semester withdrawal policies and procedures.

Accommodations:

Students with disabilities who require reasonable accommodations to fully participate in course activities or meet course requirements must register with the Disability Services Office. If you qualify for services through the Disability office, bring your letter of accommodations to me as soon as possible so I can make the appropriate arrangements. Letters are available through Dian Jenkins, Coordinator of Disability Services, 280 Noble Hall, 247-7459.

Tentative Schedule

This schedule is very much like DNA. It is subject to additions, deletions, and rearrangements. Changes will be announced in class and posted on Moodle.

Wk	Date	Topics/Readings/Assignments
Part I: Evolution Fundamentals		
1	Jan. 13/15/17	<p>M: Introduction: What is Evolution?</p> <ul style="list-style-type: none"> • B & D Chap. 1 • Dobzhansky, T. 1973. Nothing in Biology makes sense except in the light of evolution. <i>American Biology Teacher</i> 35: 125-129. • Homework: “Measure of Acceptance of the Theory of Evolution” <p>W: Evolutionary theory and the general public</p> <ul style="list-style-type: none"> • Miller, J. D., et al. 2006. Public acceptance of evolution. <i>Science</i> 313: 765-766. <p>F: A <u>brief</u> history of evolutionary thought</p> <ul style="list-style-type: none"> • B & D Chap. 2
2	Jan. 20/22/24	<p>M: Natural Selection and Adaptations – Basic concepts</p> <ul style="list-style-type: none"> • Homework: “Conceptual inventory of Natural Selection” • B & D Chap. 3 • Darwin, C. R. 1859. <i>On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for life.</i> John Murray, London. (Available on-line at http://darwin-online.org.uk/) Chap. 1 & 2 (skim only) <p>W, F: Natural selection in Legos (My son will lend us his Legos – believe me, this is a big deal)</p>
3	Jan. 27/29/31	<p>M, W: Ultimate and proximate causes of variation and adaptation – a contemporary example</p> <ul style="list-style-type: none"> • Hoekstra, H. E. 2011. From Darwin to DNA: The genetic basis of color adaptations. pp. 277-295 in <i>In the Light of Evolution: Essays from the Laboratory and Field</i>, Losos, J. (ed). Roberts and Company Publishers, Greenwood Village, Colorado. <p>F: Phylogeny and Evolutionary History – Reading and using trees</p> <ul style="list-style-type: none"> • B & D Chap. 4 <p>For more help interpreting phylogenetic trees see also:</p> <ul style="list-style-type: none"> • Gregory, T. R. 2008. Understanding evolutionary trees. <i>Evolution: Education and Outreach</i> 1: 121-137. • Meikle, W. E. & E. C. Scott. 2010. Why are there still monkeys? <i>Evolution: Education and Outreach</i> 3: 573-575.
4	Feb. 3/5/7	<p>M: No Class: Dr. M. at a meeting in Denver</p> <p>W: Inferring phylogeny – Methods</p> <ul style="list-style-type: none"> • B & D Chap. 5 <p>F: Practice with parsimony</p> <p style="text-align: right;">Complete Peer Teaching Topic Assignments (Friday)</p>
5	Feb. 10/12/14	<p>M, W: Molecular phylogenetics – Evolution of the plant kingdom exercise</p> <ul style="list-style-type: none"> • Homework: Generation of a phylogenetic hypothesis based on gene-sequence data using MEGA <p>F: No Class – Happy Valentine’s Day!</p>
6	Feb. 17/19/21	<p>M, W: Presentation of student phylogenies</p> <p>F: Review of transmission genetics and sources of variation</p> <ul style="list-style-type: none"> • B & D Chap. 6
7	Feb. 24/26/28	<p>M, W: Population genetics</p> <ul style="list-style-type: none"> • B & D Chap. 7

		F: Evolution of Finite populations <ul style="list-style-type: none"> • B & D Chap. 8 • Homework: Simulation of Genetic Drift (http://www.biology.arizona.edu/evolution/act/drift/drift.html)
8	Mar. 3/5/7	
		Open lectures (videos, student initiated discussions, etc) Midterm Exam – Give Monday – Return Friday
		Part II: Advanced Evolutionary Concepts and Applications
9	Mar. 10/12/14	
		M: Review of midterm <ul style="list-style-type: none"> • Peer teaching presentations
10	Mar. 17/19/21	
		<ul style="list-style-type: none"> • Peer teaching presentations
Spring Break!!		
12	Mar. 31 Apr. 2/4	
		<ul style="list-style-type: none"> • Peer teaching presentations
13	Apr. 7/9/11	
		<ul style="list-style-type: none"> • Peer teaching presentations
14	Apr. 14/16/18	
		<ul style="list-style-type: none"> • Peer teaching presentations
15	Apr. 21/23/25	
		<ul style="list-style-type: none"> • Peer teaching presentations
16	Mon. Apr. 28	Final Exam 9:45 – 11:45 a.m Meet to turn in final exam