

EEES 4150/5150-001, **Evolution/Organic Evolution** (CRN 10186)
Spring 2015, Tuesday and Thursday, 11:00 – 12:15, Bowman-Oddy 1014
3 credit-hours

The modern theory of evolution is presented within a framework of theoretical genetics and population biology; phylogeny and evolution of the vertebrates.

Instructors

Dr. Mark Camp, Associate Professor of Geology, Department Environmental Sciences

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Dr. Von Sigler, Associate Professor of Environmental Microbiology, Department of Environmental Sciences

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Kristen Coleman, Graduate Teaching Assistant, Department of Environmental Sciences

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Office hours: MW 12:30 – 2:30

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

Recommended (not required) text **Strickberger, M.W.** Evolution, 4th Edition. Jones and Bartlett Publishers, Sudbury, MS.

Technology requirement Course notes of Dr. Sigler will be posted to BlackBoard.

Learning outcomes

This course covers the modern theory of evolution, presented within a framework of geology and biology. Following the completion of this course, students will:

1. effectively communicate through concise writing about fundamental principles that drive evolution.
2. perform a lab experiment that illustrates the mechanisms of evolution.
3. learn how efficiency was a necessary hallmark attribute of early organisms.
4. demonstrate a knowledge of how early biochemical pathways evolved into the foundational pathways used in today's organisms.
5. learn how oxygen impacted evolution and the ability of organisms to generate energy.
6. demonstrate an overall knowledge of the underlying principles that drive the evolution of micro- and macroorganisms.

Tentative schedule

Dates in bold - in-class writing assignments

* -Lab exercise

Week	Meeting Dates	Topic	Book Chapter
1	01/13 01/15	What is Evolution? 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 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, Tectonism, Plate Tectonics, Stratigraphy	Chap. 1, 5
11	03/24 03/26	Sedimentary Rocks, Fossils and their Preservation	Chap. 5 Chap. 3, 5
12	03/31	Quiz 2 (Chap. 1, 3, 5) PrePaleozoic Life—adapting to chemical changes, first hardparts	Chap. 15
	04/02	The Early Paleozoic Era - larger skeletons and increasing complexity major reefs, moving to land	Chap. 14-16
13	04/07	The Late Paleozoic Era - forested landscapes, flying organisms	Chap. 14-18
	04/09	The Mesozoic Era—dinosaurs, first birds, mammals, flowering plants, and grasses	
14	04/14 04/16	The Cenozoic Era-- mammals Historical Development of Evolutionary Thought Darwin's Legacy, Beagle Reports	
15	04/21	Beagle Reports	
	04/23	Beagle Reports	
16	04/28	Beagle Reports	
	04/30	Beagle Reports	
	05/7	EXAM II (Chap. 1, 3, 5, 14-18) 10:15-12:15 pm	

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.

II. Voyage of the *Beagle* Reports (25 points) - Each student will report on a selected chapter of Darwin’s *Voyage of the Beagle* in a 12-15 minute oral in-class Power Point presentation between April 16-30 and complete a 2-3 page synopsis to be turned in by Friday, May 1 (either by e-mail or hard copy).

What	When	Worth
Quiz I	February 10 th (in class)	25 points
Writing assignments	01/15, 01/22, 01/29, 02/12, 02/24 (in class)	50 points total
Lab report	March 7 th (via email)	50 points
Exam I	March 5 th (in class)	100 points
Quiz II	March 31 (in class)	25 points
<i>Beagle</i> reports	April 16 - April 30	25 points
Exam II	May, 7 10:15-12:15	100 points
Total points		375 points

Attendance

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 at the discretion of the instructor.

and

In-class writing assignments can be made up only if we receive an email explaining your absence prior to class-time on the day of the assignment.

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 notes, calculators or other programmable equipment during tests, exams, or quizzes.
3. 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.

University policies

Policy Statement on Non-Discrimination on the basis of Disability (ADA) The University is an equal opportunity educational institution. Please read The University’s Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.

Academic Accommodations The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office.