

EEES 4150/5150, **Evolution/Organic Evolution**
Spring 2009
3 credit-hours
Tuesday and Thursday, 11:00 – 12:15, Bowman-Oddy 3045

Instructors

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Wednesday- 11:00 to 12:30

Prerequisites EEES 2150 or BIOL 2150; CHEM 1230; or consent of instructors.

Required text **Strickberger, M.W. 2008.** Evolution, 4th Edition. Jones and Bartlett Publishers, Sudbury, MS. (available at campus book stores)

Overall Goals

This course covers the modern theory of evolution, presented within a framework of geology and biology. The goals of this course are to:

1. understand the vastness of geologic time and the mechanics of geological dating.
2. discuss the requirements of fossil preservation.
3. survey the development of life through geologic time, focusing on evolution and influences of the environment.
4. become familiar with the specialized conditions that facilitate and promote diversification and eventual evolution of Earth's organisms.
5. understand the underlying principles that drive the evolution of micro- and macroorganisms.

Tentative schedule

In addition to the book chapters noted below, additional readings will be provided when necessary.

Notes for the first half of the course will be provided through the Evolution course website

(<http://www.eeescience.utoledo.edu/Faculty/Sigler/COURSES/Evolution/Evolution%20cover.htm>), accessed through the DES website.

Week	Meeting Dates	Topic	Book Chapter
1	01/13 01/15	The Central Dogma Molecules, Protocells and Natural Selection	Chap. 6
2	01/20* 01/22	Molecules, Protocells and Natural Selection	Chap. 6
3	01/27* 01/29	From Molecules to Life	Chap. 7
4	02/03* 02/05	Origins of Cells and the First Organisms	Chap. 8
5	02/10* 02/12	QUIZ I (Chap. 6-8) Cell Division, Mendelian Genetics and Sex Determination	Chap. 9
6	02/17* 02/19	Chromosomes, Mutation, Gene Regulation and Variation	Chap. 10
7	02/24* 02/26	Species, Phylogeny and Classification	Chap. 11
8	03/03 03/05	Genes and Phylogenetic Relationships Exam I (covers lecture and lab material)	Chap. 12
9	03/10 03/12	SPRING BREAK	
10	03/17 03/19	The Concept of Geologic Time Radiometric Dating	Chap. 1, 5 Chap. 5
11	03/24 03/26	Sedimentary Rocks, Stratigraphy Fossils and their Preservation	Chap. 5 Chap. 3, 5
12	03/31 04/02	Darwin's Legacy (Reports presented) Darwin's Legacy cont. (Reports presented)	Chap. 3 Chap. 3
13	04/07 04/09	Darwin's Legacy cont. (Reports presented)(written version of Darwin Reports Due) Quiz 2 (Chap. 1, 3, 5) The Pre-Paleozoic – earliest forms of life, adapting to chemical changes, first hardparts	Chap. 15
14	04/14 04/16	The Early Paleozoic Era - larger skeletons and increasing complexity The Early Paleozoic Era - major reefs, moving to land	Chap. 14-16 Chap. 14-18
15	04/21 04/23	The Late Paleozoic Era - forested landscapes, flying The Late Paleozoic Era - mass extinction	Chap 14-18 Chap. 14-18
16	04/28 04/30 05/07	The Mesozoic Era –the dinosaurs, birds, and mammals Mesozoic Era cont., The Cenozoic Era EXAM II (Chap. 1, 3, 5, 14-19) 10:15am – 12:15pm	Chap. 18-19 Chap. 18-19

Dates in bold - in-class writing assignments

* -Lab exercise

Grading: Grades will be earned based on your performance on two quizzes, five short writing assignments (in class during the first half of the semester), a midterm exam, and final exam (non-comprehensive).

In addition, two “half-semester” projects (described below) will be assigned during the semester to develop a further understanding of evolution from the geological and biological perspective. Students are responsible for saving all graded assignments in case a dispute over a recorded grade occurs.

I. Evolution of antibiotic resistance in bacteria (50 points) - Students will learn about adaptation and selection in evolution by investigating the development of antibiotic resistance in bacteria. Students will culture *Escherichia coli*, a bacterium normally found in the gut of humans and other mammals, and expose the bacteria to antibiotics to investigate how rapidly the bacteria evolve resistance to these compounds. A report describing the results of the experiment will be due on February 21st.

II. Darwin Reports (25 points) - Each student will read a selected chapter in Voyage of the Beagle and complete a 2-3 page synopsis answering the following questions: 1) From his reports, how did Darwin view geologic time? 2) What geologic observations did he make? 3) What observations in this chapter paved the way for Darwin's ideas on evolution? Also be prepared to give a short summary as part of an in-class discussion on March 31st, April 2nd and April 7th.

What	When	Worth
Quiz I	February 5 th (in class)	25 points
Writing assignments	01/13, 01/22, 01/29, 02/12, 02/24 (in class)	50 points total
Lab report	Due March 3 rd	50 points
Exam I	March 5 th (in class)	100 points
Quiz II	April 9 (in class)	25 points
Darwin reports	March 31 st - April 7 th	25 points
Exam II	May 7, 10:15 AM	100 points
Total points		375 points

Attendance and communication We will not take attendance. However your presence at each class meeting will greatly impact your grade. If you miss a class, it is your responsibility to get the class notes from a fellow student. Missed exams and quizzes can only be made-up if a written letter explaining the reason for the absence (including a contact phone number of doctor, mechanic, alarm clock manufacturer, etc)) is presented to the instructor *at the time of the student's next attended class*. In-class writing assignments cannot be made up. **All email correspondence will be sent to your UT account.**

Academic dishonesty Academic dishonesty in this course will not be tolerated. Examples of academic dishonesty include:

1. Obtaining or using work other than your own on tests, exams, quizzes or assignments.
2. Unauthorized use of calculators or other programmable equipment during tests, exams, or quizzes.
3. Unauthorized use of study aids, answer or crib sheets.
4. Soliciting or providing answers on exams, tests or quizzes.

Students who violate the above policy can expect disciplinary action. Disciplinary action may consist of receiving a zero on the assignment, failing the course, being reported to the Dean of Students, or other action as deemed appropriate by the course instructors.