



Biodiversity Course Syllabus, Spring 2015

EEES 2150-001 [CRN: 10166]

EEES 2150-009 (Honors) [CRN: 10167]

Department of Environmental Sciences

Instructor: Dr. Scott Heckathorn

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Office hours: MW 10:00-12:00; T&TH 12:00-2:00; or by appointment

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Class location: 1520 Rocket Hall

Class day/time: 10:00-11:40 am, Tuesday & Thursday (T & R)

Credit hours: 4

Prerequisites: none

Course Description:

This course serves as an introduction to the basic principles of genetics, biological evolution, biodiversity, and ecology. It begins with a discussion of the characteristics of living organisms, the hierarchical structure of biology, and its major organizing concepts. It briefly examines cell division and reproduction, chromosomes & DNA, and basic concepts of heredity and genetics, in order to understand concepts of adaptation and evolution. Biological diversity will be explored and emphasized in the context of evolution, rather than as a “parade of kingdoms”. During the last section, the ecology of populations, communities, and ecosystems will be examined, and human impacts on the environmental will be discussed.

Course Format:

This course is a lecture-based course, and lecture material will be primarily in “power-point” format. Lectures will follow assigned readings from the text, but will be supplemented heavily with material from other sources (including audio-visual media). Supplemental assigned readings (articles or websites) on important scientific topics will serve to increase scientific literacy and critical thinking skills. The course will emphasize the development of skills in critical thinking, synthesis of information, science literacy, and current topical issues in biology, in addition to fact-based learning.

Student Learning Outcomes (SLOs):

This course counts towards fulfilling the University of Toledo (UT) Natural Science competency requirements of our general education and core curriculums, by addressing the following SLOs.

Natural Science Core SLOs:

- a. Provide an understanding of the nature of science in general and major scientific concepts;
- b. Provide analysis and evaluation of scientific information;
- c. Provide discipline specific principles and information;
- d. Present applications and demonstrate the value of the discipline to society in general;
- e. Introduce scientific reasoning skills.

UT Core Curriculum Five Fundamental Skills:

- a. Communication: UT students must demonstrate abilities to communicate meaningfully, persuasively, and creatively with different audiences through written, oral, numeric, graphic, and visual modes.
- b. Personal, Social, and Global Responsibility: UT students must demonstrate understanding of and critical engagement in ethical, cultural, and political discourse and a capacity to work productively as a community member committed to the values of diversity, difference, and the imperatives of justice.
- c. Scientific and Quantitative Reasoning and Literacy: UT students must demonstrate the capacity to apply mathematical reasoning and scientific inquiry to diverse problems.
- d. Information Literacy: UT students must demonstrate the ability to find, organize, critically assess, and effectively use information to engage in advanced work in a challenging field of study. Students should demonstrate responsible, legal, creative, and ethical use of information.
- e. Critical and Integrative Thinking: UT students must be able to integrate reasoning, questioning, and analysis across traditional boundaries of viewpoint, practice, and discipline.

Required Textbook:

This course requires (1) a text book and (2) access to the online website “Mastering Biology” (www.masteringbiology.com), a study site for students through which course homework will be administered.

The text used for this course is the custom UT edition of “Campbell Biology” [10th edition, by Reece *et al.*; 2014; Pearson Education; ISBN-13: 978-1-269-90331-8]; the UT custom text is paperback and contains only the chapters covered in this course (and hence is cheaper).

Students may purchase a textbook and access to the website separately, or may purchase the text and access bundled together (e.g., available at the UT bookstore). Other recent versions or editions of the textbook (new or used, complete or custom UT) will suffice for this course too, but access to “Mastering Biology” will need to be purchased separately by the student if it does not come with the text (e.g., purchased directly from the publisher on-line). You are expected to read each textbook assignment before it is covered in class. The book, however, is not a replacement for the lectures, which are primary used for exams.

Required Technology:

Access to the on-line website “Mastering Biology” (www.masteringbiology.com) (see above).

Course Website:

Course materials (syllabus, all lectures, study guides and old exams, extra readings & links, etc.) will be posted on the UT “blackboard” course website (Log onto “myUT”, then go to “blackboard login”, then choose this course). I will also post grades for all exams and assignments on this website, which you can access using your UTAD userID and password.

Grading and Evaluation:

Grades will be based on:

- four (4) exams (each worth 20% of your total semester grade), and
- assigned weekly homework from “Mastering Biology” (15%), and
- in-class quizzes associated with assigned extra readings (5%).

Exams will be mostly objective, multiple-choice, and computer-graded (bring a pencil to each exam). Exams will not be comprehensive, in the strict sense. Exams 1-3 will be conducted during the last 75 min of a 100-min class period. The fourth exam will be given during the week of "final exams". The first exam will be given, graded, and returned to students before the "final withdrawal date" for courses. All exams must be taken (*i.e.*, none will be dropped from calculating your grade). Make-up exams will only be permitted following justified documented reasons, and make-up exams will be essay exams (see the UT policy at: <http://www.utoledo.edu/policies/academic/undergraduate/>). Only a portion of the exam questions will deal with memorization of "factoids". Many of the questions will require critical thinking and analysis, synthesis of information, and conceptual understanding. Material for the exams will come from the lectures and assigned readings (including the assigned sections of the textbook). Sample exams from a past semester will be provided for review purposes prior to each exam, as will study guides that summarize the main foci of each exam. Both in-class review sessions and out-of-class reviews will precede each exam. Should you require special accommodations to complete the exam, please let me know ahead of time, and if you prefer, you may take the exam at the UT testing center in Memorial Hall.

A homework assignment will be assigned during most weeks of the course, and this homework will be administered through the "Mastering Biology" website that accompanies the textbook. Typically, each homework assignment will be designed to require *ca.* 1 hour to complete. As this assigned homework is associated with a substantial fraction of your overall course grade, it is essential that students purchase access to the website (purchased either with the text or stand-alone access). Students will typically be given two or more weeks to complete each homework assignment (typically made available > 1 week in advance of coverage of the material in class and due 24 hours before the next exam); late homework will not be accepted.

In-class quizzes will relate to extra assigned readings (in some cases, readings found on the internet), will be scattered throughout the term, and will occur *ca.* 4 times during the semester. Readings will be announced and assigned as we go, but exact dates of the quizzes will not necessarily be announced in advance.

Extra credit work is available, and it will involve optional extra readings and associated extra-credit exam questions on each of the four exams during the semester.

Overall course grades, based on the earned % of total possible points will follow the standard format:

A = > 92%; A⁻ = 90-92%
B⁻ = 80-82%, B = 83-86%; B⁺ = 87-89%
C⁻ = 70-72%, C = 73-76%; C⁺ = 77-79%
D⁻ = 60-62%, D = 63-66%; D⁺ = 67-69%
F = <60%.

It is possible that I may end up "curving" the exams (*e.g.*, by lowering the scores required to earn specific letter grades). Should I curve any exam, I will only "curve down" (*i.e.*, by lowering the scores required to earn specific letter grades), will explicitly state the new grade scale in class, and that new grade scale will be reflected in calculating your overall course grade.

Midterm grades and attendance (based on attendance at exams and quizzes only) will be posted with the UT Registrar no later than the UT deadline for midterm grades, in order to assist you with decision to drop the course or not.

Honors Credit:

Honors students who are participating in the course will complete extra-class readings and associated assignments, with most communications between us via email (please email me within the first week of class to establish a working email link with me).

Academic Honesty Policy:

Students are expected to strictly adhere to principles of academic honesty in all aspects of this course, in accordance with UT policies (<http://www.utoledo.edu/dl/students/dishonesty.html>). Academic dishonesty of any kind by students in this course will not be tolerated. At the very least, students involved in academic dishonesty (including "copy & paste" plagiarism) will receive a grade of "0" on the specific assignment/exam involved. Following a second instance of academic dishonesty, you will receive an automatic "F" for the course, be expelled from the class, and you will be reported to UT administration for further disciplinary action.

Classroom Behavior Policy:

The highest standards of classroom behavior will be expected and enforced in this course. Behavior that is disruptive or disrespectful to fellow students or the instructor will not be tolerated, including unnecessary talking among students, use of electronic devices other than laptop computers used for following the current power-point lecture or taking notes, or reading newspapers or other materials unrelated to class.

In the case of talking during class, I will warn offending students once verbally, and following a second instance, I will dismiss students from that day's class. Repeated offenders will be dismissed from the course and not allowed to return until meeting with University administration. In any instance when classroom behavior warrants an initial verbal in-class warning from me, I will follow up on the incident by providing you a formal written warning via your UT email, so that a written record of the incident and warning is available in the future.

Policy on Use of Electronic Devices in this Course:

Unless otherwise cleared with me first, the use of electronic devices in this course is prohibited, with the exception of the use of laptop computers used for following the current power-point lecture or taking notes. Note that the use of cell phones is prohibited during class, as is the use of laptop computers for purposes not directly related to current lecture material. If you need to send or receive a phone call during class, please step out into the hallway to do so.

Attendance Policy:

I do not record attendance. Please note, however, that you will find it very difficult to do well in this class if you do not attend regularly. In accordance with UT policy (<http://www.utoledo.edu/policies/academic/undergraduate/>), I will provide opportunities to complete missed classes, provided such absences are justified. If you know ahead of time that you will miss a class, then you should communicate this information to me in advance by email or in writing.

Email Policy:

All correspondence regarding this course between students and instructor should be conducted via your UT email account. I will typically respond to student emails in less than 24 hours.

University Policies:

The University of Toledo is an equal opportunity educational institution.

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.

For a complete listing of current UT undergraduate policies (including those pertaining to academic dishonesty, missed classes), please see:
<http://www.utoledo.edu/policies/academic/undergraduate/>.

Additional Student Learning and Support Services:

For additional out-of-class learning and support resources at UT (e.g., the UT Learning Enhancement Center, Writing Center, Library, Counseling), see:

<http://www.utoledo.edu/success>

<http://www.utoledo.edu/library/>

<http://www.utoledo.edu/studentaffairs/counseling/>

Lecture Schedule:

Topics in lecture, and associated readings from the textbook, are as follows (next page). Note that the exact pace of lectures is approximate; however, the schedule for exams will not change. Class lectures, with rare exceptions, will be in PowerPoint format, and these presentations will be posted on the class website in advance.

SEMESTER SCHEDULE

<u>Week</u>	<u>Topics</u>	<u>Chapter #</u>
	<u>SECTION 1- GENETICS</u>	
1 (13 Jan)	Introduction to biology, organizing concepts.	1
1 (15 Jan)	Mitosis and the cell cycle.	12
2 (20 Jan)	Meiosis and sexual reproduction.	13
2 (22 Jan)	Mendel and the gene idea.	14
3 (27 Jan)	Chromosomes and inheritance.	15
3 (29 Jan)	DNA & the molecular basis of genes.	16
4 (3 Feb)	Special topics: jumping genes and cancer	
4 (5 Feb)	Catch-up day	
5 (10 Feb)	First Exam: Tuesday, 2nd week of Feb	
	<u>SECTION 2- EVOLUTION</u>	
5 (12 Feb)	Evolutionary biology: Darwin & descent w/ modification.	22
6 (17 Feb)	Micro-evolution: the evolution of populations.	23
6 (19 Feb)	Macro-evolution: the origin of species.	24
7 (24 Feb)	The history of life on Earth.	25
7 (26 Feb)	Phylogeny and the "tree of life".	26
8 (3 Mar)	Special topic: Human evolution	
8 (5 Mar)	Second Exam: Thursday, 1st week of Mar	
9	SPRING BREAK (9-13 March)	
	<u>SECTION 3- BIOLOGICAL DIVERSITY</u>	
10 (17 Mar)	Viruses.	19
10 (19 Mar)	Prokaryotes (bacteria and archaea).	27
11 (24 Mar)	Protists.	28
11 (26 Mar)	Plants.	29-30
12 (31 Mar)	Fungi.	31
12 (2 Apr)	Animals, part 1	32-34
13 (7 Apr)	Animals, part 2	
13 (9 Apr)	Third Exam: Thursday, 2nd week of Apr	
	<u>SECTION 4- ECOLOGY</u>	
14 (14 Apr)	Introduction to ecology.	52
14 (16 Apr)	Population ecology.	53
15 (21 Apr)	Community ecology.	54
15 (23 Apr)	Ecosystem ecology.	55
16 (28 Apr)	Global Environmental Change.	56
16 (30 Apr)	Special topic: Conservation of NW Ohio Ecosystems	56
17 (4 May)	Fourth (Final) Exam: Monday, Finals Week, 10:15-12:15, 1520 Rocket Hall	