

**Biology I****BIOL 1610****Fall semester, 2018**Instructor: Shana Geffaney, Ph.D.Office: BEERC 221LEmail: shana.geffaney@usu.eduOffice phone: 435-722-1784**Time & Place:** Mondays & Wednesdays 5-6:55 PM, BEERC B120**Office Hours:** Friday 10 AM-12 noon & please contact me by email to make an appointment for another time

**Required Textbook:** Biology: How Life Works, 2<sup>nd</sup> edition (ISBN-10: 1-4641-2609-7) by Morris, Hartl, Knoll, Lue, Michael, Berry, Biewener, Farrell & Holbrook  
Additionally you need to purchase access to the LaunchPad portal for the textbook.

**COURSE GOALS**

The broad goals for this course are to help you:

- Develop an understanding of how life works within the framework of core biological processes and concepts
- Begin to think like a biologist and understand how biologists construct new knowledge using evidence gained through the scientific method of observation, experimentation and hypothesis testing
- Develop learning strategies for success in college and beyond

**This class is organized into five conceptual units.**

**Core Concepts in Biology**

1) Structure and function are linked. The structure of molecules, cells, tissues and organisms determine how they function. Example: the types of atoms that form a molecule and the types of bonds between the atoms affect the function of the molecule. Nucleic acids and proteins are important molecules with different structures and functions in living things. What you will learn in this class: how differences in the organization of atoms in nucleic acids and proteins affect their molecular structure and allow these molecules to be used either for information storage or to do work in cells.

2) Organisms grow, change, and maintain themselves by processes that transform and transfer energy. All organisms must obtain energy from their external environment and transform it in a variety of ways to build and maintain themselves. Example: the energy that is stored in a molecule of ATP (chemical energy) can be transferred to a protein, Na<sup>+</sup>/K<sup>+</sup> ATPase. This transfer of energy alters the shape of the protein (mechanical energy) and drives the movement of ions (sodium ions (Na<sup>+</sup>) and potassium ions (K<sup>+</sup>)) against their concentration gradients. This ion gradient is used to maintain osmotic balance in cells. What you will learn in this class: How stored energy in many forms (e.g. chemical bonds and ion gradients) is used to build macromolecules and maintain organisms.

3) Information is transformed as it is transmitted. Organisms require proper information flow within cells and between cells to grow and maintain themselves. Example: the information about how to form a particular protein is held in the sequence of nucleotides in a DNA molecule. This information is transformed from DNA to RNA and then to an amino acid sequence in order to

synthesize a protein. What you will learn in this class: how genetic information and chemical signals are transmitted within and between cells.

4) Evolution: The diversity of life evolved by processes of mutation, selection, and genetic change. All living things are related by common ancestry and change over time in organisms has produced modern, modified species from ancestral species. The heritable traits of a species change through time by the process of evolution. What you will learn in this class: a) how shared structures and processes found in all cells provide evidence that all living things are related by common ancestry and b) how mutations caused by errors in DNA repair lead to genetic variation among individuals.

5) Living systems are interconnected and interacting. Cells are the fundamental units of life. In contrast to non-living things, cells are self-organizing. Cellular self-organization entails a change in cell behavior in response to signals provided by other cells. All multicellular organisms begin life as single cells that have no resemblance to the forms they develop into. The process of development involves organized systems of connections and interactions between cells. What you will learn in this class: how cells use genetic information and chemical signals through common processes of interaction to organize themselves and allow organisms to grow and develop.

**Course Style:** Lectures, discussions and in-class exercises. PowerPoint slides will be posted on Canvas each week before lecture.

**Lectures and note taking:** You will need notes from the discussions, case studies, in-class exercises, lecture, and textbook to study for the exams and answer the multiple-choice and short-answer questions in the exams.

**Pre-class assignments:** There will be seventeen (17) Pre-class assignments, each worth 5 points for a total of 85 possible points. Please complete these in LaunchPad by 2 PM on the day that they are due.

**Quizzes and the Final Exam:** There will be **six (6) quizzes**, each worth 50 points. I will drop your lowest score on the quizzes for your final grade (250 possible points total). The cumulative **final exam** is worth 200 possible points. **You must take the final exam to pass the course.** Quizzes and the final exam will consist of multiple-choice and short answer questions. The multiple-choice questions will be similar in format to the questions in the Pre-Class, In-class Answers and LearningCurve assignments. The short answer questions will be similar in format to the in-class exercises.

**In-class answers:** Learning to communicate scientific information is an important part of your education. You will have multiple opportunities to teach your fellow students and help them understand the material. You will receive 10 possible points each for five (5) in-class answers that you will present to the class. The class will be organized into discussion groups. You will be expected to work with other members of your group to answer the assigned question and then one person will be randomly chosen to present the answer to the entire class.

**Extra Credit:** There will be eighteen (18) LearningCurve assignments in LaunchPad, one for each chapter. You will earn two (2) extra credit points for each LearningCurve assignment you

complete in LaunchPad for a total of thirty-six (36) possible extra credit points. These assignments need to be completed by their due date to earn extra-credit points.

**Grading Scale:**

A	-	93-100%
A-	-	90-92%
B+	-	87-89%
B	-	83-86%
B-	-	80-82%
C+	-	77-79%
C	-	73-76%
C-	-	70-72%
D+	-	67-69%
D	-	63-60%
F	-	59% and below

1. It is your responsibility to keep all graded papers. You will need these if you detect a discrepancy between the grade you calculate for yourself and the grade that you are awarded.
2. I will provide a spreadsheet in Canvas that you can use to calculate your grade.

Grades for Biology I (BIOL 1610) will be based on the following evaluations:

Pre-class Assignments (17 X 5pts.)	85
Quizzes (5 X 50 pts; lowest score dropped for 6 quizzes)	250
In-class Answers (5 X 10pts.)	50
<u>Final Exam</u>	<u>200</u>
Total Points Possible	585

Lecture, Assignment, Quiz and Exam schedule

Lecture	Topics	Readings	Assignments & Exams
August 27	Introduction What is life? How to study life?	Chapter 1	
August 29	Molecules of Life: Atoms and Molecules	Chapter 2 (2.1 to 2.4)	Pre-Class Assignment in LanchPad due August 29
September 3	No Lecture or Lab! Enjoy Labor Day!		
September 5	Molecules of Life: Organic Molecules	Chapter 2 (2.5 & 2.6)	
September 10	Nucleic Acids	Chapter 3 (3.1 & 3.2)	Pre-Class Assignment in LanchPad due September 10
September 12	Transcription	Chapter 3 (3.3 & 3.4)	
September 17	Protein Structure	Chapter 4 (4.1)	Pre-Class Assignment in LanchPad due September 17
September 19	Translation and Protein Evolution	Chapter 4 (4.2 & 4.3)	Quiz 1 (1-3) due Sept. 22
September 24	Lipids, Membranes, and Cell Compartments	Chapter 5	Pre-Class Assignment in LanchPad due September 25
September 26	Capturing and Using Energy	Chapter 6	Pre-Class Assignment in LanchPad due September 26
October 1	Cellular Respiration	Chapter 7 (7.1 to 7.4)	Pre-Class Assignment in LanchPad due October 1
October 3	Cellular Respiration	Chapter 7 (7.5 to 7.7)	Quiz 2 (4-6) due Oct. 6
October 8	Photosynthesis	Chapter 8 (8.1 to 8.3)	Pre-Class Assignment in LanchPad due October 8
October 10	Photosynthesis	Chapter 8 (8.4 & 8.5)	
October 15	Cell Signaling	Chapter 9	Pre-Class Assignment in LanchPad due October 15
October 17	Cells and Tissues	Chapter 10	1. Pre-Class Assignment in LanchPad due October 17 2. Quiz 3 (7 & 8) due Oct. 20
October 22	Cell Division: Mitosis and the Cell Cycle	Chapter 11 (11.1, 11.2 & 11.4)	Pre-Class Assignment in LanchPad due October 22
October 24	Cell Division: Meiosis Crossing Over	Chapter 11 (11.3)	
October 29	Replication of DNA and Chromosomes	Chapter 12 (12.1 & 12.2)	Pre-Class Assignment in LanchPad due October 29
October 31	DNA Manipulation and Genetic Engineering	Chapter 12 (12.3 & 12.4)	Quiz 4 (9-11) due Nov. 3

November 5	Genomes	Chapter 13	Pre-Class Assignment in LanchPad due November 5
November 7	Mutation and DNA Repair	Chapter 14	Pre-Class Assignment in LanchPad due November 7
November 12	Genetic Variation	Chapter 15	Pre-Class Assignment in LanchPad due November 12
November 14	Mendelian Inheritance	Chapter 16 (16.1 to 16.3)	1. Pre-Class Assignment in LanchPad due November 14 2. Quiz 5 (12-14) due Nov. 17
November 19	Mendelian Inheritance	Chapter 16 (16.4 & 16.5)	
November 21	No Lecture! Enjoy the Thanksgiving Holiday!		
November 26	Genetic and Epigenetic Regulation	Chapter 19 (19.1 & 19.2)	Pre-Class Assignment in LanchPad due November 26
November 28	Genetic and Epigenetic Regulation	Chapter 19 (19.3)	Quiz 6 (15-16) due Dec. 1
December 3	Genes and Development	Chapter 20 (20.1 to 20.3)	Pre-Class Assignment in LanchPad due December 3
December 5	Genes and Development	Chapter 20 (20.4 & 20.5)	
Final Exam Week	No lecture		<ul style="list-style-type: none"> <li>• Final Exam (Chapters 1-16 and 19-20)</li> <li>• Available Monday (12/10/2017) through Wednesday (12/12/2017)</li> </ul>

## **ABOUT STUDY AND PREPARATION FOR THE COURSE**

### Studying

Do your best to complete assignments on time. Spend time outside of class thinking about making connections between what you are reading, what we are talking about in class, what we are doing in lab, and your daily life. Since we will spend time on complex concepts in class, you are responsible for learning much of the vocabulary on your own. Flash cards are good for this. In your textbook, be sure to read the introductory material written to you the student for some excellent advice on how to use the book and how to study for biology. Some of the BEST study resources are your peers. I strongly encourage you to study together and try teaching each other as a way to strengthen your understanding of the material.

### **Online Student Resources**

In addition to the textbook website, the USU Academic Resource Center can help you develop your study skill at the Online Learning Center

([http://www.usu.edu/arc/online\\_learning\\_center/](http://www.usu.edu/arc/online_learning_center/)). Additionally, the Student Policy Manual can be read online at <http://www.usu.edu/policies/>

## **COURSE POLICIES**

Instructor's Responsibilities: I will help you learn by engaging you in the material and challenging you to think like a biologist. You can expect me to attend all lectures, read the assigned material, and prepare examinations and quizzes that are fair and representative of the reading assignments, lecture activities, and lab activities as they relate to the learning objectives provided. I will also be available by email, telephone, or in my office during the day to answer questions and provide any needed assistance toward the course learning objectives.

Student's Responsibilities: You are expected to attend each lecture and laboratory, participate in activities, take comprehensive notes, and read the relevant material in the text. You should focus your efforts on achieving the learning objectives by doing the appropriate problems in the text and lab manual, reviewing concepts, and practicing problem solving. In the event that there is any difficulty in keeping up with the pace of the course, it is YOUR responsibility to contact me for advice or assistance. If you cannot take an exam during the scheduled period, you must make other arrangements with me *at least 48 hours before the exam* is given. If you cannot attend a class, you are still responsible for all content.

Attendance: Attendance is very important to be successful in this course. I will not take attendance for the class but be aware that you are fully responsible for all announcements made and material covered in class.

Use of mobile devices and laptops in class: Laptops and tablets are fine for taking notes and following along with material. Please do not open social media pages during class or multitask with non-course elements. This is incredibly distracting. Please do not text, surf the web, or otherwise play with cell phones during class.

!!! Cell phones and Safety: As a general rule cell phones should be put away during lab. Although we are not using hazardous materials (in general) in class phones can provide a pathway from the lab bench to you that should be avoided.

## **UNIVERSITY POLICIES**

### Students with Disabilities

The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program." If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille. For more information go to <http://www.usu.edu/drc/>

### Withdrawal and Incomplete Grade

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework

because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor. If an incomplete grade is to be given, an Incomplete Grade Documentation Form must be filed by the instructor in the department or college office. Students may not be given an incomplete grade due to poor performance or in order to retain financial aid. An incomplete grade may be granted only if the student has completed the majority of the course and is passing the class at the time. More information can be found at <http://www.usu.edu/policies/pdf/Incomplete-Grade.pdf>

### Plagiarism

Plagiarism includes knowingly "representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." To help you learn how to identify and avoid committing plagiarism, go to <http://ocw.usu.edu/English/english-1010/plagiarism.html>

The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, denial or revocation of degrees, and referral to psychological counseling. More about USU policy on plagiarism can be found at <http://www.usu.edu/policies/pdf/Acad-Integrity.pdf>

### Academic Honesty – The “Honor System”

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students.

The University expects that students and faculty alike maintain the highest standards of academic honesty. For the benefit of the students who may not be aware of specific standards of the University with regards to academic honesty, the following paragraph discussing infractions of academic integrity is quoted from the Student Policy Handbook (<http://www.usu.edu/policies/pdf/Acad-Integrity.pdf> )

### Infractions

*Acts of academic dishonesty include, but are not limited to:*

*1. Cheating. (1) Using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity, including working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually”; (2) depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (3) substituting for another student, or permitting another student to substitute for oneself, in*

*taking an examination or preparing academic work; (4) acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission; (5) continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity; (6) submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or (7) engaging in any form of research fraud.*

*2. Falsification. Altering or fabricating any information or citation in an academic exercise or activity.*

*3. Plagiarism. Representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.*

### Penalties

*A. An instructor has full autonomy to evaluate a student's academic performance in a course. If a student violates the Honor System, the instructor may sanction the student as part of the course evaluation. Such sanctions may include: (1) verbally warning the student; (2) giving the student a written reprimand; (3) requiring the student to rewrite a paper/assignment or to retake a test/examination; (4) adjusting the student's grade—for either an assignment/test or the course; or (5) giving the student a failing grade for the course. A sanction by the instructor is not a disciplinary penalty. If the instructor believes that, in addition to any sanction, the student should be disciplined and a penalty imposed, the instructor shall refer the student for disciplinary proceedings.*