Biology 102 Introduction to Biology: Biodiversity and Ecology

University of Tennessee, Spring 2018

Monday-Wednesday-Friday, 11:15 AM – 12:05 PM, Sections 44 – 55, Strong 101

Instructor: Benjamin P. Keck, PhD bkeck@utk.edu
203 Strong Hall 974-8828

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 102 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.

Course website: You will find the Biology 102 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 for the lecture, and a group for your lab.

Course description: For non-biology majors, introduction to the principles of biology as they relate to biodiversity and ecological processes. Topics include a survey of evolutionary theory, an analysis of major representative organisms in the Tree of Life, and ecosystem dynamics including human impact on the environment.

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 incorporate biological ideas into your major area of study.

> **"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 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)

Required Books:

Text: Shuster, Vigna, Tontonoz, and Sinha. 2014. Biology for a Changing World with Physiology. 2nd ed., WH Freeman and Co., New York. 783 pp.

Lab Manual: Biology 102 laboratory manual, 5th ed. by Brewton *must be purchased new*

Sapling Learning Access: If you purchase a new or electronic version of the textbook it will be packaged with access to Sapling Learning (the kit contains a code that will allow you access to the website). If your book is used, you may purchase access to the online site by going to the website http://www2.saplinglearning.com/. Do not wait to ask for help with this! Homework assigned through Homework through Sapling Learning is worth 60 points.

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 lab section. Extra credit is only offered to the class as a whole. Any excuse or concern for absence or tardy work should be discussed in a timely manner. There is a total of 800 points available during the course: 600 in Lecture and 200 in Lab.

Clicker Points:	80
In Class Group Questions:	60
Sapling:	60
Lecture Exam 1:	80
Lecture Exam 2:	100
Lecture Exam 3:	100
Lecture Final:	120
Lab Grades:	200
Total:	**800**

Grading Scale by percentage of 800 points

90 – 100	= A
87 – 89	= B+
80 – 86	= B
77 – 79	= C+
70 – 76	= C
67 – 69	= D+
60 – 66	= D
≤ 59	= F

Tests: There are four exams, worth a total of 400 points. I will provide study guides/lists of keywords 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 3-4 students working together to answer a set of questions. I'll go over this in more detail before the first exam.

Clickers: During lectures, I will ask questions that you will answer with a Turning Point Technologies device (a clicker), or a mobile device with the Turning Point Technologies app. Instructions for registering and using your clicker are found in the Files area of the lecture Canvas site. There will be about 100 points available during the term, but a maximum of 80 points will be applied to your grade. Questions will usually cover previous material along with material from readings assigned for that lecture.

In Class Group Activities: There will be two group learning exercises during the term worth 30 points each; dates below. 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.

Technology: You may use electronic devices in class for topical applications. Off topic use of these devices is not permitted and will result in that device living next to the podium for the remainder of class. Anyone caught using multiple clickers will lose ALL of their clicker points as will the owners of the other clickers, plus they will be confiscated and must be picked up in my office. **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 this before lecture. There may also be readings, videos, or podcasts assigned; these will be mentioned in a preceding lecture.

Week 1: 10 and 12 January
Lecture 1: Introduction: Review and Goals
Lecture 2: Scientific Method: Data, correlations, and hypothesis testing **Ch. 1, Vaccine on Canvas**

Week 2: 15, 17, and 19 January
MLK Day
Lecture 3: Genetics: Genes and individuals **Ch. 7.1, 8.2, 8.4, 10.5**
Lecture 4: Genetics: Recombination, mutation, and reproduction **Ch. 11.2 to 11.5**

Week 3: 22, 24, and 26 January
Lecture 5: Genetics: Populations **Ch. 15.1, 15.2**
Lecture 6: Genetics: Species **Ch. 17.5, 17.6**
Exam 1

Week 4: 29 and 31 January, and 2 February
Lecture 7: Evolution: Theory **Milestones in Biology 5, Ch. 16.7**
Lecture 8: Evolution: Phylogenetics **Ch. 17.1 to 17.3, 17.7**
Lecture 9: Evolution: Earth, Fossils, and Phylogeny **Article or video**

Week 5: 5, 7, and 9 February
Lecture 10: Evolution: Natural Selection **Ch. 14.5 to 14.7, 15.3 to 15.5**
Lecture 11: Evolution: Speciation and Reproductive Isolating Barriers **Ch. 15.6, 15.7, RIB on Canvas**
Lecture 12: Evolution: Hybridization and Introgression

Week 6: 12, 14, and 16 February
Lecture 13: Evolution: Biogeography 1 **Ch. 17.4**
Lecture 14: Evolution: Biogeography 2 **Article or video**
Lecture 15: Evolution: Group Activity 1

Week 7: 19, 21, and 23 February
Lecture 16: Evolution: Extinction **Article or video**
Lecture 17: Evolution: Diversification
Exam 2

Week 8: 26 and 28 February, and 2 March
Lecture 18: Ecology: Intro to Ecology **Palm Oil on Canvas**
Lecture 19: Ecology: Individuals and Populations **Ch. 21**
Lecture 20: Ecology: Community 1 **Ch. 22**

Week 9: 5, 7, and 9 March
Lecture 21: Ecology: Community 2
Lecture 22: Ecology: Ecosystems **Ch. 23**
Lecture 23: Ecology: Biomes

Week 10: 12, 14, and 16 March
SPRING BREAK!

Week 11: 19, 21, and 23 March
Lecture 24: Ecology: Climate change **Article or video**
Lecture 25: Ecology: Island and Invasion biology **Article or video**
Lecture 26: Ecology: Urban Systems **Urbanization on Canvas**

Week 12: 26, 28, and 30 March
Lecture 27: Ecology: Buffer day for snow days or wrap up of ecology and review
Exam 3
Spring Recess

Week 13: 2, 4, and 6 April
Lecture 28: Biodiversity: Origins of Life **Ch. 17.8**
Lecture 29: Biodiversity: Bacteria and Archaea **Ch. 18**
Lecture 30: Biodiversity: Plants and Fungi **Ch. 19**

Week 14: 9, 11, and 13 April
Lecture 31: Biodiversity: Invertebrates
Lecture 32: Biodiversity: Fishes **Ch. 16**
Lecture 33: Biodiversity: Amphibians

Week 15: 16, 18, and 20 April
Lecture 34: Biodiversity: Reptiles
Lecture 34: Biodiversity: Avian and non-Avian Dinosaurs
Lecture 35: Biodiversity: Group Activity 2

Week 16: 23, 25, and 27 April
Lecture 36: Biodiversity: Mammals and Hominids **Ch. 20**
Lecture 37: Biodiversity: The Anthropocene –loss of biodiversity **Ch. 24 and Elephants on Canvas**
Lecture 38: Biodiversity: The Anthropocene –loss of biodiversity **Biodiversity on Canvas**

Final Exam
Thursday the 4th of May at 10:15 AM, in normal classroom.

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 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."***

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/).

Tutoring: Biological Sciences 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/

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://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)