

BIO 150: Organismal and Ecological Biology (Sections 1-9), 3 credits
The University of Tennessee, Spring 2015

- Lecture:** M, W 11:15 am-12:05 pm, Dougherty Engineering (DO) 416
75% of course grade
- Lecture Instructor:** P. Brandon Matheny (pmatheny@utk.edu)
Office hours: T 11-12, W 1:30-2:30, Hesler 334 (in Hesler 332)
Other meetings by appointment
- Discussion:** One hour per week; 25% of course grade; see separate Discussion syllabus
Discussions start the week of Jan 12 (see your schedule for discussion time)
- Discussion Instructors:** Joshua Birkebak, jbirkeba@vols.utk.edu
Emma Harrower, eharrowe@vols.utk.edu
Nicole Hergott, nhergott@vols.utk.edu
- Discussion Head TA:** Justin Hendy, jhendy@vols.utk.edu

Course Description: Intended for science majors, an introduction to the major biological concepts emphasizing organismal and ecological aspects of life. Organized along themes of evolution, structure and function, information flow, exchange and storage, pathways of energy and matter, and systems.
Satisfies General Education Requirement: (NS)

Course Learning Objectives

- Be able to describe a hypothesis, prediction, and design an experimental approach
- Evaluate molecular phylogenies
- Understand what makes a group monophyletic, paraphyletic, or polyphyletic
- Recognize how natural selection works
- Recognize different mechanisms that induce evolution
- Explain how species are recognized
- Explain processes that lead to speciation
- Explain how evolution occurs at the molecular level
- Compare and contrast bacteria, archaea, and eukaryotes (understand what makes them unique)
- Explain degree of functional diversity in bacteria and archaea
- Explain what makes fungi unique
- Explain major themes of diversification in eukaryotes
- Explain adaptations that occurred in various groups of eukaryotes as they transitioned to life on land
- Explain evolutionary history of primates and hominins
- Understand differences between taxonomic, genetic, and functional diversity
- Explain general patterns in distribution and abundance of organisms
- Identify threats to biodiversity
- Recognize the five big ideas (FBIs) in biology
- Describe biological scenarios that combine two or more five big ideas in biology

Biology Degree Learning Objectives

You should be able to explain the **five big ideas (FBIs)** in biology as they relate to topics you have learned throughout your degree program:

1. **Evolution:** Populations of organisms and their cellular components have changed over time through both selective and non-selective evolutionary processes.

2. **Structure and Function:** All living systems (organisms, ecosystems, etc.) are made of structural components whose arrangement determines the function of the systems.
3. **Information Flow and Storage:** Information (DNA, for example) and signals are used and exchanged within and among organisms to direct their functioning.
4. **Transformation of Energy and Matter:** All living things acquire, use, and release and cycle matter and energy for cellular / organismal functioning.
5. **Systems:** Living systems are interconnected, and they interact and influence each other on multiple levels.

You should also be proficient in the following **scientific practices**:

- Formulate empirically-testable hypotheses
- Interpret visual representations (figures and diagrams)
- Evaluate data and come to a conclusion (with evidence) (formulate an argument)

How you will learn the material

Textbook reading, MasteringBiology homework, active learning exercises in-class, discussion sections

****The lecture schedule is tentative and subject to change****

Lecture Schedule (readings in parentheses)	Discussion / Lab Schedule
Jan. 7 Introduction and Big Ideas in Biology	No Discussion
Jan. 12 Doing Biology (1.5, Bioskills 1-4 in Appendix B) Jan. 14 Time, Phylogenies, and Tree Thinking (1.4, 25.2, 28.1-28.4, Bioskills 7)	Module 1 (<i>Experimental design and data interpretation</i>): What is a hypothesis?
Jan. 19 HOLIDAY Jan. 21 Time, Phylogenies, and Tree Thinking (1.4, 25.2, 28.1-28.4, Bioskills 7)	Module 1: Human systems and bacteria
Jan. 26 Evolution by Natural Selection (25, 1.3) Jan. 28 Evolution by Natural Selection (25, 1.3)	Module 1: Leaf cutter ants and fungal pathogens
Feb. 2 EXAM 1 Feb. 4 Evolutionary Processes (26.2-26.6)	Module 1: Induced plant defenses
Feb. 9 Evolutionary Processes (26.2-26.6) Feb. 11 Speciation (27)	Module 1: Quiz
Feb. 16 Speciation (27) Feb. 18 Molecular Evolution (16.2-16.4)	Module 2 (<i>Synthesizing data and using models</i>): Ant bodyguards and pollinators
Feb. 23 Bacteria and Archaea (7.1, 29) Feb. 25 Protists – Evolution of Eukaryotes (30)	Module 2: Recreational fishing and trophic cascades, part 1
Mar. 2 EXAM 2 Mar. 4 Green Algae and Land Plants (31)	Recreational fishing and trophic cascades, part 2
Mar. 9 Green Algae and Land Plants (31) Mar. 11 Fungi (32)	Module 2: Quiz

Mar. 16 Spring Break – no class Mar. 18 Spring Break – no class	No Discussion – Spring Break
Mar. 23 Fungi (32) Mar. 25 Introduction to Animals (33)	Module 3 (<i>Synthesizing multiple scientific papers</i>): Structured activity related to final project
Mar. 30 Protostome Animals (34) Apr. 1 Deuterostome Animals (35.1-35.3)	Module 3: Structured activity related to final project
Apr. 6 EXAM 3 Apr. 8 Primates and Hominins (35.4)	Module 3: Structured activity related to final project
Apr. 13 Ecology (52) Apr. 15 Ecology (52)	Final project presentation
Apr. 20 What is Biodiversity? (57.1) Apr. 22 Threats to Biodiversity (57.2)	No Discussions
Final Exam 10:15-12:15, Thur, Apr. 30, 2015 <i>As per the registrar's website: "Final exams must be given during the final exam period at the scheduled time, although alternative uses of the scheduled exam period may be designated by the instructor. Students are not required to take more than two written exams on any day. The instructor(s) of the last non-departmental exam(s) on that day must reschedule the student's exam during the exam period. It is the obligation of students with such conflicts to make appropriate arrangements with the instructor at least two weeks prior to the end of classes."</i>	

Important Dates:

*Jan 16 - Last day to drop without a "W"; Mar 31 - Last Day to Drop with a "W" (WP/WF);
Apr 24 - Last Day for a University Withdrawal*

Technology: During exams and quizzes, any electronic device seen on your desk or within sight will result in a grade of zero.

Support for learning

REQUIRED Texts and Materials:

- Freeman S. et al. (2014) *Biological Science*. Fifth edition. Pearson: Boston.
- MasteringBiology access code [instructor will supply courseID]
- Electronic device (smart phone, tablet, or laptop) with wi-fi to access Learning Catalytics

Course website: Go to "Online@UT" to login to Blackboard. You will have two Blackboard sites for the course, one for your discussion / lab section and one for lecture. The lecture site will be used regularly for communication and posting lecture syllabus, extra readings, assignments, course grades, etc.

Communications:

- You need to regularly check your utk e-mail account for announcements related to this course. If you are not receiving those e-mails, there is something wrong with your account!
- If you need to meet and can't make office hours, please use your UTK e-mail (spam filters may exclude other addresses) to schedule a meeting.

- I am happy to answer your e-mail questions, but allow up to 24 hours for a response. Also, once I leave the office I may not check my e-mail until the following workday, or the first day back after a weekend.

Study Rooms:

417 Hesler is a quiet study room for majors in Biology. It can also be reserved for group study. There is also a student study room in Neyland Biology Annex, room 103.

Learning Assessments:

Exams will be a mixture of multiple-choice, matching, short answer, and short essays.

Breakdown of Points:

Lecture: (75% of grade; 750 points)

Exams	375 points
Exam 1 – 50 points	
Exam 2 – 85 points	
Exam 3 – 90 points	
Final Exam – 150 points	
Homework and Assignments (approximate break-down below)	275 points
Homework (online Mastering Biology) – 200 points	
Assignments (concept maps, reading exercise) – 75 points	
In-class questions	100 points
Learning Catalytics – 100 points	

Discussion / Lab: (25% of grade; 250 points) – see separate Discussion syllabus

Exams & Assignment Policies:

- If you miss an exam, the only make-up is an *oral exam* with the instructor
- Late policy – Assignments turned in after the due date will lose 25% of points
- All work should be done independently (unless group work is permitted, and then you may only work within your group on the assignment); plagiarism software will be used to check written assignments for copying from classmates or other sources. **Plagiarism will result in stiff penalties – please see section below.**

Final letter grades will be determined by the total percentage of 750 points accumulated as follows:

A	93 – 100%	C	73 – 76%
A-	90 – 92%	C-	70 – 72%
B+	87 – 89%	D+	67 – 69%
B	83 – 86%	D	63 – 66%
B-	80 – 82%	D-	60 – 62%
C+	77 – 79%	F	<60%

Academic integrity:

Academic dishonesty of any sort will not be tolerated. Plagiarism includes the copying of phrases, portions of sentences or the main ideas from ANYONE (including a classmate) on ANY work submitted for a grade (exams, assignments, quizzes, etc). Academic dishonesty also includes assisting other students on quizzes or exams.

You are expected to abide by The University of Tennessee honor statement in Biology and in all of your university activities as pledged in the honor code:

“An essential feature of the University of Tennessee, Knoxville, is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty.

As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.”

(2014-2015 Undergraduate Catalog)

Depending on the offence, penalties for academic dishonesty range from a minimum of a zero for the assignment, to an F for the course, to the filing of formal academic dishonesty charges seeking dismissal from The University of Tennessee. These choices are at the discretion of the instructor, and can occur in either the lecture or the lab portion of the class.

You should be familiar with the requisites of academic honesty and what constitutes academic dishonesty as outlined in the UT Undergraduate Catalog (<http://catalog.utk.edu/>).

Other information

Disability Services: If you need course adaptations or accommodations because of a documented disability, please contact me privately to discuss your needs. If you have questions or concerns about disabilities or emergency information to share, please contact Disability Services: 2227 Dunford Hall; 974-6807; Email: ods@utk.edu; Website: <http://ods.utk.edu/>.

Academic Assistance:

Tutoring: The Division of Biology does not offer tutoring services. Contact the Student Success Center and the Academic Support Unit of The Office of Minority Student Affairs for information about tutoring opportunities.

- **Student Success Center:** The comprehensive source for information, services, and resources to assist your success at UT: <http://studentsuccess.utk.edu>
 - 812 Volunteer Boulevard, Greve Hall, room 324
 - 865 974-6641, Email: studentsuccess@utk.edu

Technical Assistance:

Blackboard or general information technology assistance:

- Help Desk: 865 974 9900 (M – F, 8:00 – 5:00)
- OIT Walk-In Help Desk: Commons, 2nd floor Hodges Library

Counseling Center: <http://counselingcenter.utk.edu/>

1800 Volunteer Boulevard

865 974-2196, Email: counselingcenter@utk.edu

OTHER RESOURCES FOR STUDENTS:

- One Stop: <http://onestop.utk.edu> (start here for any question you have)
- Undergraduate Catalogs: <http://catalog.utk.edu> (Listing of academic programs, courses, and policies)
- Hilltopics: <http://dos.utk.edu/hilltopics> (Campus and academic policies, procedures and standards of conduct)
- Course Timetable: https://bannersb.utk.edu/kbanpr/bwckschd.p_disp_dyn_sched (Schedule of classes)
- Academic Planning: <http://www.utk.edu/advising> (Advising resources, course requirements, and major guides)
- Library: <http://www.lib.utk.edu> (Access to library resources, databases, course reserves, and services)
- Career Services: <http://career.utk.edu> (Career counseling and resources; HIRE-A-VOL job search system)