2014

160-03/05 General Biology I

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BIOL 160- 03, 05 General Biology I Fall 2014
Section 03: Tue and Thur 8:30 – 9:45 in Albers 103, and Fri 1:00 – 1:50
Section 05: Tue and Thur 1:00 – 2:15 in Albers 103, and Fri 1:00 – 1:50

Lecture Syllabus – short version

instructor: Dr. Dottie Engle office: Albers 108 email: engle@xavier.edu phone: 745-3807

Overall Course Goals

Your goal for this course is to learn as much Biology as possible.

My goal is to facilitate your learning during our time together (3 hours a week in class and 1 hour a week in tests or other activities, plus some additional time with personal appointments as needed).

The Biology departments’ goal is for you to obtain a thorough understanding of fundamental biological concepts that you will use in the further study of Biology or related fields. The other teachers in the Biology Dept. expect to build on what you learned this semester.

Secondary Education: This course addresses NSTA standards 1a, 1b, 3a, 3b, 5d.

Useful Information:

Materials For homework and lecture preparation, access materials posted in Canvas.

Attendance In class, we will have lecture and group activities. Please bring your notes for the day’s material, and also an internet-connectable device (portable computer, tablet or phone, whatever you have).

Textbook BIOLOGY by Urry et al. (10th ed.)

Homework Assignments

Daily homework assignments (Pre Assignments for each chapter) will be posted in Mastering Biology interactive website, via CANVAS.

Occasional paper homework assignments will be given out in class or posted in Canvas.

Office Hours Tuesdays and Thursdays 10:00 -11:00, 3:00 – 3:30 and Wednesdays 2:00 – 3:00. Other time available if you ask me.

Grading

Your grade is determined by a combination of tests, assignments, and class participation.

Assignments: 10% (average of all assignments)

On-line Chapter Pre-Assignments – each one is a separate score, percentage score X 10 points
(The lowest 3 on-line scores will be dropped before final grades are calculated.)
On-paper Assignments (see Schedule) – 10 points each for a good-faith effort, no unanswered questions
Attendance at 5 Freshman Friday Information Sessions or appropriate substitutes – 10 points each

Team Exercises: 5%

In-class participation includes group exercises and group tests. Averaged together these are worth 5% of your grade.

Tests: 85%

All tests are taken in Kennedy Auditorium, on Fridays at 1:00 for most of you or 3:00 for those in CHEM 160 at 1:00. Except the final exam, which will be on a Tuesday.
**Schedule**

The schedule and procedures in this course are subject to change in the event of extenuating circumstances.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Before class: Text to skim/read and Chapter Pre-Assignment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/26 Tu</td>
<td>Introduction, the process of science</td>
<td>Ch. 1 pp1-11, 18-24, Ch. 1 Pre-assignment due 9 am, 8/29</td>
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<tr>
<td></td>
<td>8/28 Th</td>
<td>Tour of the Cell</td>
<td>Ch. 6 Pre-assign.</td>
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<tr>
<td></td>
<td>8/29 F</td>
<td>Meet in location TBA: Learning Style Assessment</td>
<td>“Being a Successful student” (link in Canvas) and Learning Style Assessment (link in Canvas)</td>
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<tr>
<td>2</td>
<td>9/2 Tu</td>
<td>High school chemistry review; Water, Carbon, and Biological Molecules</td>
<td>Ch. 3, 4, 5 (Ch. 2 if needed) Pre-assign.</td>
<td>Remember to go to SI this week and every week!</td>
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<tr>
<td></td>
<td>9/4 Th</td>
<td>continued</td>
<td>Ch. 3, 4, 5 Pre-assign.</td>
<td>Team Interview Sheet due</td>
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<td></td>
<td>9/5 F</td>
<td>Freshman Friday in Kennedy Aud CLC 412</td>
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<tr>
<td>3</td>
<td>9/9 Tu</td>
<td>Metabolism</td>
<td>Ch. 8 Pre-assign.</td>
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<tr>
<td></td>
<td>9/11 Th</td>
<td>Membranes</td>
<td>Ch. 7 Pre-assign.</td>
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<td></td>
<td>9/12 F</td>
<td>Test 1 Ch. 1 - 8 (not 7) 100 points Meet in Kennedy Auditorium CLC 412</td>
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<tr>
<td>4</td>
<td>9/16 Tu</td>
<td>Chemical Signals</td>
<td>Ch 11 pp 206-210, Pre-assign.</td>
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<tr>
<td></td>
<td>9/18 Th</td>
<td>Photosynthesis</td>
<td>Ch. 10 Pre-assign.</td>
<td>Post Test 1 Analysis due</td>
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<td></td>
<td>9/19 F</td>
<td>Freshman Friday in Kennedy Aud CLC 412</td>
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<tr>
<td>5</td>
<td>9/23 Tu</td>
<td>Cellular Respiration</td>
<td>Ch. 9 Pre-assign.</td>
<td>Due: Paper Assignment 1 – Time Log 1 (complete for Chapter 10)</td>
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<tr>
<td></td>
<td>9/25 Th</td>
<td>Mitosis</td>
<td>Ch. 12 Pre-assign.</td>
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<td></td>
<td>9/26 F</td>
<td>Test 2 Ch. 7, 11, 9, 10: 100 points</td>
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<tr>
<td>6</td>
<td>9/30 Tu</td>
<td>Meiosis and Sexual Life Cycles</td>
<td>Ch. 13 Pre-assign.</td>
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<tr>
<td></td>
<td>10/2 Th</td>
<td>Mendel and Genes</td>
<td>Ch. 14 Pre-assign.</td>
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<td></td>
<td>10/3 F</td>
<td>Test 3.1 Ch. 12, 13, 50 points</td>
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<td>7</td>
<td>10/7 Tu</td>
<td>Chromosomal Basis of Inheritance</td>
<td>Ch. 15 Pre-assign.</td>
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<td></td>
<td>10/9 Th</td>
<td>No class: Fall Holiday</td>
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<tr>
<td></td>
<td>10/10 F</td>
<td>No class: Fall Holiday</td>
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<tr>
<td>8</td>
<td>10/14 Tu</td>
<td>Molecular Basis of Inheritance</td>
<td>Ch. 16 Pre-assign.</td>
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<td></td>
<td>10/16</td>
<td>Genes to Proteins</td>
<td>Ch. 17 Pre-assign.</td>
<td>Due: Paper Assignment 2 – Preparing for your advising appointment</td>
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<td></td>
<td>10/17</td>
<td>Test 3.2 Ch. 14, 15, 16: 50 points</td>
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<td></td>
<td>Date</td>
<td>Topic</td>
<td>Chapters</td>
<td>Assignments</td>
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<tr>
<td>9</td>
<td>10/21</td>
<td>Genetics of Viruses, Gene Expression</td>
<td>Ch. 18, 19 Pre-assign.</td>
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<td></td>
<td>10/23</td>
<td>DNA Technology</td>
<td>Ch 20    Pre-assign.</td>
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<td></td>
<td>10/24</td>
<td>Freshman Friday in Kennedy Aud CLC 412</td>
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<tr>
<td>10</td>
<td>10/28</td>
<td>Animal Structure and Function</td>
<td>Ch 40    Pre-assign.</td>
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<td></td>
<td>10/30</td>
<td>Animal Nutrition</td>
<td>Ch. 41   Pre-assign.</td>
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<td>10/31</td>
<td>Test 4, Ch. 17, 18, 19, 20, 100 pts</td>
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<tr>
<td>11</td>
<td>11/4</td>
<td>Gas Exchange</td>
<td>Ch. 42A pp 898, 918-927 Pre-assign.</td>
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<td></td>
<td>11/6</td>
<td>Circulation</td>
<td>Ch. 42B pp 898, 901-915 Pre-assign.</td>
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<td>11/7</td>
<td>Freshman Friday in Kennedy Aud CLC 412</td>
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<td>12</td>
<td>11/11</td>
<td>Immunity</td>
<td>Ch. 43   Pre-assign.</td>
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<td>11/13</td>
<td>Excretion</td>
<td>Ch. 44   Pre-assign.</td>
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<td>11/14</td>
<td>Test 5, Ch. 40, 41, 42, 43, 100 points</td>
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<td>13</td>
<td>11/18</td>
<td>Animal Reproduction</td>
<td>Ch. 46   Pre-assign.</td>
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<td>11/20</td>
<td>Animal Development</td>
<td>Ch. 47   Pre-assign.</td>
<td>Due: Paper assignment 3 – End of semester reality check</td>
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<td></td>
<td>11/21</td>
<td>Freshman Friday in Kennedy Aud CLC 412</td>
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<td>14</td>
<td>11/25</td>
<td>Nervous System</td>
<td>Ch. 48   Pre-assign.</td>
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<td></td>
<td>11/26-28</td>
<td>No classes: Thanksgiving Break</td>
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<tr>
<td>15</td>
<td>12/2</td>
<td>Nervous System, Sensory Mechanisms</td>
<td>Ch. 49, 50A pp1087-1105 Pre-assign.</td>
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<td></td>
<td>12/4</td>
<td>Sensory Mechanisms</td>
<td>Ch. 50A  Pre-assign.</td>
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<td>12/5</td>
<td>Test 6, Ch. 44, 46, 47, 48, 100 pts</td>
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<td>16</td>
<td>12/9</td>
<td>Movement and Locomotion</td>
<td>Ch. 50B pp1105 – 1117 Pre-assign.</td>
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<td></td>
<td>12/11</td>
<td>Endocrine System</td>
<td>Ch. 45   Pre-assign</td>
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<td></td>
<td>12/12</td>
<td>Makeup exams, location TBA</td>
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<td>(Optional final review assignment—no credit)</td>
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<td>1:30-2:20</td>
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<td>17</td>
<td>12/16</td>
<td>Test 7, Ch. 49, 45, 50: 50 points &amp; Comprehensive Final Exam 200 points</td>
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<td>3:00 – 5:00</td>
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Notes: Write down key points from the extended syllabus that you want to keep handy.
Lecture Syllabus – extended version

Introduction and Logistics quiz in Canvas to count for hw

Overall Course Goals
Your goal for this course is to learn as much Biology as possible. Since each person comes to this class with different backgrounds, study skills, desires, and abilities, “possible” for you may be different than for others. Your depth of knowledge should increase over the semester, regardless of where you start. So be cautious about comparing yourself to others. On the other hand, it can be useful to find out what very successful students are doing that makes them successful. In order to earn the grade that you want, you will have to “walk the walk”, modeling the study skills and behaviors of high-achieving students. For example, it will be better to discuss Biology during lunch than to discuss last weekend’s party during lab.

My goal is to facilitate your learning during our time together (3 hours a week in class and 1 hour a week in tests or other activities, plus some additional time with personal appointments as needed). In class I will define, explain, apply, ask and answer questions. I will give you opportunities to practice and reinforce what you learn. From tests and group activities you will get feedback on how much and how well you are learning Biology. I will help you as you refine study skills, explore career choices, and prepare for the future. I will even tell you a few jokes.

The Biology departments’ goal is for you to obtain a thorough understanding of fundamental biological concepts that you will use in the further study of Biology or related fields. The other teachers in the Biology Dept. expect to build on what you learned this semester.

Specific Learning Outcomes

When you are finished with this course, if you have applied appropriate amounts of time, attention and energy, you should be able to:

• define a “testable hypothesis” and distinguish between a hypothesis and a prediction
• define “scientific theory” and explain how a scientific theory differs from a hypothesis and from colloquial uses of the word “theory”
• name the seven characteristics common to all living things
• list the levels of biological organization and apply them to the study of vertebrate systems
• compare and contrast the structure of prokaryotic and eukaryotic cells
• describe the structure and function of organelles
• explain the relationship between chemistry and biology and describe how chemical reactions drive biological processes
• name the four major kinds of biological macromolecules and be able to recognize their structure
• define metabolism and homeostasis and explain their roles in living systems
• describe the structure and function of biological membranes, including chemical signalling
• describe the process and products of cellular respiration and explain its role in living systems
• describe the process and products of photosynthesis
• describe mitosis and meiosis and be able to compare and contrast these processes
• distinguish between “gene”, “allele”, “locus”, “genotype”, and “phenotype”
• describe inheritance in living systems, both at a chromosomal and molecular level
• construct a Punnett Square and conduct a simple pedigree analysis
• state and explain the “Central Dogma” of molecular biology
• describe the processes of DNA replication, transcription, and translation
• explain how it is possible that all cells in a body contain the same genetic information, but have different structures and functions
• describe current techniques in molecular biology and be able to apply these concepts to real situations
• describe the structure and function of various cell types in the body
• name the four basic tissue types in the body and be able to recognize them
• describe the structure and function of the digestive system of vertebrates
• describe the structure and function of the cardiopulmonary system of vertebrates
• describe the structure and function of the immune system of vertebrates
• describe the structure and function of the endocrine system of vertebrates
• describe the structure and function of the reproductive system of vertebrates
• describe vertebrate development, including the origins of different tissue types
• describe the structure and function of the nervous system, including the sensory mechanisms
• describe the structure and function of the skeletal-muscular system
• apply concepts of vertebrate physiology to real situations
• demonstrate higher-order (critical) thinking skills in using the understanding gained by meeting the previous objectives

Resources to Achieve Goals

In class

Bring to class the outline posted in Canvas and your notes from the Pre-Assignment.

During lecture I will explain concepts, simplify difficult areas, break complex material down into easier pieces, demonstrate how to solve problems, and give you practice working problems. In class, take notes using the lecture outline provided, but don’t be hysterical to get every detail. It is more important to get the big picture to connect to what you learned earlier, and to understand the “whys” and “hows”. Leave spaces between lines to fill in details from the textbook later, or plan to re-write your notes.

Useful things happen in class that can’t be replicated by reading the textbook on your own. Because teamwork is an important component of almost every career, some of our work will take place in small groups. The ability to work well with others is especially important in scientific research and/or health care, and is greatly emphasized in health professional schools. For example, medical school faculty have specifically requested that we use group work in at least some of our pre-med courses, and that we specifically evaluate your relevant interpersonal skills in letters of recommendation. In this course, in-class participation includes group exercises for credit.

Textbook

BIOLOGY by Urry et al. (10th ed.) Be sure to read over the assigned pages before class. This gives you a good idea of what will be covered, allows you to ask questions, and helps you remember what you already know from high school Biology (even if it was a long time ago.) The book comes with a useful web site that has learning activities, animations, and practice quizzes (see below).

In college you will have to read textbooks, articles, and primary sources such as historical documents or scientific papers. If some high schools do not emphasize good reading habits, then the amount of reading can come as a shock to students. I hope these hints will help you:

Make sure you know what is expected from the reading. Sometimes you are looking for simple facts or definitions. Other times you are reading to understand ideas or concepts. There may be examples that help you to understand the concepts; does the teacher expect you to memorize the examples or just understand the ideas? Early on, teachers will give you guidance about their expectations. Eventually, though, you should learn to figure out for yourself what level of reading depth is needed.

When reading something that has new words, attack it one paragraph at a time. First skim the paragraph and underline any words you don’t know. Then use the glossary or a dictionary to find synonyms or short definitions for each word; write these above the word. Now read the paragraph, using the synonyms or definitions in place of the unfamiliar words. It even helps to read the paragraph out loud! This strategy is a great way to learn new vocabulary words as well as learn the ideas in the material.
When you take written notes on your reading, read a paragraph, then cover it and write down the main idea. Make sure that you “paraphrase” instead of copying. If you can’t put a definition or idea into your own words, then you don’t really understand it!

Don’t be surprised if you have to read something more than once. We all have to do this!

**Homework Assignments**
Daily homework assignments (Pre Assignments for each chapter) will be posted in Mastering Biology interactive website; access this via Canvas.

MYLAB and MASTERING BIOLOGY: I recommend that you start with the two-week free trial first. If you decide to stay in General Biology, then to set up your account in Mastering Biology, you will need these things:

1 – email address,
2 – your personal access code that came with your new textbook or that you will purchase separately,
3 – the Course Name: General Biology I Fall 2014 Engle
4 – the Course ID: which I will give you in class

Occasional homework assignments will be given out in class or posted in Canvas. Some of these will help you assess your personal study skills and others will be personal preparation for group exercises.

**Office Hours**
If you have questions that are not answered in the syllabus or the textbook, then please visit me in my office, Albers 108. Bring some friends if they have the same questions. My office hours are Tuesdays and Thursdays 10:00 -11:00, 3:00 – 3:30 and Wednesdays 2:00 – 3:00. Also, I am usually here every day by 8:30ish (with occasional exceptions), so you have ample opportunities to catch me if my office hours don’t suit you.

**Supplemental Instruction**
You might have heard the legends about killer science courses that are designed to weed out students. DO NOT EXPECT THAT TO HAPPEN HERE. At XU, we prefer to nurture your development as young scientists! We have provided a variety of tools for your success. The Learning Assistance Center offers approved SI (Supplemental Instruction) General Biology Study Groups. In addition to being fun, SI groups have been shown to have a dramatic positive effect on achievement in high-risk courses. SI is one of the best tools available.

The Learning Assistance Center also provides private tutors, but you will be required to try the SI groups first. 8:30 class SI leader is Michael Crowe. 1:00 class SI leader is Grace Lambert.

**Assessment (Testing)**
We all need feedback to determine whether or not we are doing what we are supposed to be doing. “Formative Assessment” is used for practice and is done early so that you can revise your study strategies and correct mistakes; this is part of Studying and Homework (see below). “Evaluative Assessment”, aka TESTING, measures what you have learned. In this class, tests are scheduled during the test time on Fridays at 1:00 as indicated. They will cover lectures and readings and will contain multiple choice or rarely, true/false questions. You will take each test on your own first. In the next class period, you will take a short version of same test in your group. The final exam period will be used for the last test and the cumulative Final Exam.

You may arrange to take a test at an alternate time, with appropriate supervision, if you have an immovable conflict with the quiz time (for example, a sporting event if you are on a team).

**MAKEUP TESTS WILL BE GIVEN AT THE END OF THE SEMESTER, ON THE LAST FRIDAY.** If you miss a test due to illness or some other real emergency, you must write or e-mail me a note explaining your absence. You don’t have to do this the day of the missed test, but a reasonable student will provide the note when he/she is well enough to return to class. If you have a very long absence by college standards (more than 1-2 days), then you should contact all your teachers to work out reasonable long-term make-up arrangements. This is especially important for extended absences that could involve making up several tests or assignments.

**Academic Honesty**
In accordance with the Xavier University catalog, the penalty for intentional academic dishonesty in this course is a failing grade (F).
You may work with others on homework, as long as you do not just copy someone else’s answers (but of course, you already know that would be stupid).

**Grading**

Your grade is determined by a combination of tests, assignments, and class participation.

**Assignments: 10%**

On-line Chapter Pre-Assignments – each one is a separate score, percentage score X 10 points

*(The lowest 3 on-line scores will be dropped before final grades are calculated.)*

On-paper Assignments (see Schedule) – 10 points each for a good-faith effort, no unanswered questions

Attendance at 5 Freshman Friday Information Sessions or appropriate substitutes – 10 points each

**Team Exercises and Tests: 5%**

In-class participation includes group exercises and group tests. Averaged together these are worth 5% of your grade. A peer evaluation score determines what proportion of the group score each person will earn. Normal participation will earn you all of the group points. The peer evaluation takes into account factors such as attendance, contribution to group work, treating team members with respect, completion of preparation assignments, etc. We will have a midterm peer evaluation for midterm grades, and a final one for final grades; in other words, a poor midterm evaluation will not hurt you if you use the feedback to revise your behavior for the rest of the term.

**Tests: 85%**

All tests are taken in Kennedy Auditorium CLC 412, on Fridays at 1:00. Except the final exam; **ALL BIOL 160 exams** are at 3:00 p.m.-5:00 p.m. on Tuesday, December 16, 2014.

**Grading Scale:**

- A = exceptionally qualified to continue in Biology (94%)
- A' = especially well qualified to continue in Biology (91%)
- B+ = very well qualified to continue in Biology (88%)
- B = well qualified to continue in Biology (84%)
- B' = qualified to continue in Biology (80%)
- C+ = minimally prepared to continue in Biology (77%)
- C = minimally prepared to continue in Biology if you improve your study skills and/or motivation (73%)
- C' = not prepared to continue in Biology unless you greatly improve your study skills and/or motivation (70%)
- D+ = passing for Core Curriculum credit, but not sufficiently prepared to continue in Biology (67%)
- D = passing for Core Curriculum credit, but not sufficiently prepared to continue in Biology (63%)
- D' = minimum passing for Core Curriculum credit, but not sufficiently prepared to continue in Biology (60%)
- F = no credit (below 60%)

Last year’s grade distribution:

A range 16%, B range 31%, C range 21%, D range 11%, F 6%, withdraw 10%, audit 2%.

**How to Use the Resources: Studying and Homework**

“Studying” is a key part of the learning cycle and includes two main components, preparing for class and preparing for evaluation or assessment (ie. tests). Probably the most common mistake that students make is trying to do all of this work in the night or two before the test. Plan to spend a minimum of 2 hours studying outside class for every hour in class. This works out to at least 6 hours a week of homework for this 3 credit course. To help you make the shift from high school studying to college studying, I will give you very specific assignments. The purpose is to reward you for establishing good study habits right at the beginning of your college career. Over time the responsibility for your studying will shift from me to you, so that by
the end of the semester you should know what you need to do to succeed in college science courses.

In addition to allowing enough time for studying, you also need to decide what you will DO while studying. In general, study habits are actions. When designing good study habits it may be useful to know your individual learning style, or your best learning strategies. In collaboration with the Learning Assistance Center, we will conduct a Learning Style Assessment the first week. For example, some people are visual learners and learn best with pictures and diagrams. Other people may be auditory learners who process by listening and talking; they should definitely tape lectures, and also study by reading the text and lecture notes out loud. Some others learn most easily by reading; the textbook will be their best friend. In addition, it is often helpful to form a study group or join Supplemental Instruction to enhance (not replace!) personal learning.

Successful performance in this course will require a large amount of factual memorization, but most importantly, conceptual understanding, as manifested by the synthesis and application of knowledge to solve problems. Your role and responsibility as a student is to actively learn. My role and responsibility as the instructor is to facilitate your learning.

**Before Class:** Get “big picture” in preparation to understand the lecture.
1. Access and complete pre-class material form Canvas.
2. Read the Key Concept headings and sub-headings for the chapter, as this helps you understand how information fits together into the whole.
3. Watch the animations posted on Canvas or Mastering Biology for the chapter.

**During Class:** Actively listen and participate to connect concepts.
1. Take thorough notes. Take notes as if you were taking them for a best friend who was solely dependent upon the information you write down to be successful.
2. Try to ask conceptual or higher level questions in class.
3. Try to make connections between previous and current information.
4. Bring colored pencils, as I sometimes utilize different colors to help explain concepts.
5. Some people like to use a small tape recorder to tape lectures; then they can take fewer notes, expanding them out later while listening again. If you have a long commute to/from school, you can use the driving time to listen to lecture tapes.

**After Class:** Assess your understanding.
1. Revise your notes the same day. Make notes in the margin concerning information that is unclear.
2. Obtain clarification of unclear information from the book, a peer, SI leader, tutor, professor, or any other resource.
3. If very helpful, re-write notes. I typically recommend this, although it can be time-consuming. However, the practice is extremely valuable in helping most students better understand the information.
4. Solve problems to assess your understanding. In Mastering Biology, there is a “Study Area” that is exceptional.
5. Complete the main studying within 2 days of the corresponding lecture for maximal benefit. Avoid procrastinating until Thursday night before the exam on Friday. Such procrastination prevents you from getting clarification on unclear concepts.
6. Attend Supplemental Instruction on a regular basis.