

Biology 370 – Evolution and Ecology Spring 2012

Instructor: David L. Schultz

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Office Hours: MWF: 7:30-8:30, 9:40-11:40,
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Course web site: www.nicholls.edu/biol-ds/biol370

Course Description: A multidisciplinary study focusing on forces operating at the population level. Emphasis is on microevolution, population genetics, population ecology, coevolution, and adaptation.

Prerequisites: Biology 155, 156 or equivalent.

Texts: Futuyma, D. J. 2009. Evolution 2nd edition. Sinauer Associates.

Dawkins, R. 1989 or 2006. The Selfish Gene. Oxford University Press.

Course Goals: My goal is to provide you with a thorough overview of the process and pattern of evolution and how evolution proceeds by interactions of organisms with their environment. If I meet my goals, at the end of the course you (the student) will have an understanding of

- The historical context the development of the modern theory of evolution
- How evolution is a scientific theory based on tests of hypotheses
- How other models of evolution and the origin of life have been rejected
- How the age of the layers of the geologic column are estimated
- How natural selection produces adaptations
- How genetic variation arises in natural populations
- How genetic variation produces fitness differences
- How complex adaptations arise at the level of genes
- How to measure the importance of environment and genes in determining phenotypic variation
- How to measure the intensity of natural selection in the laboratory or in natural populations
- How allele frequencies change in natural populations
- How to predict the outcome of natural selection
- The levels at which natural selection can act, from gene, to individual, to group
- The importance of population size and genetic drift in evolution
- How the schedule of reproduction and mortality can be shaped by natural selection
- How schedules of reproduction and mortality impact the dynamics of populations
- The growth, decline, and stability of populations sizes
- How interactions of organisms result in reciprocal coevolution.
- How reproductive isolation arises
- How new species arise
- How phylogenetic relationships are estimated

Course Requirements and Grading: Grades will be based on your performance on 4 lecture exams (15% each), lecture quizzes (20%), and in-class and on-line discussions of assigned readings (20%). Final letter grades will be based on a distribution to be determined at the end of the semester but will be no more stringent than a 10 point scale.

Examinations and Quizzes: Lecture exams and quizzes will consist of essays, short answers, and problems. The material covered on the exams and quizzes will come from material presented in lecture or discussions or assigned readings.

Make-up exams will be given only when the justification is unquestionable. If you miss an exam you must notify me within 48 hours of the scheduled exam time to be eligible for a make-up. Unexcused missed exams receive a grade of 0. There will be no make-up for missed quizzes. An unexcused absence on the day of a quiz will result in a quiz grade of 0.

Students with Disabilities: If you have a documented disability that requires assistance, you will need to register with the Office of Disability Services (Room 100A Peltier Hall, 985-448-4430 TDD: 985-449-7002) for coordination of your academic accommodations.

ACADEMIC HONESTY POLICY:

Dishonesty will not be tolerated. Cheating during examination and submission of non-original work are each grounds for dismissal and application of sanctions in accordance with the *Code of Student Conduct of Nicholls State University*. Plagiarism or any other form of dishonesty detected in reports or exams will result in a course grade of F.

Academic Grievances: The proper procedure for grade appeals or grievances related to academic matters is listed in Section 5 of the Code of Student Conduct and at the following link: http://www.nicholls.edu/documents/student_life/code_of_conduct.pdf

Continued learning following an extreme emergency: In order to make continued learning possible following an extreme emergency, students are responsible for:

- Reading regular emergency notifications on the NSU website
- Knowing how to use and access Blackboard (or university designated electronic delivery system)
- Familiarity with emergency guidelines
- Evacuating textbooks and other course materials
- Knowing their Blackboard (or designated system) student login and password
- Contacting faculty regarding their intentions for completing the course.

Faculty responsibilities for emergencies:

- their development in the use of the Blackboard (or designated) software
- having a plan for continuing their courses using only Blackboard and email
- continuing their course in whatever way suits the completion of the course best, and being creative in the continuation of these courses
- making adjustments or compensations to a student’s progress in special programs with labs, clinical sequences or the like only in the immediate semester following the emergency.

Attendance: Lack of attendance will affect your grade in two ways: In-class discussion participation is graded and on-line discussion questions will be assigned in class to those present. Do not schedule outside commitments that conflict with regular class time.

Course Content

| Lecture Topic | Reading |
|---|-----------------------|
| 1 Review of Basic Evolutionary Biology | On-line lecture notes |
| 2 Evolutionary Biology | Ch. 1 |
| 3 Classification and Phylogeny | Ch. 2 |
| 4 Patterns of Evolution | Ch. 3 |
| 5 Evolution in the Fossil Record | Ch. 4 |
| 6 A History of Life on Earth | Ch. 5 |
| 7 The Geography of Evolution | Ch. 6 |
| 8 The Evolution of Biodiversity | Ch. 7 |
| 9 The Origin of Genetic Variation | Ch. 8 |
| 10 Variation | Ch. 9 |
| 11 Genetic Drift | Ch. 10 |
| 12 Natural Selection and Adaptation | Ch. 11 |
| 13 The Genetical Theory of Natural Selection | Ch. 12 |
| 14 Evolution of Phenotypic Traits | Ch. 13 |
| 15 Conflict and Cooperation | Ch. 14 |
| 16 Species | Ch. 15 |
| 17 Speciation | Ch. 16 |
| 18 How to be Fit: Reproductive Success | Ch. 17 |
| 19 Coevolution | Ch. 18 |
| 20 Introduction to Ecology | On-line lecture notes |
| Populations | On-line lecture notes |
| Communities | On-line lecture notes |
| 21 Evolution of Genes and Genomes | Ch. 19 |
| 22 Evolution and Development | Ch. 20 |
| 23 Macroevolution | Ch. 21 |
| 24 Evolutionary Science, Creationism, and Society | |

IMPORTANT DATES (Spring 2012)

January 16: Martin Luther King, Jr. Day
 February 12: Charles Darwin’s Birthday
 February 20-22: Mardi Gras Holiday
 April 4: Last drop day

April 6-15: Spring Break
 May 2: Last class day
 May 7: Final Exam 8 AM