

**PCB 4683: Evolutionary Biology**  
Summer 2014  
M-F 1500 - 1650 h in Engineering 2, Rm. 102

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**Catalog description:** PCB 4683 COS-BIOL 4(4,0)

Evolutionary Biology: PR: A grade of "C" (2.0) or better in PCB 3044 and PCB 3063 or C.I.  
Demographic and genetic structure of populations and their relationship to speciation, adaptation, and macroevolutionary processes in plants and animals. Fall, Spring.

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**Course overview:** This course introduces major topics of population genetics and evolutionary biology. The approach emphasizes basic principles and theory rather than descriptive science. Principles of ecology and genetics will be considered as the foundation underlying all aspects of evolutionary biology. Concepts in selection, adaptation, speciation, classification and macroevolution will be considered. The importance of evolutionary concepts to all facets of biology will be stressed, with special emphasis on the explanatory power of evolution in all facets of biology.

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### Course objectives

- Understand the principles of population genetics, including selection, genetic drift, linkage, and gene flow
- Understand the mechanisms of adaptation, speciation, and diversification
- Understand the relevance of evolutionary biology to human society, particularly human health issues
- Develop quantitative reasoning skills

**Prerequisites:** A grade of C (or better) in undergraduate genetics and ecology courses. A sound understanding of ecology and genetics is crucial to your success in this class.

**Required text:** Futuyma, D. J. 2013. Evolution, 3<sup>rd</sup> edition. Sinauer Associates, Sunderland, MA. ISBN 978-1-60535-115-5. Other recently published textbooks are viable substitutes.

**Office hours:** T-TH, 1700-1800 h, or at another mutually convenient time. Please e-mail 1-2 d in advance so I can schedule time for you. Graduate students and others also see me during office hours and everyone benefits when I maintain an organized schedule – your time is valuable, let's use it efficiently.



[http://www.statesymbolsusa.org/Pennsylvania/Fossil\\_Trilobite.html](http://www.statesymbolsusa.org/Pennsylvania/Fossil_Trilobite.html)

**Schedule**

<b>Date</b>	<b>Topic</b>	<b>Readings</b>
23 JUN	<b>EXAM I: Pre-test</b>	
24 JUN	Course logistics Why evolution is important	
25 JUN	Theories of evolution Evolution in the fossil record & historical evolution	Chapters 1, 4 & 5
26 JUN	Evolution of biodiversity & the great extinctions	Chapter 7
27 JUN	Patterns of evolution & allometry	Chapter 3
30 JUN	Classification & cladistics	Pages 19-49
01 JUL	Biogeography & phylogeography	Chapter 6
02 JUL	<i>Review Session</i>	
03 JUL	<b>EXAM II</b>	
07 JUL	Origins of genetic variation	Chapter 8
08 JUL	Variation	Chapter 9
09 JUL	Basics of ecological & population genetics	Pages 217-228 & 239-247
10 JUL	Inbreeding & linkage disequilibrium	Pages 229-239
11 JUL	Genetic drift	Chapter 10
14 JUL	Natural selection & adaptation	Chapter 11
15 JUL	<i>Review Session</i>	
16 JUL	<b>EXAM III</b>	
17 JUL	Genetic theory of natural selection	Chapter 12
18 JUL	Phenotypic & life history evolution	Chapters 13 & 14
21 JUL	Sex and reproductive success; conflict and cooperation	Chapters 15 & 16
22 JUL	Species & speciation	Chapters 17 & 18
23 JUL	<i>Review Session</i>	
24 JUL	<b>EXAM IV</b>	
25 JUL	Evolution of species interactions	Chapter 19
28 JUL	Evolution of genes, genomes & development	Chapters 20 & 21
29 JUL	Macroevolution	Chapter 22
30 JUL	Evolution & society	Chapter 23
31 JUL	<i>Review Session</i>	
01 AUG	<b>EXAM V – Final Exam, 1500-1650 h</b>	

**Attendance:** I will not monitor attendance but past results show that students who actively participate in my courses do much better than those who don't.

**Assessment:** Your final grade will be determined by your performance on the five exams, as follows:

Exam I (Pre-test)	5%
Exam II	15%
Exam III	20%
Exam IV	25%
Exam V (Final exam)	35%

All exams are closed book and cumulative. They will include diverse questions on all aspects of the course, including lecture material, readings, and activities. Exams will be challenging and will require you to apply evolutionary concepts to new situations, to evaluate data, and to design incisive hypothesis tests.

**Make-up exams:** All exams are cumulative, so if an acceptable absence forces you to miss an exam, its weight will be added to the final exam. Acceptable absences are limited to major illness, serious family emergencies, special curricular or professional requirements (e.g., attending a scientific meeting), court-imposed legal obligations, military obligations, severe weather conditions, religious holidays, and participation in official university-sponsored activities such as intercollegiate athletics. If you miss an exam for other than an acceptable absence your score will be a zero.

**Grades:** Dr. Fauth uses competency-based grading in all of his courses: to earn an A, one must demonstrate the abilities expected of an excellent undergraduate-level evolutionary biologist. If the entire class demonstrates such abilities, I will be absolutely delighted to give everyone an A! The easiest way for everyone to earn an A is to help each another - peer learning and altruism benefits everyone. A score of 60.0% is necessary for a D, 70.0% for a C, 80.0% for a B, and 90.0% for an A. Numerical grades <60.0% earn an F. Pluses and minuses will be assigned to the upper and lower 25% of each grade bracket, e.g., 87.5-89.5 = B+, 82.5-87.4 = B, 79.6-82.4 = B-. Dr. Fauth a longstanding reputation as a "harsh but fair" grader. Your final grade should reflect your ability as an undergraduate-level evolutionary biologist. However, I hope you will not obsess about grades as they may not reflect how hard you've worked, how much you've learned, or even how much you've matured as a biologist, and they certainly do not reflect your value as a person. In college there is much to be learned outside the classroom and you will need to balance your personal goals and aspirations versus grades *per se*.

**Classroom behavior:** I expect you to come to class on time, organized, prepared, and focused. I do not tolerate disruptive behavior, and will deduct 5 pts. from a student's final numerical grade for each incident of arriving late to class, leaving class early, disruptions from a cellular phone, pager, or other electronic device, or other unruly behavior. Electronic recording devices of any kind (e.g., tape recorders, cell phone or computer cameras, etc.) are not permitted in lecture. I will provide some – but not all – of the lecture notes as PDFs. However, I expect you to take notes on the rest, or bring your textbook and follow along.

**Cheating:** Don't! I do not tolerate cheating, unauthorized assistance or plagiarism of any type and will pursue disciplinary actions to the fullest extent possible. Rules of student conduct (including definitions of cheating, unauthorized assistance and plagiarism) are published in Section E of *Golden Rule*.

**Withdrawal:** The deadline for withdrawal without penalty is published by UCF. You will need to decide whether or not to remain in the course by that time. I do not give grades of Incomplete and the Biology Department does not give grades of NC (no credit).

**Disability statement:** UCF & Dr. Fauth are committed to providing reasonable accommodations for all persons with disabilities. This syllabus is available in alternate formats on request. Students with disabilities who need accommodations in this course must meet with Dr. Fauth at the beginning of the semester to discuss ways to implement them.

<p><b>The professor reserve the right to change the syllabus as necessary. Changes will be e-mailed and announced in class.</b></p>
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