

# Biology 180 – General Biology: Molecules, Cells, and Genetics

4 Credits, CRN # 10014

Fall 2012

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**Office Hours:** Mon 1-2 PM, Tues 2-3 PM, Wed 12-1 PM, Thurs 1:30-2:30 PM

## Class Schedule:

Lecture	Room 2726	10:15 AM – 11:40 AM	Tuesday/Thursday
Laboratory	Room 2711	8:35 AM – 11:45 AM	Wednesday

## Required Materials:

**Textbook:** Volume 1 Biology (Custom Edition), Campbell, et al.  
**Lab Manuals:** General Biology: Molecules, Cells, and Genetics – Symbiosis Lab Manual  
BioRad Lab Manual

## Course Description:

This is one of two entry-level courses designed for life science majors, health care, and science educators intending to transfer to four-year institutions. However, the course is open to all students. This course will introduce students to molecules of cells, cell structures and functions, cell division, cellular respiration, photosynthesis, molecular biology, and genetics.

## Course Objectives:

1. The student will understand the basic concepts of biology and explain and use the scientific method.
2. The student will describe the structure of atoms, and understand why chemical bonds form.
3. The student will explain the important properties of water molecules and carbon atoms for life.
4. The student will describe the different macromolecules in living organisms, and give examples of each type.
5. The student will understand the functions of cell organelles.
6. The student will explain the functions of the cell membrane.
7. The student will describe metabolism, and understand how enzymes assist in chemical reactions.
8. The student will explain the processes of cellular respiration and photosynthesis.
9. The student will understand the processes of cell communication.
10. The student will describe the processes of mitosis and meiosis, and how they are regulated.
11. The student will explain Mendelian inheritance, give examples of inheritance patterns, and work problems dealing with basic Mendelian genetics.
12. The student will describe chromosome structure and function, including DNA replication and repair, and give examples of genetic diseases at the chromosomal level.
13. The student will understand the processes of transcription and translation, and how DNA mutations cause changes in protein sequences.
14. The student will discuss modern DNA technologies, and their importance in life.

## Student Learning Outcomes (SLOs): (1) Communication Skills, (2) Critical Thinking Skills, (3) Personal Responsibility, (4) Information Literacy, (5) Global Awareness

Upon completion of this course students will be able to:

1. Write lab reports that demonstrate an understanding of the lab and the ability to draw conclusions based on data. (1, 2)
2. Discuss primary research literature and understand how science is performed and described. (4)
3. Demonstrate the ability to think like a scientist by coming up with a valid experimental design. (2)
4. Demonstrate critical-thinking skills on exam essay questions. (2)

### **Class Policies:**

1. Class attendance and tardy policy follows the regulations in the IVC catalog.
2. Attendance will be taken at the start of each lecture and lab.
3. Students may be asked to drop the class if absent or tardy from more than 3 lectures and/or labs.  
**NOTE:** Family issues, travel issues, work-related problems, alarm clock failure, UFO sightings, etc., are not valid reasons for being late or absent to class! Only real emergencies will be considered to be excused absences. Excused absences must be documented.
4. The deadline for dropping a course without appearing on transcript is **Monday, September 3**.
5. The deadline for dropping a full-term class is **Saturday, November 10**.
6. No food or drinks in the lab. Only bottled water allowed in the classroom.
7. **Cell phones must be turned off at all times!** Ringing cell phones are a distraction both to me and to other students in the class. If you must use your cell phone during class, please take it outside, and then come back in when you are done. You should not be checking your phone, or texting, during lectures. If you are caught checking your phone, or texting, during class, you may be asked to leave for the day and will be marked absent.
8. **No talking during class!** Talking is a distraction to me and other students in the class. If you have questions during the lecture, please ask me! If you are caught talking, you may be asked to leave for the day and will be marked absent.
9. **Cheating and plagiarism will not be tolerated at all!** **Plagiarism** is defined as copying entire sections or parts from the lab manual, textbook, or any other source (including other students) for any assignment. Students will receive a **zero** for any assignment if they are caught **cheating** or **plagiarizing**. Students may work together for lab worksheets and lab reports, but each student must turn in **their own work in their own words**. If students turn in assignments with the same or similar wording (i.e., from copying off another student), they will all be given a **zero** for that assignment. Additional disciplinary action may be taken if needed.
10. Lab groups cannot leave the lab until **all** members of the group have finished the experiments. Lab groups will have to show me the data from the lab, and may be asked to explain the data before the lab group is allowed to leave the lab. Lab groups **must** thoroughly clean up after themselves, or else groups will be assigned to do clean up at the end of the lab!
11. When doing labs, make sure that you observe the results from all parts of the experiments. You may be asked about your results before you can leave the lab, so make sure you have seen the results, or else you may have to repeat that experiment!
12. Any student with a documented disability who may need educational accommodations should notify the instructor or Disabled Student Programs and Services Office (DSP&S; Room 2117, Health Science Building; 355-6312) as soon as possible.

### **Grading Policies:**

1. There will be **4** written exams, worth **120 points** each (**480 points** total). Exams will begin at the start of class, and will consist of 50 multiple choice/matching questions, and 5 short-answer questions. Figures from the lectures and textbook will appear on the exams. Scantron sheets will be provided, but make sure you bring good-quality #2 pencils with working erasers. If you are late to the exam, you will not be given extra time to finish it. There will be no make-up exams, except for extreme circumstances. If you have a valid, documented reason for missing an exam, it is **your responsibility** to tell me about it and provide valid documentation by the **next class meeting**, otherwise you will not have the opportunity to make up the exam, and will be given a **zero** for that exam.
2. There will be **1** comprehensive final exam worth **150 points**. It will consist of 75 multiple choice/matching questions, and will cover all of the lecture material covered in the course. There are no make-ups for this exam.
3. There will be **1** lab exam, worth **110 points**. This lab exam will test your ability to think like a scientist by using lab techniques and the scientific method covered in the class to answer a scientific question. This lab exam will be open book/notes/papers. There are no make-ups for this exam.
4. We will be reading and discussing scientific papers during some of the labs. Reading the papers and discussing them are part of your grade. There are **4** paper discussion sessions worth **20 points** each (**80 points** total). **5 points** from each discussion will be an "open paper" 5 minute quiz about the paper before the discussion. The other **15 points** will be for the group discussion.

- There will be **10** lab worksheets worth **10 points** each (**100 points** total). Lab worksheets are due at the end of the lab. Lab worksheets cannot be made up, except for extreme circumstances.
- There will be **6** lab reports worth **30 points** each (**180 points** total). Lab reports are due at the start of lab one week after the completion of the lab. Lab reports will be due for the following labs – Diffusion & Osmosis, Enzymes, Cell Respiration, DNA Fingerprinting, pGLO, and PV92.
- There will be extra credit available during the review sessions and exams.

**Grading scale:**

4 exams	=	480 points
1 comprehensive final	=	150 points
1 lab exam	=	110 points
4 Paper discussions	=	80 points
10 Lab worksheets	=	100 points
6 Lab reports	=	180 points
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<b>Total</b>	=	<b>1100 points</b>

<b>A</b>	990 – 1100 points
<b>B</b>	880 – 989 points
<b>C</b>	770 – 879 points
<b>D</b>	660 – 769 points
<b>F</b>	0 – 659 points

**How to do well in this class:**

- Make sure you come on time to all lectures and labs! Arriving late or missing a class for any reason (excused or unexcused) can cause you to miss quizzes and lecture material, and will only put you at a disadvantage in this class.
- Make sure you know what will be happening each day for class! Keep the class schedule handy.
- Skim through or read the chapter before coming to lecture. You will have a general feel for the subject matter, which will help your understanding of the material during lecture. Look through the figures for the chapter, and try to understand them.
- Read through the lab activity before coming to lab. It will make you more prepared to do the lab activity, and you can perform it better, quicker, and will be able to easily understand what is happening in the lab.
- Pay attention during lectures! I will say things during lecture that are not written on the PowerPoint slides or the board that will be on the exams. Make sure you take good notes during class. Don't just mindlessly write down word-for-word what is on the slides. Listen to what I have to say, and take notes on that also!
- Study, study, study! You should spend at least 6 hours studying for this class each week. You should study in an area where there are no distractions (television, radio, computers, iPods, other people, etc.). However, you should also spend time studying in groups. Nothing makes you learn the material better than having to explain it to someone else!
- Don't cram! It's better to spend some time each week studying as compared to saving it all until the night before the exam.

**Tentative Class Schedule (Tues/Thurs 10:15 AM – 11:40 AM lecture, Wed 8:35 AM –11:45 AM lab)**

<b>Week</b>	<b>Lecture (Tuesdays)</b>	<b>Lab (Wednesdays)</b>	<b>Lecture (Thursdays)</b>
Aug 21-23	Introduction to the class	Introduction to the lab / Ch. 1 – Themes in the Study of Life	Ch. 1 – Themes in the Study of Life
Aug 28-30	Ch. 2 – Chemical Context of Life	Ch. 2 – Chemical Context of Life / Ch. 3 – Water	Ch. 4 – Carbon
Sept 4-6	Ch. 5 – Large Biological Molecules	<u>Paper discussion</u> / Pipets lab	Ch. 5 – Large Biological Molecules
Sept 11-13	<u>Review for Exam 1</u>	Got Protein? lab	<b>Exam 1 – Ch. 1 – 5</b>
Sept 18-20	Ch. 6 – Tour of the Cell	Ch. 6 – Tour of the Cell / Microscope and Cells lab	Ch. 7 –Membrane Structure and Function
Sept 25-27	Ch. 8 – Metabolism	Ch. 9 – Cellular Respiration / Diffusion and Osmosis lab	Ch. 9 – Cellular Respiration
Oct 2-4	Ch. 10 – Photosynthesis	Enzymes lab / <u>Paper discussion</u> / <b>Diffusion &amp; Osmosis Lab Report</b>	Ch. 10 – Photosynthesis
Oct 9-11	<u>Review for Exam 2</u>	Cellular Respiration lab / <b>Enzymes Lab Report</b>	<b>Exam 2 – Ch. 6 – 10</b>
Oct 16-18	Ch. 11 – Cell Communication	Ch. 12 – Cell Cycle / Mitosis lab / <b>Cellular Respiration Lab Report</b>	Ch. 13 – Meiosis
Oct 23-25	Ch. 16 – Molecular Basis of Inheritance	DNA Fingerprint I lab (Ch. 20 – Restriction enzymes & Gel electrophoresis) / <u>Paper discussion</u>	<u>Review for Exam 3</u>
Oct 30 – Nov 1	Ch. 17 – Gene to Protein	pGLO I lab (Ch. 20 – Bacterial transformation) / DNA Fingerprint II lab	<b>Exam 3 – Ch. 11-13, 16</b>
Nov 6-8	Ch. 17 – Gene to Protein	PV92 I lab (Ch. 20 – PCR) / pGLO II lab / <b>DNA Fingerprint Lab Report</b>	Ch. 14 – Mendel and the Gene Idea
Nov 13-15	Ch. 14 – Mendel and the Gene Idea	PV92 II lab / <b>pGLO Lab Report</b> / Ch. 15 – Chromosomal Basis of Inheritance	Ch. 15 – Chromosomal Basis of Inheritance
Nov 20-22	Ch. 20 & 21 – Biotechnology & Genomes	PV92 III lab / Ch. 20 & 21 – Biotechnology & Genomes	<u>Exam 4 review</u>
Nov 27-29	<b>Exam 4 – Ch. 17, 14, 15, 20, 21</b>	<u>Paper discussion</u> / <u>Lab exam review</u> / <b>PV92 Lab Report</b>	<b>THANKSGIVING!!!!</b>
Dec 4-6	<u>Final exam review</u>	<b>Lab Exam</b>	<b>Comprehensive Final (all chapters)</b>