

Evolution: Theory and Process (BIOL 316)

Summer 2018 - Course Syllabus

Instructor: Dr. Carl Dick, carl.dick@wku.edu

Office Hours: email anytime

Home Page: <http://www.wku.edu/biology/staff/index.php?memberid=759>

Required Text: Herron, J.C. & S. Freeman. 2014. *Evolutionary Analysis* (5th Edition) or Freeman, S. & J.C. Herron. 2007. *Evolutionary Analysis* (4th Edition)

Overview and Learning Objectives: Evolutionary biology is not merely a subdiscipline of biological science - it embodies the fundamental framework from which we understand the natural world. Simply put, evolutionary science is an objective and effective way to make sense of the world. Evolution comprises two primary components: (1) the historical fact of evolution, and (2) the theory of how evolution occurs. Evolutionary biology is multidisciplinary, synthesizing information from geology, paleontology, chemistry, genetics, systematics, ecology, biogeography, etc. This course will draw on diverse information, and will emphasize concepts, critical thinking, and connections. We will consider the fact of evolution (that life has changed over time) and the theory of evolution (how life changes over time). Upon successful completion of this course, you should be able to (1) describe examples of changes in life over time, (2) identify the four major mechanisms of evolutionary change, (3) identify the facts and inferences regarding natural selection, (4) explain the tenets and rationale of Hardy-Weinberg equilibrium theory, and (5) compare and contrast individuals and populations in the context of evolutionary biology. Overall, the goals of this course are for you to (a) develop a general understanding of the fact and theory of biological evolution, (b) learn how to apply an evolutionary perspective to questions in other areas of biology, and (c) develop an appreciation of evolutionary biology as a dynamic, rigorous, hypothesis-driven field of science.

Evaluation: There will be four exams, including a comprehensive final. Exams will be administered via Blackboard, and while you may use whatever books or notes are at your disposal (ie. open-book), time will be somewhat limited. Questions shall comprise material from the textbook and lecture slides, and from additional assigned readings, discussions, presentations, or special seminars. Exams may include, but are not limited to, true/false, multiple choice, short answer, short essay, essay, or problem-solving questions. Note that as this is an online course, the schedule below is somewhat loose and tentative. Also, exam dates are approximate. The first three exams are worth 100 points each, and the final is worth 200 points. In addition to the exams, I will from time to time post videos or articles related to topics in evolutionary biology. Up to five of these will be graded (50 points each), and evaluation will be based on written, substantive summaries (ca. 1 page typed, single-spaced, and well-written) you provide for each article or video. A final paper, due toward the end of the semester, will also be required. This paper (5 pages, single-spaced and with references) will be worth 200 points and may be on any topic of interest so long as it is related to evolutionary biology.

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You will be given wide latitude in your choice of subject, but you must receive topic approval from me before proceeding. Finally, we will regularly conduct online discussions of course material or of topics, articles, or videos I will identify and post. This discussion may be in real-time, or more probably will take the form of a discussion board where people can post comments and questions for discussion (for example, we may have a given discussion open for a period of two weeks). Your participation in such discussions through the semester shall be worth a total of 200 points. Grades will be based as follows: A = 90-100%; B = 80-89%; C = 70-79%; D = 60-69%; F = 59% or below.

Exams 1-3 = 100 points each (300 total)
Final Exam = 200 points
Summary write-ups = 50 points each (up to 250 total)
Final Paper = 200 points
Online discussions = 200 points

Standard Course Policies:

Academic Honesty: Students who commit any act of academic dishonesty may receive a failing grade in that portion of the course work in which the act is detected or a failing grade in a course without possibility of withdrawal. The faculty member may also present the case to the Office of Judicial Affairs for disciplinary sanctions. A student who believes a faculty member has dealt unfairly with him/her in a course involving academic dishonesty may seek relief through the Student Complaint Procedure.

Engagement: Success in this course depends on regular participation and full engagement in all activities.

Civility: Students are expected to abide by the Code of Student Conduct
http://wku.edu/judicialaffairs/?page_id=70

Disability: In compliance with university policy, students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the: Office for Student Disability Services in Downing University Center A-200. The phone number is 745-5004; TTY is 745-3030. Per university policy, please DO NOT request accommodations directly from the professor or instructor without a letter of accommodation from the OFSDS.

Missed exams or Assignments: Missed exams or assignments will be recorded as a grade of zero unless there is a documented emergency. If a case of documented emergency, the instructor will decide on any makeup work on a case-by-case basis.

The Learning Center: The Learning Center (DUC A330) provides free supplemental education programs for all currently enrolled WKU students. TLC at DUC offers CRLA Certified, one-on-one tutoring in over 100 general education subjects by appointment or

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walk in and a hosts a branch of the English Department's Writing Center. TLC is a also a quiet study area, with side rooms designated for peer to peer tutoring, and offers a thirty two machine computer lab. Additionally, TLC has two satellite locations, one each in Douglas Keen Hall and in Pearce Ford Tower that provide computer and print service, tutoring, and quiet study areas. For more information, or to schedule a tutoring appointment, please call TLC at (270) 745 - 6254 or log on to our website at www.wku.edu/tlc. Hours TLC at DUC: Monday - Thursday 8:00am - 9:00pm; Friday 8:00am - 4:00pm; Sunday 4:00pm - 9:00pm TLC at Keen/PFT: Sunday - Thursday 6:00pm - 11:00pm

Withdrawal Schedules:

It is each student's responsibility to be cognizant about course withdrawal schedules for the semester of enrollment.

TENTATIVE COURSE TOPICS (based on 5th Edition; subject to change)

TOPIC	READING
Introduction to evolution; evolutionary thinking (Chaps 2-4)	
Intro; history of evolutionary thought	none
Thinking evolutionarily, patterns in evolution	Ch. 2, 4
Natural selection	Ch. 3
Mechanisms of evolution (Chaps 5-9)	
Mutation and variation	Ch. 5
Selection and mutation	Ch. 6
Migration, genetic drift, nonrandom mating	Ch. 7
Linkage equilibrium, sex	Ch. 8
Evolution at mult. loci, quant. genetics, modes of selection	Ch. 9
Adaptation, character evolution, systematics (Chaps 4, 10-13)	
Phylogenetic systematics	Ch. 4
Evolution and comparative method	Ch. 10
Sexual selection	Ch. 11
Kin selection, sociality, altruism	Ch. 12
Live history evolution	Ch. 13
Evolution and human behavior	TBA
Speciation, history of life, human evolution (Chaps 16-18, 20)	
Species concepts, speciation	Ch. 16
Origin of life, early life on earth	Ch. 17
Fossil record, macroevolutionary pattern	Ch. 18
Human evolution	Ch. 20
Evolution, ethics, culture	TBA