

Biology 160: Cellular and Molecular Biology (Sections 010-018)
3 credits: 2 credits lecture, 1 credit BioLit Session
The University of Tennessee, Spring 2018

Lecture: Tuesdays and Thursdays, 08:10 am – 09:00 am, Strong Hall, Room 101

Lecture Instructor: Dr. Ben England
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Office: 657B Dabney
Office Hours: Tuesday 10:00am – 12:00pm; Wednesday 1:00pm – 2:00pm

Lecture Assistant: Erin Mans (emans@vols.utk.edu); Office: 242 Strong Hall; hours: TBD
*note: Ms. Mans will take over the lecture for 2-3 weeks starting in mid-February

Skills of Biological Literacy (BioLit): 50 minutes per week in Strong Hall
BioLit starts the week of January 15th
You will receive a separate BioLit syllabus

BioLit Instructors: Amanda DeVolk (adevolk@vols.utk.edu)
Grace Satterfield (gmcsween@vols.utk.edu)
Katrina Schlum (kschlum@vols.utk.edu)

Course Description (from official course catalog): Intended for science majors. An introduction to the major biological concepts emphasizing the cellular and molecular 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).

What you should learn in this course (and certainly by the time you graduate):

By the end of the course, you should be able to explain the **five big ideas (FBIs)*** of Biology:

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.

***the FBIs are taken from the AAAS/NSF Vision and Change report, 2011**

You should also be proficient in 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

In BioLit sessions every week, you will relate the concepts you are learning in lecture to the modern scientific investigations and discoveries being conducted by scientists. BioLit will focus on the FBIs and FSPs, with a specific focus on helping students to be able to do the following by the end of the semester:

1. Interpret a figure.
2. Formulate a testable hypothesis to address a scientific question.
3. Synthesize information and identify patterns from the primary literature.
4. Evaluate data and come to a conclusion.
5. Use a model to make predictions.

How you will learn in this course:

You need to think for learning to occur. I will assign pre-class readings, videos, and quizzes so you can think about the basic concepts before class. Class time will focus on applying ideas, clarifying your understanding, and testing your learning. Exams will test your understanding of the concepts, NOT just your ability to memorize information (short answer will be included on exams).

Active learning techniques will be used in this class. Active learning has been demonstrated to result in better student attitudes toward the subject matter as well as higher grades. Active learning in this course will take various forms: group work and discussion to respond to problems and scenarios posed in class, responding to problems and scenarios using Learning Catalytics (in-class response system), Mastering Biology assignments to re-inforce ideas, and Socratic discussion.

Coming to class is more important than just receiving attendance points. There is a level of learning that one can reach by attending class that one cannot reach by simply teaching oneself the material at home. So yes, attendance will usually be tracked through Learning Catalytics, but that is not the *sole* reason it will be used.

Learning materials (tangible or intangible, buyer's choice):

- Text: Freeman, et al. 2017. Biological Science (6th ed). Pearson Publishing. This book is available at the bookstore, bundled with the Mastering Biology software you also need (see below). The library has a limited number of textbook copies on reserve.
- Mastering Biology software: free with purchase of a new textbook at bookstore. If you purchased Mastering Biology last semester, your subscription is still good. Instructions for registering for MB will be posted on Canvas.
- You will also need to have Learning Catalytics access. Access comes with the purchase of Mastering Biology + the e-text, or you can purchase it separately for ~\$12.

Course website: Go to my.utk.edu to login to Canvas. You will have one Canvas site for the course; BioLit sections will be housed in “groups” within the Canvas site. Canvas will be used regularly for communication and posting the syllabus, extra readings, assignments, course grades, etc.

Communications:

- You need to regularly check your UTK e-mail account for weekly announcements related to this course. If you are not receiving those e-mails, there is something wrong with your account! E-mail is the official means of communication, as dictated by UTK. Therefore, all course announcements and news will be disseminated via e-mail.
- If you need to meet and cannot make office hours, use your UTK e-mail to schedule a meeting.
- Please allow up to 2 work days for responses to your e-mails.

Study Rooms:

- Hesler 417 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 102 Strong Hall.

Assessment of your learning:

As with any class, assessment exists. Assessment in this class will take the form of exams, quizzes, and assignments (both in-class and outside of class). Assessment is important to the learning process. It lets you and I know what you understand. I assess often because it encourages you to keep up with your studying and helps you learn – it also helps me see areas where review may be needed. I am front-loading smaller, lower-stakes assessments in this course in an attempt to ease you into the style of my assessments.

Quiz 1 will be multiple choice; quiz 2 will have a multiple choice in-class portion and a take-home short answer portion. Quizzes 3 and 4 and the exams will be a mixture of multiple choice and short answer, all in-class.

Distribution of Points:

Lecture (75% of grade)

Quizzes/Exams

4 Quizzes	120 points (30 each)
2 Exams	+200 points (100 each)
1 Final exam	+ <u>130 points</u>
	450 points

Assignments (300 points)

Mastering Biology (pre-lectures & homeworks)

In-class Learning Catalytics

Miscellaneous (in-class or take-home)

+300 points for all assignments
750 points total for Lecture

Skills of Biological Literacy (25% of grade)

See BioLit syllabus

+250 points

1000 points total for BIOL 160

Exams / Quizzes / Assignments Policies:

- No make-up assignments will be given for unexcused absences; rather, there will be “extra” points built into the course; these will also allow for missing classes when necessary, forgetting a Wifi-enabled device, etc.
- In the case of an excused absence, you will likely be exempted from the assignment.
- No make-up exams or quizzes 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, call, leave a note on my door – whatever it takes – and make sure you include your name, e-mail, AND a phone number where I can contact you.
 - Make-up exams may be multiple choice, short answer, fill-in-the-blank, or essay and will be scheduled at the instructor’s convenience and with his permission only.
- All work should be done independently (unless group work is permitted, and then you may work only 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 Grades:

Final letter grades will be determined by the total points earned out of 1,000 possible points:

A	925 – 1000	C	725 – 764
A-	895 – 924	C-	695 – 724
B+	865 – 894	D+	665 – 694
B	825 – 864	D	625 – 664
B-	795 – 824	D-	594.5 – 624
C+	765 – 794	F	< 594.5

A note on rounding

If there is a situation where there are digits to the right of the decimal point, points will be rounded as follows: ≥ 0.50 will be rounded to the next highest whole number. For example,

- Jon earns 893 points out of 1000 possible points. Jon receives a B+ in the class.
- Robb earns 929 points out of 1000 possible points. Robb receives an A in the class.
- Arya earns 924.5 points out of 1000 possible points. This is rounded to 925 points, following the established rounding rule. Arya receives an A in the class.
- Bran somehow manages to earn 894.49 points out of 1000 points. Following the established rounding rule, Bran's point total remains at 894.49. Bran receives a B+ in the class, a completely acceptable and above average grade.

You can always reference this syllabus to see how many points you need in order to earn your desired grade. You will know your point total several days before the final exam, allowing you to do the math to determine how many points you need to earn on the final exam in order to achieve your desired grade. There will be no extra credit opportunities during finals week. So there is no need to e-mail me to ask if you can write a paper, do a project, etc. to earn a few more points.

Academic Integrity:

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

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.”

-- 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 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 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, 9am-9pm M-Th, 9am-5pm F, 4p-9p Su

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://bannersb.utk.edu/kbanpr/bwkschd.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)

Study Tips and Suggestions:

General recommendations for college study patterns indicate that a student may need to spend up to 2 hours studying outside of class for every hour in class. As this class is a 3-hour class (meets 3 hours per week), that would mean you may need to spend up to 6 hours outside of class each week studying. Combined with the 3 hours of class you will have each week, this means you may spend up to 9 hours per week devoted to BIOL 160. Please note that when I write study or studying, I am also including viewing videos and completing class-related assignments. Therefore, it's about 9 hours a week devoted to completing all activities related to BIOL 160: assignments, studying, and attending class itself.

Here is a suggested study pattern:

- Before Class: Complete the pre-class activities (reading, videos, quizzes, assignments)
- Attend class (lecture or BioLit Session)
- After class: work on class assignments to identify weaknesses. Re-read the text and/or seek help to understand those topics you have not fully grasped.

You can repeat this pattern 2-3 times per week (repeat for every class session).

In case you were wondering, that math can be extrapolated to your entire semester schedule. If you are taking 15 credits this semester, you should plan on devoting 30 hours per week to studying and completing homework (2 hours outside of class per credit). Combined with the 15 hours of week you spend in class, that's $30 + 15 = 45$ hours per week devoted to school. A full-time job! However, this number is often lower, generally for two main reasons: (1) some classes do not require 2 hours outside of class for every hour in class, and (2) student study habits tend to improve as time proceeds. Even if you spend 45 hours a week devoted to school as a freshman, that number is almost guaranteed to decrease as you progress through college.

Course Schedule:

WEEK	DATE	TOPIC	READING
1	01/11/2018	Course Introduction & Cell Theory	1.1-1.2
2	01/16 01/18	Basic Chemistry, Water, Functional groups Macromolecules: Proteins	2.1-2.2, 2.5 3.1-3.4
3	01/23 01/25	QUIZ 1 (Ch 1-3) & Macromolecules: Nucleic Acids Macromolecules: Carbohydrates (take-home assigned)	4.1-4.3 5.1-5.3
4	1/30 2/1	Macromolecules: Lipids. Diffusion & Osmosis QUIZ 2 (Ch 4-6) + take-home due (discuss in class)	6.1-6.3 -----
5	2/6 2/8	Cellular Components & Transport Cellular Components & Transport	6.4, 7.1-7.2 7.2, 7.4-7.5
6	2/13 2/15	Energy Enzymes	8.1-8.2 8.3-8.5
7	2/20 2/22	QUIZ 3 (Ch 7-8) Cell Respiration: Glycolysis, Citric Acid Cycle	----- 9.1-9.4
8	2/27 3/1	Cell Respiration: Electron Transport. Fermentation Light & Photosynthesis	9.5-9.6 10.1-10.4
9	3/6 3/8	QUIZ 4 (Ch 9-10) & Cell Cycle & Mitosis Meiosis & Genetic Variation	12.1-12.3 13.1-13.3
-----	3/13 3/15	SPRING BREAK WOOOOOOOO!	Netflix Hulu
10	3/20 3/22	Mendelian Genetics Mendelian Genetics Applications	14.1-14.3 14.4-14.5
11	3/27 3/29	DNA: Structure and Synthesis DNA: Synthesis and Repair	15.1-15.2 15.3-15.5
12	4/3 4/5	EXAM 1 (Ch 12-15) Genes: Central Dogma, The Genetic Code, & Mutations	----- 16.1-16.4
13	4/10 4/12	Gene Expression: Transcription & RNA Processing Gene Expression: Translation, tRNA, rRNA	17.1-17.2 17.3-17.5
14	4/17 4/19	Control of Gene Expression: Operons and Splicing Special Topic: Cancer	18.3-18.4, 19.4 12.4, 19.6
15	4/24 4/26	EXAM 2 (Ch 16-19 + Cancer) Review	----- -----
16	5/8	FINAL EXAM 8-10 AM	-----

schedule is tentative and subject to change at instructor's discretion

Most chapters have a pre-lecture and homework associated with them. The pre-lectures are due at 8am the day of the related lecture, and the homeworks are typically due by midnight one week after the associated lecture. Specific due dates are in the Mastering Biology calendar.