

Biology 150: Organismal and Ecological Biology

University of Tennessee, Fall 2017

(Sections 1 – 9)

Lecture Instructor: Xingli Giam, PhD
527 Hesler Biology Building

e: xgiam@utk.edu
t: 865-974-2189

Lecture: Tuesday and Thursday, 9:40 – 10:30 am, Alumni Memorial Building Auditorium

BioLit “Discussion”: Strong Hall 242, Meeting day/time differs across sections, starts Aug 29

Office hours: 10.45 am – 12:15 pm Tuesday and Thursday, or by appointment. I highly encourage students to stop by during office hours, individually or in small groups.

BioLit Instructors: Mae Berlow
Clara Howell
Mali Lubic

e: mberlow@vols.utk.edu
e: chowel30@vols.utk.edu
e: mlubic@vols.utk.edu

Course website: You will find the Biology 150 web page on *Canvas* at <https://utk.instructure.com/>. If you don't know how to use this resource, tutorials are available at <https://oit.utk.edu/teachingtools/online/> under the section “Getting Started with Canvas (For Students)”. Please check Canvas frequently for new announcements, schedule changes, and assignments.

Course description: Intended for science majors, an introduction to the major biological concepts emphasizing the 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.

Goals of this course: This course is organized to meet the goals of the General Education Natural Sciences (NS) requirement. Reaching these goals will help you interpret and interact with the world around you, as well as prepare you for subsequent courses in the biological sciences.

“As science and technology come to play an increasingly important role in contemporary life, it is essential for all educated persons to have a fundamental understanding of science and its methods. All students should be familiar with one or more scientific disciplines and the role of science in contemporary society. Such familiarity may be gained through acquisition of knowledge of a discipline's basic vocabulary, chief discoveries, and fundamental principles; exposure to a discipline's experimental techniques; and the ability to analyze issues with scientific dimensions.”

By the end of this course, you should be able to explain how the **five big ideas (FBIs)** in biology relate to the development, maintenance, and loss of biodiversity on the planet

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. **Transformations of Energy and Matter:** All living things acquire, use, and release matter and energy for cellular / organismal functioning.
5. **Systems:** Living systems are interconnected, and interact and influence each other on multiple levels.

You should also demonstrate the following **five scientific practices (FSPs)**:

1. Link lecture topics and synthesize information, particularly in reference to the FBIs
2. Develop hypotheses and predictions (ask scientific questions) based on models or data
3. Interpret scientific representations, such as graphs, phylogenies, or molecular structures, or data, and come to a conclusion (with evidence)
4. Summarize information from scientific articles or other sources
5. Predict the consequences of changes to systems or pathways

How you will learn the material

You need to think for learning to occur, and not just in class. Before class you should complete any assigned readings; these assignments will provide the background information for what we do during lecture. Lecture time is divided between putting information into context and synthesizing the information through discussion and activities. After class (both lectures and BioLit discussions), you should review the learning objectives and make sure you can link concepts from multiple classes together. Exams will test your understanding of the concepts, not just your ability to memorize information.

Required Books/Resources:

Text: Freeman et al. 2014. Biological Science. 6th ed., Pearson. ISBN-10: 0321976495. Reserve copies are available in the library. We are trying Inclusive Access with opt out, covered on the first day. Opt Out by 1 Sep; note that this is also the deadline for dropping a course without a 'W' grade.

Learning Catalytics Access: You will need online access to the Learning Catalytics website to answer real-time questions and do real-time assignments in Lectures. Access to Learning Catalytics comes with the purchase of a new book or with an e-text through the Pearson website. If you have chosen not to buy a textbook or have purchased a used textbook, you can purchase Learning Catalytics for \$12 at this web-link (<https://www.pearson.com/us/higher-education/products-services-teaching/learning-engagement-tools/learning-catalytics/training-support/students/buy-access.html>).

Please contact me if you have issues obtaining Learning Catalytics access.

Readings and Videos: There will be several articles and links to videos available on the class Canvas site that will be required for specific lectures. These will be announced in class and on Blackboard

Grading: I will use the standard UT grading scale without minuses. There will be no extra credit for individuals. Any excuse or concern for absence or tardy work should be discussed with me within one

week. Make up exams may be entirely different and adjusted to account for extra study time. There is a total of 1000 points available during the course: 750 in Lecture and 250 in BioLit.

Learning Catalytics:	80
In Class Activities:	70
Take-Home Assignments:	120
Pop-Quiz:	50
Lecture Exam 1:	80
Lecture Exam 2:	100
Lecture Exam 3:	100
Final Exam:	150
<u>BioLit Grades:</u>	<u>250</u>
Total:	1000

Grading Scale by percentage of 1000 points	
---	--

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

Lecture and Final Exams: There are four closed-book exams, worth a total of 450 points. In each exam, there will be multiple choice, short answer, and long answer (essay-like) questions. I will provide study guides/lists of definitions and ideas you should know for each exam. No make-up exams will be given without a valid excuse (e.g., family or medical emergencies, etc.). The excuse must be documented. Make-up exams will be scheduled at the instructor's convenience.

Pop-Quiz: There will be one surprise pop-quiz given in a one lecture session worth a maximum of 50 points, somewhat early in the semester. This is to motivate you to begin revising consistently from early on in the semester. Being up-to-date with learning helps with morale, lowers stress levels, and helps prepare you for the final exams. The pop-quiz will be open-notes (but not open-textbook), which means you can use your hand-written notes for the quiz. This is to encourage you to take notes in class. I recommend printing out the lecture slides (double-sided) and take notes on the slides itself to help link concepts, remind yourself of the meaning of terms, etc. Doing this will help internalize your understanding and learning of the topic.

Graded In-class and Take-home Assignments:

(1) Learning Catalytics. During lectures, I will ask questions that you will answer through Learning Catalytics, associated with your book, using a mobile device or computer. There will be 100 points available during the term, but a maximum of 80 points will be applied to your grade. These extra points are added to cover a missed lecture or forgotten device.

(2) Lecture Group Activities. In some lectures, I will plan short activities or assignments designed to be completed by groups of 3-4 students. There will be 90 points available during the term, but only a maximum of 70 points will be counted toward your final course grade.

(3) Take-home Assignments. I will be giving take-home assignments worth 120 points maximum; they will be accessible via Canvas. Please take the due-date seriously; assignments turned in after the deadline will lose 25% of the total points per 24 hours exceeded. For Learning Catalytics, Lecture Activities, and MasteringBiology), there will be no make-up assignments.

All work should be done independently unless group work is permitted, such as in Lecture Group Activities. Plagiarism software will be used to check written assignments for copying from classmates or

other uncited sources. Plagiarism will result in stiff penalties – please see section on **Academic Integrity**.

Technology: While in class, use electronic devices only for class purposes such as Learning Catalytics or note-taking. Using them for other tasks will distract you as well as your classmates, and has been found to lower grades. During exams, any electronic device seen on your desk or within sight will result in a grade of zero.

Academic integrity:

Academic dishonesty of any sort will not be tolerated. Plagiarism includes the copying of answers, phrases, portions of sentences or the main ideas from ANYONE (including a classmate or friends who had taken the class previously) and on ANY work submitted for a grade (exams, assignments, quizzes, etc).

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.”

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 BioLit session 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/>).

Schedule (subject to change):

Important dates for this and other courses. 1 Sep – last day to drop without ‘W’, 22 November – last day to drop with ‘W’. For other dates, please visit <http://onestop.utk.edu/calendar/>.

Readings from textbook (TB) chapters (Ch), in **bold** print should be read before lecture. There may also be other non-textbook readings (R), videos (V), or podcasts (P) assigned, also in **bold**.

Date	Day	Topic	Reading
Aug 24	R	L1. Introduction To Class	
I. The Scientific Method, Genetics, Units of Biodiversity			
Aug 29	T	L1. Doing Science: Data, Correlations, and Testing Hypotheses	(TB) Ch 1.1, 1.6; BioSkills 1-4, 12, 16, 18 (R) Vaccines (d/I from Canvas)
Aug 31	R	L2. Genetics: Structure and Function of DNA	(TB) Ch 13.2, 13.4, 15.5, 16.2

Sept 5	T	L3. Genetics: Mutations, The Engine of Variation Among Individuals (Dr. Matthew J. Troia)	(TB) Ch 16.4, 23.6; (R) https://www.livescience.com/58573-delayed-sleep-phase-disorder-linked-to-gene-mutation.html
Sept 7	R	L4. Guest Lecture: Doing Actual Science! (Dr. Matthew J. Troia)	
Sept 12	T	L5. Genetics and Units of Biodiversity: Populations and Species	(TB) Ch 23.1, 23.2, 24.1; (R) Species: Reality and Concepts (d/l from Canvas)
II. Evolutionary Processes Generate Biodiversity			
Sept 14	R	L6. Evolution: Natural Selection, A Scientific Revolution!	(TB) Ch 22.1, 22.2, 22.3, 22.4, 22.5
Sept 19	T	Exam 1 - 80 points (Covering L1 to L6)	
Sept 21	R	L7. Evolution: Natural Selection and Other Mechanisms	(TB) Ch 23.3, 23.4, 23.5
Sept 25	T	L8. Speciation: How Do Different Species Come About?	(TB) Ch 24.2, 24.3, 24.4
Sept 28	R	L9. Phylogenetic Trees: Displaying Evolutionary History	(TB) Ch 25.1
III. Diversity of Life			
Oct 3	T	L10. The Tree of Life: Summing It All Up	(TB) Ch 25.2, 25.3, 25.4
Oct 5	R	NO CLASS - FALL BREAK	
Oct 10	T	L11. Prokaryotes	(TB) Ch 7.1, 7.2, 26.1, 26.2, 26.3, 26.4
Oct 12	R	L12. Protists and Viruses	(TB) Ch 27.3, 27.4, 33.1, 33.3
Oct 17	T	Exam 2 - 100 points (Covering L6 to L12)	
Oct 19	R	L13. Green Algae to Land Plants: Adapting To (Being) High And Dry	(TB) Ch 28.1, 28.2, 28.3, 28.4
Oct 24	T	L14. Fungi	(TB) Ch 29.1, 29.2, 29.3, 29.4
Oct 26	R	L15. Animals: Invertebrates to Fishes	(TB) Ch 30, 31, 32.1, 32.2, 32.3
Oct 31	T	L16. Animals: Fishes to Amphibians, Reptiles, Dinosaurs, Birds, Mammals (Moving Onto Land)	(TB) Ch 32.4, 32.5
IV. Ecology: A Study of Interactions			
Nov 2	R	L17. An Introduction and The Issue of Scales	(TB) Ch 49.1, 49.4, 49.5
Nov 7	T	L18. Ecology of Populations: Intraspecific Processes	(TB) Ch 51.1, 51.3, 51.4
Nov 9	R	L19. Ecology of Communities: Interspecific Interactions	(TB) Ch 52.1, 52.2, 52.3

Nov 14	T	Exam 3 - 100 points (Covering L13 to L19)	
Nov 16	R	L20.Ecology of Ecosystems: Energy and Material Fluxes	(TB) Ch 53.1, 53.2, 53.3
Nov 21	T	L21.Macroecology: Data Mining Large Scale Phenomena	(TB) Ch 52.1; (R) To Be Announced
Nov 23	R	NO CLASS - THANKSGIVING BREAK	
Nov 28	T	L22.The Anthropocene: Age of Humans (And Not Always In A Good Way)	(TB) Ch 54.1, 54.2, 54.3; (R) http://humanorigins.si.edu/research/age-humans-evolutionary-perspectives-anthropocene ; Conservation in Human Modified Landscapes (d/I from Canvas)
Nov 30	R	L23.Conservation Failures and Successes: Looking Forward	(TB) Ch 54.4; Role of People in Nature (d/I from Canvas)
Dec 5	T	L24.Review Session	
Dec 12	T	FINAL EXAM (Exam 4, which covers L20 to L24 + Cumulative Final, which covers ALL lectures), 150 points, 8:00 am - 10:00 am	

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 or 865-622-6566 for video phone; Email: ods@utk.edu; Website: <http://ods.utk.edu/>).

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:

Canvas 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/>

900Volunteer 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://bannerssb.utk.edu/kbanpr/bwckschd.p_disp_dyn_sched (Schedule of classes)
- Academic Planning: <http://www.utk.edu/advising> (Advising, 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)