Biology 150: Organismal and Ecological Biology
3 credits (2 credits lecture, 1 credit BioLit session)
The University of Tennessee, Spring 2018

Lecture: days/times: Mondays and Wednesdays from 11:15 AM to 12:05 PM
location: MM-63 (F.H. McClung Museum of Natural History and Culture)

Lecture Instructor: Dr. Arpad Nyari (anyari@utk.edu)
Office location: F239/F241 Walters Life Science
Office hours: Tuesdays from 2 – 5 PM (other meeting times by email appointment please)

BioLit (Biological Literacy): 50 minutes per week (Wednesday) in Strong Hall 242 or 232
accounts for 25% of your course grade
BioLit starts week of Jan. 15th – You MUST attend the first session!
you will receive a separate BioLit syllabus in BioLit class

BioLit Instructors: Chloe Lash – Wednesday, room 242 (28363-001; 28364-002; 28365-003)
Angela Chuang – Wednesday, room 232 (28366-004; 28367-005; 28368-006)
Mali Hubert – Wednesday, room 232 (28369-007; 28370-008; 28371-009)

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.

What you should learn in this course (and for a Biology degree):
By the end of the 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 they 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.

Lecture Schedule **This schedule is tentative and subject to change!** (readings listed here are Freeman SECTIONS; other readings may be assigned)	BioLit Discussion Schedule	Week
Jan. 10 – Course Introduction / Big Ideas in Biology	**No BioLit**	**1**
Jan. 15 – **Dr. Martin Luther King Jr. HOLIDAY** Jan. 17 – Doing Biology (1.6, Bioskills 1, 4, 12, 15, 18) / Scales of Study in Biology (51.1, 52.4 (not Island Biogeography), 54.1, 54.3)	Unit 1: Introduction to BioLit; What is a hypothesis?	**2**
Jan. 22 – Genetic variation in Individuals (1.3, 1.4, 4.2, 16.2 – 16.6) Jan. 24 – Genetic variation in Populations and Species (12.1, 12.2, 13.1, 13.2, 14.2, 14.4)	Unit 1: Duodenal infusion of donor feces for recurrent *C. difficile*	**3**
Jan. 29 – Evolution by Natural Selection (all of Ch 22, 23.1, 23.3) Jan. 31 – Evolution by Natural Selection	Unit 1: Herbivore release through cascading effects	**4**
Feb. 5 – Other Evolutionary Mechanisms (23.2, 23.4 – 23.6) Feb. 7 – Speciation (24.1 – 24.3, 25.3) **--- Exam 1, Friday, Feb. 9 (Doing Biology - Other Evolutionary Mechanisms)**	Unit 1: Rapid temporal reversal in predator-driven natural selection	**5**
Feb. 12 – Speciation Feb. 14 – Phylogenies and Tree Thinking (1.5, 25.1, 25.2, 25.4, Bioskills 13)	**--- Unit 1 Quiz ---**	**6**
Feb. 19 – Phylogenies and Tree Thinking Feb. 21 – Ecology - Populations (49.1, 51.3 – 51.5)	Unit 2: Influence of phylogeny on fungal community assembly and ecosystem functioning	**7**
Feb. 26 – Ecology - Communities (52.1 – 52.2) Feb. 28 – Ecology - Energy and Ecosystems (53.1 – 53.3)	Unit 2: How aggressive ant-guards assist seed-set in Acacia flowers	**8**
Mar. 5 – Biogeography - Global processes (49.2 – 49.5) Mar. 7 – Biogeography - Islands (52.4) **--- Exam 2, Friday, Mar. 9 (Speciation - Biogeography)**	Unit 2: A trophic cascade triggers collapse of salt-marsh ecosystem with intensive recreational fishing	**9**
Mar. 12 – **SPRING BREAK** Mar. 16 – **SPRING BREAK**	**No BioLit**	**10**
Mar. 19 – Prokaryotes (7.1, 7.2, 26.1 – 26.4, 33.1) Mar. 21 – Protists – Evolution of Eukaryotes (27.1 – 27.4)	**--- Unit 2 Quiz ---**	**11**
Mar. 26 – Protists – Evolution of Eukaryotes Mar. 28 – Fungi (29.1 – 29.4)	Designing a scientific poster	**12**
Apr. 2 – Plants (28.1 – 28.4) Apr. 4 – Plants **--- Exam 3, Friday, Apr. 6 (Prokaryotes - Plants)**	Generating graphs using Excel	**13**
Apr. 9 – Animals – Protostomes (21.3, 30.1 – 30.4, 31.1 – 31.3) Apr. 11 – Animals – Protostomes	**No BioLit**	**14**
Apr. 16 – Animals – Deuterostomes (32.1 – 32.4) Apr. 18 – Animals – Deuterostomes, Primates & Hominids (32.5, pg. 702 – 703)	**Poster Presentation Session**	**15**
Apr. 23 – Biodiversity – Threats and Conservation (54.2, 54.4) Apr. 25 – Catch-up and review	**No BioLit**	**16**
--- FINAL Exam = Exam 4 (Animals - Biodiversity) + Cumulative Final, Thursday, May 3, 10:15 AM – 12:15 PM *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."*		

Important Dates: *Jan. 19 - Last day to drop without a "W"*; *Jan. 23 – Adjust hours for financial aid*
Apr. 3 - Last Day to Drop with a "W" (full term); *Apr. 27 - Last Day for a University Withdrawal*

Technology: While in class, use electronic devices only for class purposes (follow along on slides, taking notes, answering posted questions). Using them for other tasks (shopping, social media, etc.) has been found to lead to a significant drop in student course grades! **During exams, any electronic device or note sheet/card seen within your sight will result in a grade of zero in addition to filing of formal academic dishonesty charges**.

Required text and online access:

Textbook: Freeman et al. 2014. Biological Science. 6th ed., Pearson. ISBN-10: 0321976495.
Already, the e-textbook is available to you through Inclusive Access (IA). The Opt-out date for IA is **Friday, January 19, 2018**.

MasteringBiology Access: Inclusise Access allow you to use the e-texbook and do online practice questions based on assigned readings though the MasteringBiology (MB) platform. To access the page for this course on the Pearson website, follow the instructions provided in the email you have received from the publisher or from the pdf I have provided on Canvas. Our course ID is: **nyari81405**

Course website: Go to "https://utk.instructure.com/" to login to Canvas. Here, you will be able to access all course-related materials, including for lectures and BioLit. The modules will be used regularly for communication and posting lecture slides, extra readings, assignments, course grades, etc.

Packback online forum: You will need to gain access to the online discussion forum Packback, where we will engage in discussions of relevant topics that were covered throughout each week. For example, I might post an article and initiate a discussion through a question, which can then be followed-up by a student providing an answer or another question related to that study. Naturally, you are being encouraged to ask your own questions about topics you did not understand during lecture time, and I or other classmates will answer your questions. **You are expected to ask one question and answer two question on this forum each week.**

Communications:

- You need to check your **utk e-mail account** regularly for weekly announcements related to this course. If you are not receiving those e-mails, there is something wrong with your account! Other email servers (Gmail, Yahoo, etc.) will not be linked to the course!
- If you need to meet and can't make office hours, use your UTK e-mail to schedule a meeting. Please allow up to 2 working days (I am away some weekends) for responses to your e-mails.

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.

Assessment of your learning:

Assessment (consisting of worksheets, exams, assignments, and discussions) is very important to the learning process. It lets you and I know what you understand and what you do not. I assess often because it encourages you to keep up with your studying and helps you learn – every time you have to re-process information you learn more! The exams will all be a mixture of multiple choice and short answer. I include written responses and assignments because this type of assessment encourages you to explain and connect ideas, and it helps you learn. Note that this is a 3 credit hour course, which means that you will have to spend **3 hours in-class and at least 6 to 9 hours out of class**, studying and understanding the material.

Distribution of points:	**TOTAL: 1,000 points**
Lecture Exams: (450 points; 45% of grade)	**450 points (45%)**
- Exam 1 (70 points)	7%
- Exams 2, 3, and 4 (90 points each; 270 points total)	27%
- Cumulative Final exam (110 points)	11%
Assignments: (300 points maximum, from about 350 available; 30% of grade)	**300 points (30%)**
- MB and worksheets (1-2 weekly assignments; about 150 - 180 points)	15%
- in-class questions (about 3 each week; about 50 - 60 points)	5%
- Packback online forum (weekly; ask and answer questions; about 100 points)	10%
BioLit: (250 points; 25% of grade) – see BioLit syllabus for breakdown of activities	**250 points (25%)**

Final letter grades will be determined by the total percentage of 1,000 points accumulated as follows:

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

Exams / In-class work / Assignment Policies:

1. NO make-up quizzes or in-class assignments will be given; there will be about 30 "extra" points built into the course to allow for missing classes, getting sick, etc.
   - Written assignments turned in after the due date will lose 25% of the points per 24 hours after the deadline.
2. NO make-up exams will be given without a valid excuse (e.g., family emergency, medical emergency, etc). The excuse MUST be documented.
   - **VERY IMPORTANT**: If you are going to miss an exam, you MUST contact me prior to the start of the exam. Send me an e-mail or leave a note on my door – whatever – and make sure you include your name and e-mail so I can contact you.
   - Make-up exams may be short answer, fill-in-the-blank, or essay and will be scheduled at the instructor's convenience and by their permission only.
3. 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.**

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."***
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> (*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 BioLit 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 useful course-related 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: 100 Dunford Hall; 974-6807 or 865-622-6566 for video phone; 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:
Canvas, clickers, or general information technology assistance:

- Help Desk: 865 974 9900 (M – F, 8:00 – 5:00) or online at http://help.utk.edu/
- OIT Walk-In Help Desk: Commons, 2nd floor Hodges Library

Turning Technologies (clickers): 866 746 3015

Student Health Center: http://studenthealth.utk.edu/
1800 Volunteer Boulevard
865 974-3648

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 (Hodges Library, Ground Floor, 8a-5p M-F)
- Undergraduate Catalogs: http://catalog.utk.edu (Listing of academic programs, courses, and policies)
- Hilltopics: http://hilltopics.utk.edu (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 resources, course requirements, major guides)
- Library: http://www.lib.utk.edu (Access to library resources, databases, course reserves, and services)
- Center for Career Development: http://career.utk.edu (Career counseling and resources; HIRE-A-VOL job search system)

Some advice on how to succeed in Biology 150:

1. This seems obvious, but… attend class, pay attention, and take notes.
2. Use the learning objectives as a study guide – know how to answer them completely, because the exam is testing your understanding of those ideas.
3. Do the pre-class work, and take notes on it. You will be lost in class without this background. And those quizzes are easy points. You will literally drop a letter grade in the class if you don't do them.
4. Go to office hours and the study sessions. Ask me to clarify the information for you!
5. Do not skip BioLit. It is 25% of your grade and the skills you will learn are critical to doing science, not only Biology!
6. Study regularly and don't cram for the exam. It rarely works.
7. Form a study group, but only if you are actually studying in it; if you study alone, create written summaries of the notes and ideas from class and the learning objectives, don't just re-read or highlight the textbook. That rarely works either. Try to EXPLAIN the information to yourself, or write out an explanation without looking at your notes.

Additional advice…

Tips for success

- **Be present** – attend all your classes (lectures, labs, and discussions – every activity in a class was included intentionally to help you learn and is therefore an important part of success in the class!)
- **Be a participant** – engage in learning in class, work with your peers to understand material, take notes in class, ask questions
- **Be perceptive** – your instructor provides clues to success via the content they focus on, activities they have you do, hints they drop in class, and the way they test. Use these cues to be successful in THAT class (which may be different from how to be successful in another class!)
- **Be prepared** – do your homework, take notes on readings (not just highlight them), try to understand things before you go into lecture class
- **Be proactive** – go to office hours and study sessions before exams, stick to a regular weekly or daily study schedule (don't cram), form a study group
- **Be purposeful** – remember your goals for attending college, make adjustments when things don't go right and don't give up

Biggest mistakes

- **Forgetting that meaningful learning takes effort** – it is creating new neural connections in your brain… of course it is hard! For a 3 credit hour course, you will have to spend **3 hours in-class and at least 6 to 9 hours out of class** studying and understanding the material on your own or in a study group.
- **Thinking that intelligence is fixed** – intelligence has no limit and can always be increased over time
- **Not changing course approach after not doing well on a quiz or exam** – see fixed intelligence above; students give up because decide they "aren't good at X or Y"
- **Using passive study approaches versus active testing of knowledge** – re-reading notes or highlighting doesn't build neural connections; studies show that re-writing, re-organizing, and testing yourself are the most effective ways to learn
- **Studying for memorization instead of application** – many high school courses test for memorization (regurgitation of information) while college exams ask students to apply information to a new problem – this requires a different way of studying (see above!)
- **Thinking that grades in high school determine grades in college** – see above; the ways you are tested will be different, so your studying has to be different; it is basically a clean slate for your GPA
- **Assuming that multi-tasking in class is no big deal** – every time you switch to a new task requires a pause in brain function, which means you can't re-capture what you missed; plus, your brain literally cannot process two streams of information at one time (no matter how awesome you think you are at it)
- **Skipping labs or not doing online homework** – just because it is a smaller part of the course grade doesn't mean it isn't significant (a loss of 10% means your highest grade is a B+)
- **Being too afraid to ask for help from peers or teachers** – seeing an idea from a different perspective can be the key to understanding
- **Thinking that college won't be a struggle sometimes** – everyone struggles to reach their potential; that effort is valuable and worth the effort.

Dear Student,
The purpose of this Campus Syllabus is to provide you with important information that is common across courses at UT. Please observe the following policies and familiarize yourself with the university resources listed below. At UT, we are committed to providing you with a high-quality learning experience. I want to wish you the best for a successful and productive semester.

Interim Provost John Zomchick

UNIVERSITY CIVILITY STATEMENT -- http://civility.utk.edu/
"Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, gracious-ness, cordiality, affability, amiability and courteous-ness. Civility enhances academic freedom and integrity, and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other's well-being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus."

EMERGENCY ALERT SYSTEM -- http://safety.utk.edu/
The University of Tennessee is committed to providing a safe environment to learn and work. When you are alerted to an emergency, please take appropriate action. Learn more about what to do in an emergency and sign up for UT Alerts. Check the emergency posters near exits and elevators for building specific information. In the event of an emergency, the course schedule and assignments may be subject to change. If changes to graded activities are required, reasonable adjustments will be made, and you will be responsible for meeting revised deadlines.

ACADEMIC INTEGRITY
"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."

YOUR ROLE IN IMPROVING TEACHING AND LEARNING THROUGH COURSE ASSESSMENT
At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester you may be requested to assess aspects of this course either during class or at the completion of the class. You are encouraged to respond to these various forms of assessment as a means of continuing to improve the quality of the UT learning experience.

DISABILITIES THAT CONSTRAIN LEARNING
"Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Student Disability Services (SDS) at 865-974-6087 in 100 Dunford Hall to document their eligibility for services. Student Disability Services will work with students and faculty to coordinate reasonable accommodations for students with documented disabilities."

Accessible Information, Materials, & Technology -- http://accessibility.utk.edu/

WELLNESS -- http://counselingcenter.utk.edu/ and http://wellness.utk.edu/
The *Student Counseling Center* is the university's primary facility for personal counseling, psychotherapy, and psychological outreach and consultation services. The *Center for Health Education and Wellness* is dedicated to a community model that is embodied in the "VOLS HELP VOLS" commitment: *We are all Volunteers. We look out for each other.* The Center manages 974-HELP, the distressed student protocol, case management, the Sexual Assault Response Team, and the Threat Assessment Task Force.