

# FLORIDA ATLANTIC UNIVERSITY™

## Undergraduate Programs—COURSE CHANGE REQUEST<sup>1</sup>

UUPC APPROVAL \_\_\_\_\_  
 UFS APPROVAL \_\_\_\_\_  
 SCNS SUBMITTAL \_\_\_\_\_  
 CONFIRMED \_\_\_\_\_  
 BANNER POSTED \_\_\_\_\_  
 CATALOG \_\_\_\_\_

DEPARTMENT: **BIOLOGICAL SCIENCE** COLLEGE: **COLLEGE OF SCIENCE**

COURSE PREFIX AND NUMBER: **PCB 4674** CURRENT COURSE TITLE: **EVOLUTION**

CHANGE(S) ARE TO BE EFFECTIVE (LIST TERM): **FALL 2013** \_\_\_\_\_ TERMINATE COURSE (LIST FINAL ACTIVE TERM):

<p><b>CHANGE TITLE TO:</b></p> <p><b>CHANGE PREFIX FROM:</b> _____ <b>TO:</b> _____</p> <p><b>CHANGE COURSE NO. FROM:</b> _____ <b>TO:</b> _____</p> <p><b>CHANGE CREDITS<sup>2</sup> FROM:</b> _____ <b>TO:</b> _____</p> <p><b>CHANGE GRADING FROM:</b> _____ <b>TO:</b> _____</p> <p><b>CHANGE WAC/GORDON RULE STATUS<sup>3</sup></b>                  ADD* _____ REMOVE _____</p> <p><b>CHANGE GENERAL EDUCATION REQUIREMENTS<sup>4</sup></b>                  ADD* _____ REMOVE _____</p> <p><small>*WAC and General Education criteria must be clearly indicated in attached syllabus. For WAC Guidelines: <a href="http://www.fau.edu/WAC">www.fau.edu/WAC</a>. Please attach General Education Course Approval Request: <a href="http://www.fau.edu/deanugstudies/GeneralEdCourseApprovalRequests.php">www.fau.edu/deanugstudies/GeneralEdCourseApprovalRequests.php</a></small></p>	<p><b>CHANGE DESCRIPTION TO:</b></p> <p><b>CHANGE PREREQUISITES/MINIMUM GRADES TO*:</b></p> <p><b>EXISTING</b>                  PCB 3063 AND BCH 3033</p> <p><b>NEW PRE/REQ.</b>                  PCB 3063</p> <p><b>MINIMUM PASSING GRADE C-</b></p> <p><b>EXISTING COREQUISITES:</b></p> <p><b>CHANGE COREQUISITES TO*:</b></p> <p><b>CHANGE REGISTRATION CONTROLS TO:</b></p>
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Attach syllabus for ANY changes to current course information.

<p>Should the requested change(s) cause this course to overlap any other FAU courses, please list them here.</p>	<p>Please consult and list departments that might be affected by the change(s) and attach comments.<sup>5</sup></p>
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Faculty contact, email and complete phone number:  
 David Binninger; binninge@fau.edu; 561.297-3323

<p><b>Approved by:</b></p> <p>Department Chair: <u><i>David Binninger</i></u></p> <p>College Curriculum Chair: <u><i>J E My</i></u></p> <p>College Dean: <u><i>Deborah</i></u></p> <p>UUPC Chair: <u><i>J E My</i></u></p> <p>Undergraduate Studies Dean: <u><i>Edward E Pratt</i></u></p> <p>UFS President: _____</p> <p>Provost: _____</p>	<p><b>Date:</b></p> <p>Feb. 27, 2013</p> <p><u><i>3/21/13</i></u></p> <p><u><i>3/20/13</i></u></p> <p><u><i>3/22/13</i></u></p> <p><u><i>3/27/13</i></u></p>	<ol style="list-style-type: none"> <li>1. Syllabus must be attached; syllabus checklist recommended; see guidelines and checklist: <a href="http://www.fau.edu/academic/registrar/UUPCinfo">www.fau.edu/academic/registrar/UUPCinfo</a></li> <li>2. Review Provost Memorandum: Definition of a Credit Hour <a href="http://www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf">www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf</a></li> <li>3. WAC approval (attach if necessary)</li> <li>4. Gen. Ed. approval (attach if necessary)</li> <li>5. Consent from affected departments (attach if necessary)</li> </ol>
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## **Evolution**, PCB4674 001, CRN 80427, 3 hours. Fall 2013

Pre-requisites, PCB3063 minimum passing grade C-

Instructor: Dr. Colin R. Hughes

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Office Hours: M, W, F, 9 'til 11, and by appointment. I will make every effort to adhere to the chosen times but suggest you contact me ahead of time to make sure I am available. email is a reliable way of contacting me, though it sometimes takes me a day to reply.

Class will be held in ES106. 2:00 'til 3:20, on T and Th

I expect to make use of the Blackboard course web site on the FAU server. You should make sure you have regular access to that page.

Required text: Evolutionary Analysis, 4<sup>th</sup> edition. Freeman and Herron.

The overarching course goal is to bring you to the point where you can use the theory of evolution to develop testable hypotheses that explain biological phenomena.

Specific outcomes. I intend that you should be able to:

Use different lines of evidence to show that all life on Earth is descended from a common ancestor.

Explain what mechanisms cause evolutionary change, and under what circumstances each will have an effect.

Analyze potential examples of natural selection by breaking them into four distinct parts, and determining the outcome if each of the four parts is shown to be true.

Produce a branching diagram that shows how different species are interrelated.

Use phylogenetic trees to address evolutionary hypotheses.

Explain how genetic variation arises.

Analyze genotype data collected from populations of organisms and determine what processes are operating within or among those populations.

Explain what happens to genetic variation when alleles have equal fitness.

Give an overview of how evolutionary mechanisms change allele frequencies.

Outline three ways that a particular feature of an organism can be studied to determine the function of that feature.

Design studies that distinguish whether a trait functions to increase survival or reproduction or to increase mating success.

Use hypotheses based on intrasexual competition, and intersexual choice to explain traits that differ between males and females.

Explain how behavior that reduces fitness can never the less be exhibited by many members of a population.

Distinguish between situations where kin selection and reciprocity are relevant.  
Explain why organisms show senescence late in life.  
Explain why some organisms have a few big offspring while others have many tiny offspring.  
Explain why some diseases are virulent, while others are benign.  
Use different concepts of what constitutes a species in deciding whether two populations are the same or different species.  
Present alternative hypotheses to account for the splitting of one species into two.  
Describe features of the history of life which can uniquely be seen in the fossil record.  
Discuss how the last 10 million years of human evolution reflect processes well understood in other organisms.

Class time is used for examination of evolutionary explanations as illustrated by examples from nature, and practice with using these mechanisms to develop explanatory hypotheses. During class I lecture and pose problems. This subject is amenable to lively debate and I expect a lot of discussion. To make this work well, I expect you to have a positive attitude, be on time, be prepared, and be respectful of other people in class.

#### Course schedule.

I will follow the presentation of material in the text (see appendix); however, since the class is largely discussion, the schedule of topics may be changed depending on class interest. Our text, after a brief introduction, presents Darwin's great contribution: the theory of natural selection; it then shows how this has been elaborated to address a variety of questions. How do variations arise? What happens to variation within a population? What happens when more than one kind of variation are considered together? How do we study adaptation? Why do some traits seem to hinder survival (like a peacocks tail, or becoming a worker bee)? What is the relevance of evolution to medicine? The later section of the book addresses the patterns that evolution has generated over time. Starting with detection of pattern, it then examines how speciation occurs, the origin of life, grand patterns that appear in the fossil record, patterns in development, and finally the origin of humans.

To help you keep up with the topics covered, I list chapters to read in the appendix. In addition, since the most important material in this class is conceptual, I provide a suite of study questions for each chapter to focus your attention on those concepts. Each study question can be addressed in one or two paragraphs but while short, they require figuring out, not memorization of the text. You should plan to spend about six hours a week working through, and writing out answers to these questions.

Assessment. There will be three tests: two mid-terms and a comprehensive final. Tests will be short answer format, and the questions will be drawn from the study questions (see above) that you will have thought through, and prepared answers to, already. The two mid-terms will be worth 50 points, the final will be worth 100 points. In addition, I will record class participation, and award up to 50 points to active participants, this will be assessed using in-class assignments. There will be no extra credit work.

Mid-term 1.	27 September in class
Mid-term 2.	15 November in class
Final	Tuesday, Dec 4, 1:15 - 3:45 PM, 2 ½ hours

Make-up exams will only be given for medical and other serious, uncontrollable, events. The exams will be the same format as the others, and must be taken within ten days of the missed test.

Test scores will be posted on Blackboard.

Students who require reasonable accommodations due to a disability to properly execute course work must register with the Office for Students with Disabilities, and follow their procedures.

Grading will be based on the cumulative sum of all tests and participation. On each test, scores will be adjusted so that the top scorer gets 100%. Grades will then be determined on the accumulated score:

		93% or more	A	90-92%	A-
87-89%	B+	83-86%	B	80-82%	B-
77-79%	C+	73-76%	C	70-72%	C-
67-69%	D+	60-76%	D		
		less than 60%	F		

'Incomplete' grades are given at FAU only to: a student who is passing a course but has not completed all the required work because of exceptional circumstances. In such a case the student, may, with the approval of the instructor, temporarily receive a grade of I (**Incomplete**). The grade of I indicates a grade deferral and must be changed to a grade other than I within a specified time frame, not to exceed 1 calendar year from the end of the semester during which the course was taken. The I grade is used only when a student has not completed some portion of the work assigned to all students as a regular part of the course. It is not to be used to allow students to do extra work subsequently in order to raise the grade earned during the regular term. The instructor is required to record on the appropriate form, and file with the Registrar, the work that must be completed for a final grade, the time frame for completion, and the grade that will be assigned if work is not completed. It is the student's responsibility to make arrangements with the instructor for the timely completion of this work.

FAU and I expect complete academic integrity of our students. Academic dishonesty interferes with our goal of providing a high quality education in which no student is enjoys an unfair advantage over any other, and corrodes the mutual trust among members of the university community. Therefore academic dishonesty is subject to harsh penalties. Please see the details in the Undergraduate Catalog, Students Handbook, and University Regulation 4.001.

[http://www.fau.edu/ctl/4.001\\_Code\\_of\\_Academic\\_Integrity.pdf](http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf)

Tentative schedule for Evolution, PCB4674, Fall 2013, Hughes.

DATE	TOPIC	ASSIGNMENTS
21 August 23	Introduction, and overview; role of Evolution in understanding HIV	Chapter 1 Study questions
28 30	The fact of evolution: pattern and supporting data.	Ch 2 Study questions
4 September 6	Natural selection:, logical structure, examples from nature.	Ch 3 Study questions
11 13	A graphical representation of evolution: trees, estimation, interpretation, use in hypothesis testing.	Ch 4 Study questions
18 20	Origin of genetic variation, measurement and fitness effects,	Ch 5 Study questions
25 27	Viewing Mendelian genetics at the population level. In class mid-term	Ch 6 Study questions
2 October 4	Hardy Weinberg equilibrium and deviations due to natural selection.	Ch 6, problems and questions
9 11	Migration, non random mating, and Genetic drift.	Ch 7 problems and questions
16 18	Testing adaptive hypotheses, the comparative method	Ch 10 Study questions
23 25	Traits that differ between males and females, Intrasexual competition, and intersexual choice	Ch 11 Study questions
30 1 November	Traits that decrease personal fitness, kin selection and reciprocity	Ch 12 Study questions
6 8	Evolution of senescence, and offspring size and number.	Ch 13 Study questions
13 15	Relevance of evolution to human health questions In class mid-term	Ch 14 Study questions
20 22	What is a species, and how do they arise? Thanksgiving.	Ch 16 Study questions
27 29	Macroevolutionary patterns and extinctions Human evolutionary record	Ch 17 and 20 Study questions
4 December	Comprehensive Final Tuesday 1:15 – 3:45	in LA 106