

Biology 150: Organismal and Ecological Biology

University of Tennessee, Spring 2018

Tuesday and Thursday, 12:40 – 1:35 pm, Sections 10 – 18, McClung Museum 63

Instructor: Benjamin P. Keck, PhD
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Office hours: 2:00 – 3:00 pm Tuesday, Wednesday, or by appointment. It's best to start with an email with a few day/times you would be able to meet, and I will respond as quickly as I can. When you email, put Bio 150 in the subject line and provide me with enough information to answer any questions. I highly encourage students to make appointments or stop by during office hours, individually or in small groups.

BioLit Instructors:

Mae Berlow

mae@utk.edu

Office hours by appointment

Domonique Hatton

dhatton@vols.utk.edu

Office hours by appointment

Clara Howell

chowel30@vols.utk.edu

Office hours by appointment

Course website: You will find the Biology 150 web page on Canvas. Tutorials on using Canvas are available at <https://oit.utk.edu/teachingtools/online/>. I recommend that you check Canvas frequently for new announcements and discussion threads. You will have one merged course site, and a group for your BioLit section.

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 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 reading, videos, or MasteringBiology; these 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. There will be several group learning exercises during the term. If you miss these days you will need a valid excuse to complete a make-up assignment. Everyone in the group receives the same grade. These will be discussion-based, problem solving exercises. After class, 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:

Text: Freeman et al. 2014. Biological Science. 6th ed., Pearson. ISBN-10: 0321976495.

We are trying Inclusive Access with opt out, covered on the first day. Opt Out by 20 January.

MasteringBiology Access: You will need access to MasteringBiology to complete online assignments.

Access comes with the purchase of a new book or with an e-text through the Pearson website. To access the page for this course on the Pearson website, follow the instructions on the pdf on Blackboard, or search for the text on the Pearson website and then for the section ID:

BIO150SPRING2018KECK

Readings and Videos: There will be several articles and links to videos available on the class Blackboard 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. I will adjust the final grades by discussion section. 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:	60	Grading Scale by percentage of 1000 points
In Class Group Activities:	180	90 – 100 = A
MasteringBiology:	60	87 – 89 = B+
Lecture Exam 1:	80	80 – 86 = B
Lecture Exam 2:	110	77 – 79 = C+
Lecture Exam 3:	110	70 – 76 = C
Lecture Final:	150	67 – 69 = D+
BioLit Grades:	250	60 – 66 = D
Total:	1000	≤ 59 = F

Tests: There are four exams, worth a total of 450 points. I will provide study guides/lists of definitions and ideas you should know for each exam. We will use Immediate Feedback (IF) testing for a portion (usually 20 points) of each exam. IF testing involves groups of 4-5 students working together to answer a set of questions. I'll go over this in more detail before the first exam.

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 more than 80 points available during the term, but a maximum of 60 points will be applied to your grade. These extra points are added to cover a missed lecture or forgotten device.

Technology: Class time is not the appropriate time to shop or use social media. I'm quite sure you are capable of doing two things at once, but that oaf sitting next to or behind you and staring at your screen is too distracted to effectively learn. Please help the oaf pay attention. **During exams and quizzes, any electronic device seen on your desk or within sight will result in a grade of zero.**

Schedule (subject to change): 16 January – last day to drop without W, 3 April – last day to drop with W. Readings from the textbook are listed next to the lecture topic, and you should read before lecture. There may also be readings, videos, or podcasts assigned; these will be mentioned in a preceding lecture.

Week 1: 11 January

Lecture 1: Introduction

BioLit Session: No meetings

Week 2: 16 and 18 January

Lecture 2: Scientific method: Data, correlations, and hypothesis testing **Ch. 1.6, BioSkills, Vaccine on Canvas**

Lecture 3: Genetics: Genes and individuals **Ch. 13.2, 13.4, 15.5, 16.2, 23.6**

BioLit Session: Module 1 – Intro and hypothesis testing

Week 3: 23 and 24 January

Lecture 4: Genetics: Mutations **Ch. 23.1, 23.2, 23.3**

Lecture 5: Genetics: Populations and Species **Ch. 24.1 and Species on Canvas**

BioLit Session: Module 1 (Experimental design and data interpretation) – Fecal transplants

Week 4: 30 January and 1 February

Exam 1

Lecture 6: Evolution: Phylogenetics **Ch. 25.1, 25.2, and Matzke on Canvas**

BioLit Session: Module 1 – Wolf Spiders

Week 5: 6 and 8 February

Lecture 7: Evolution: Drift and Natural Selection **Ch. 22, 23.3, 23.4, 23.5**

Lecture 8: Evolution: Sexual Selection and Reproductive isolating barriers **Ch. 24.2 to 24.4, RIB on Canvas**

BioLit Session: Module 1 – Influence of phylogeny on fungal communities

Week 6: 13 and 15 February

Lecture 9: Evolution: Hybridization and novel phenotypes

Lecture 10: Evolution: Dispersal and Vicariance **Dispersal & Vicariance on Canvas**

BioLit Session: Module 1 – Assessment

Week 7: 20 and 22 February

Lecture 11: Evolution: Biogeography; Group Activity 1 **Article or video**

Lecture 12: Evolution: Evolutionary novelty and patterns through the Tree of Life **Ch. 25.3, 25.4, and article**

BioLit Session: Module 2 (Synthesizing data and using models) – Predator driven selection in lizards

Week 8: 27 February and 1 March

Exam 2

Lecture 13: Ecology: Populations **Ch. 49, 51**

BioLit Session: Module 2 – Ant bodyguards and pollinators

Week 9: 6 and 8 March

Lecture 14: Ecology: Communities **Ch. 52**

Lecture 15: Ecology: Dispersal – islands and invasions **Article or video**

BioLit Session: Module 2 – Recreational fishing and trophic cascades

Week 10: 13 and 15 March

SPRING BREAK!!!!!!!!!!

Week 11: 20 and 22 March

Lecture 16: Ecology: Ecosystems **Ch. 53**

Lecture 17: Ecology: Urban Systems **Urbanization on Canvas**

BioLit Session: Module 2 – Assessment

Week 12: 27 and 29 March

Exam 3

Lecture 18: Biodiversity: Origins of Life **review Ch. 6 and read ChemEvolution on Canvas**

BioLit Session: Module 3 (Synthesizing multiple scientific papers) – S & S methods

Week 13: 3 and 5 April

Lecture 19: Biodiversity: Bacteria & Archaea **Ch. 26**

Lecture 20: Biodiversity: Protists & Viruses **Ch. 27, 33**

BioLit Session: Module 3 – S & S results

Week 14: 10 and 12 April

Lecture 21: Biodiversity: Plants & Fungi **Ch. 28, 29, 34.1, 34.2, 35.1 to 35.3, 37.1, 37.7, 38.1 to 38.4**

Lecture 22: Biodiversity: Invertebrates to Fishes **Ch. 30, 31, 32.1 to 32.3**

BioLit Session: Module 3 – Print Posters

Week 15: 17 and 19 April

Lecture 23: Biodiversity: Fishes to Amphibians, Reptiles, Dinosaurs, and Avians **Ch. 32.4**

Lecture 24: Biodiversity: Mammals and Hominids **Ch. 32.5 and articles**

BioLit Session: Module 3 – Presentation of final projects

Week 16: 24 and 26 April

Lecture 25: Biodiversity: Evolution of terrestrial organisms Group Activity 2

Lecture 26: Biodiversity: The Anthropocene: loss of biodiversity **Ch. 54 and Extinction Happens on Canvas**

BioLit Session: No Meetings

Final Exam

Wednesday the 2nd of May at 12:30 PM, normal classroom.

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 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/>).

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:

Blackboard, clickers, 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
- Turning Technologies (clickers): 866 746 3015

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

900 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, 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)