Bi 211 General Biology I: Cells
Information Sheet and Syllabus for Winter Quarter 2010
Instructors: John Postlethwait & Cristin Hulslander

Course Background

This course is designed for majors in biology and certain other sciences who want an overview of the field of biology. This includes:

- Biology majors with interests more in ecology or organismal biology.
- Students intending to major in a science other than biology and do not need the extended coverage of biochemistry and molecular genetics that is provided by the Bi251-253 sequence (e.g. Environmental Science, Environmental Studies, Psychology, Computer and Information Science majors).
- Students who are interested in teaching.

Students beginning the General Biology sequence with Bi 211 need a competency in math and chemistry, but should continue their studies in these areas if they want to be able to take Bi214 and leave open the option of becoming biology majors. Students completing Bi213 should be eligible to take some, but not all, upper division biology courses. Bi211 is the only prerequisite for Bi212 and Bi213. Completion of Bi 211-214 will allow students to take any 300-level biology course and major in biology.

Course Prerequisites

Students need to have taken Ch111 or higher. If you are going to take only one chemistry course, then we recommend Ch111 rather than the general chemistry sequence. A year of general chemistry (Ch221-223), with lab, is required for biology majors. **Prerequisites for Bi211-214 will be strictly enforced**

Course Goals

Concepts Since this is a survey course, we cover all major areas of biology. Biology, however, is a large field, so we concentrate on a few fundamentals, rather than covering everything superficially. To pass Bi211, students must demonstrate understanding of the major concepts of cellular biology: how cells carry out the functions of living organisms; the genetic basis of inheritance; and how genes and proteins work.

Skills It is important for all citizens to be scientifically literate, whether or not they are in a science profession. Part of literacy is the ability to find information, evaluate the information and communicate or act on that information. In this course we will help you learn to find reliable information related to biology, evaluate the quality of that information, and communicate that information to your peers and instructors.

Science We think that it is important for everyone, not just scientists, to understand the process of science. To understand how scientists learn about the world, you will read papers from various sources (including original research papers) for your issues project. You will perform the methods of science whenever possible including such scientific methods as hypothesis testing (this will even occur in lecture) and modeling.

Course Format

Lectures (Monday, Wednesday and Friday, 11:00-11:50 in room 182 Lillis). You should do the assigned readings before coming to lectures. Some lectures will include activities that help you to actively address the material. These activities will often be done collaboratively with two or three students discussing the problem together for a few minutes before each independently writes a solution. You will not turn these in but your active participation will help you to truly understand the material and better prepare you for exams.

Labs (Wednesday, Thursday and Fridays in room 5 Klamath)

The lab is a small group of about 30 students that meets once a week for 110 minutes. You will explore the diversity and complexities of cells, model major concepts in cellular biology, discuss issues related to cellular biology and perform scientific investigations to understand the mechanism of inheritance. You should attend the section for which you are registered. Attending other sections will only be allowed in extraordinary situations and with **prior** approval from your GTF. Attendance is mandatory; it is not possible to make up labs.

*Problem Solving Session*s (most Mondays 2:30-3:30, 5 Klamath and most Wednesdays 2:00-2:50, 112 Huestis)
The single biggest problem students have in general biology is solving the kinds of problems presented in homeworks and exams. These are similar to the kinds of questions that biologists ask; they can't be solved by memorization of facts. In the problem solving sessions, we will go over homework problems and discuss ways to approach these problems. Although attendance is not required, we encourage you to attend these sessions on a regular basis, or regularly attend the office hours of one of the GTFs or tutoring sessions of one of the Biology Peer Tutors. Students often find these sessions helpful for better understanding the course material.

Office Hours and BPT Tutoring Sessions see the course blackboard site for times and locations.

Course Evaluation

Posting of Grades
Scores for assignments and exams will be posted on the web a couple of times during the term. We will make announcements in class when they are posted. Check your scores each time we post them because you will have only one week after the posting to notify us about a mistake or omission.

Problem Sets (homeworks)
There are 7 problem sets that will be available on blackboard. The problems are similar to the types of problems used for exams. They will be graded on a 5-point scale. Due dates are listed on the course schedule. Please note that all problem sets, except problem set #6, are due on Fridays by 4 p.m. You should turn your problem set into the box outside of Klamath 5. **No late homework will be accepted.** The solutions to each week's problems will be posted on blackboard shortly after each assignment is due. We may not have time to return some homeworks before the exams so we suggest that you photocopy your homework before turning it in and then compare your answers to those posted. Staff members will be prepared to discuss the problems during their office hours and in the peer tutor center. Problems sets will be discussed in the weekly problem solving sessions (see above).

Laboratory Activities
Lab handouts will be turned in at the end of a lab period or at the beginning of the lab the following week. The due date for each lab will be announced in lab. Each lab will be graded on a 5-point scale. For some labs, part of this grade will be based on your active engagement in the lab. Most labs cannot be made up because they involve additional materials. **Late labs will not be accepted.**

Issues Paper
Each of you will work on an issue related to cellular biology. You will choose your issue topic during week 2 and work on the project during the entire term. The project is worth 19% of your grade, and consists of three parts: a proposal (2%), a paper outline (2%), and a paper (15%). Late work on all three parts will be accepted but deducted 3% for each day (excluding weekends) that it is late. **No work will be accepted more than one week late.**

Clickers (Personal Response Systems)
Clickers will be used in almost every class. Clickers offer a good opportunity to improve learning and provide valuable feedback to instructors and students. Each student is expected to purchase a clicker for use in this class. You should register your clicker on the course blackboard site. If you have already registered your clicker for another class *this term*, then you do not need to register it again. Questions during lecture that require clickers will be multiple choice or true/false. Points will be earned two different ways: for some questions, points will be awarded based on participation alone, not on whether the question is answered correctly; for other questions, more points will be earned for responding with the correct answer. Further information concerning how your clicker grade will be calculated will be discussed during class in week 1. You can miss up to 15% of the clicker points and still get full credit. This policy has been implemented for students that need to miss class because of serious illness.

Exams

This course has three exams: two midterms and a final. All exams will be the same short-answer format. The final exam is cumulative. The exams will cover material from all aspects of the course including lectures, labs, readings, and homeworks. Exams will be designed to probe a deep understanding of the concepts and principles discussed, and an ability to apply the concepts to novel situations rather than a memorization of detail. Exams cannot be made up. Exams are graded by the GTFs under the supervision of faculty. To promote consistency, a single person grades each question. Everyone is required to take the final exam, which is on Tuesday of final's week. There will be no early or late exams given. Your final course grade will be automatically calculated two ways and the better grade will be assigned. Version A uses the score of all three exams. Version B uses the score of your best midterm and the final. If you miss a midterm, **for any reason**, then we will use version B to calculate your final grade.

Laboratory activities (10% each)	**10%**
Problem sets (homeworks) (1% each)	**7%**
Clicker questions	**4%**
Exams Version A	**60%**
midterm exams (15% each)	
final exam (30%)	
Exams Version B	**60%**
best midterm exam (20%)	
final exam (40%)	
Issues Project	**19%**
proposal (2%)	
outline (2%)	
paper (initial paper and final paper) (15%)	

Professional Conduct

We will work hard to make this a course from which you can learn the fundamental concepts of biology and develop important skills. We welcome suggestions from you at anytime about things you think could be done to improve the course. In return, we ask that you arrive at lab and lecture on time and stay until class is over without making unnecessary noise that could distract your classmates or the instructors. Please read the student conduct code at http://studentlife.uoregon.edu/StudentConductandCommunityStandards/StudentConductCode/tabid/69/Default.aspx; academic dishonesty includes cheating, plagiarizing (taking credit for the work of others) or knowingly supplying false information -- it is a serious offense. We want you to learn and to do well in the course, but we will not tolerate academic dishonesty. Sanctions for academic dishonesty will be a lowering of the final grade or failure. If you find yourself in trouble, or if you are aware of academic dishonesty occurring, please talk to one of the instructors. Personal crises do happen. If you are having difficulties that are interfering with your ability to do well in the class, please tell an instructor as soon as possible. We may be able to refer you to someone for help or to make special arrangements if the need is real and if you have done your best to deal with the situation in a timely manner. Finally, we promise to respect you as students and as individuals, and ask that you return that respect to us and to your fellow classmates.

Bi211 Schedule

Week	Date	Lectures	Lab/Discussion
1	1/4 1/6 1/8	L1: Macromolecules: carbs & lipids (case: Gaucher disease) L2: Macromolecules: proteins & nucleic acids (case: Gaucher disease) L3: Cell Structure & Function (case: Gaucher disease)	Lab 1: Discovering Cells
2	1/11 1/13 1/15	L4: Cell Structure & Function (case: Gaucher disease) L5: Energy, Enzymes and ATP L6: Harvesting Chemical Energy (case: Kristine) ***Problem set #1 due by 4:00 p.m.** (turn into box outside KL 5)	Lab 2: Introduction to Issues Project & Finding References for Project
3	1/18 1/20 1/22	*No class: Martin Luther King Day* L7: Harvesting Chemical Energy (case: Kristine) L8: Harvesting Chemical Energy (case: Kristine) ***Problem set #2 due by 4 p.m.** (turn into box outside KL 5)	Lab 3: Modeling Cellular Respiration
4	1/25 1/27 1/29	L9: Photosynthesis L10: Photosynthesis L11: DNA Structure & Replication ***Problem set #3 due by 4 p.m.** (turn into box outside KL 5)	Lab 4: Modeling Photosynthesis ***Issues paper proposal due in lab**
5	2/1 2/3 2/5	**Midterm 1 on lectures 1-10 and labs 1-4** L12: Cell Cycle: Mitosis L13: Cell Cycle: Cancer	Lab 5: Cell Cycle in Onion Root Tips & Introduction to *Drosophila*
6	2/8 2/10 2/12	L14: Protein Synthesis: transcription(case: cystic fibrosis) L15: Protein Synthesis: translation (case: cystic fibrosis) L16: Protein Synthesis: regulation (case: cystic fibrosis) ***Problem set #4 due by 4 p.m.** (turn into box outside KL 5)	Lab 6: Modeling Protein Synthesis ***Issues paper outline due in lab**
7	2/15 2/17 2/19	L17: Meiosis & Sexual Life Cycle (case: Down syndrome) L18: Meiosis & Transmission Genetics L19: Genetics: Mendel's 1st Law ***Problem set #5 due by 4 p.m.** (turn into box outside KL 5)	Lab 7: *Drosophila* Genetics & Modeling Meiosis
8	2/22 2/24 2/26	**Midterm 2 on lectures 11-18 and labs 5-7** L20: Genetics: Mendel's 2nd Law L21: Genetics: Recombination & Mapping	Lab 8: Modeling Simple Genetic Traits & peer review of issues paper ***Initial paper due in lab**
9	3/1 3/3 3/5	L22: Genetics: Human Genetics & Pedigrees ***Problem set #6 due by 4 p.m.** (turn into box outside KL 5) L23: Genetic Basis of Sex (case: Maria Patino) L24: Sex-linked traits/ Pedigrees	Lab 9: Recombination & Mapping ***Final paper due Friday by 5 p.m.** (turn into box outside KL 5)
10	3/8 3/10 3/12	L25: Incomplete Dominance, Codominance & Multiple Alleles L26: Complex Traits (case: BRCA genes) L27: Wrap-up ***Problem set #7 due by 4 p.m.** (turn into box outside KL 5)	Lab 10: Modeling Complex Genetic Traits
final	3/16	**Tuesday 10:15: Final exam on entire course**	Issues paper returned at final exam

Readings

Textbook : The text, *Biological Science* by S. Freeman, 3rd edition, will be used as a general reference throughout the first three quarters of General Biology. The readings include background material useful for preparing you for lecture and for studying for exams. We don't expect you to remember all the details in this material. A good strategy would be to skim over the entire chapter first, concentrating on the major concepts, then to read more carefully the assigned pages, focusing on the ideas discussed in lecture and lab.

Course Packet: This packet contains many of the handouts you will need during the quarter including lecture handouts, lab handouts, and issues project instructions.

Lectures	Readings
1	• Ch 1: read quickly to get an overview of the book and the overall structure of the field of biology. Pay particular attention to the sections on cells (p. 2-4), classification (p. 6-10), and science as a process (p. 11-15). It is highly recommended that you review basic chemistry principles in Ch 2. • Ch 5: read the entire chapter on carbohydrates • Ch 6: focus on pgs. 95-104 (types, structure of lipids); skim pgs. 105-107 to review diffusion and osmosis
2	• Ch 3: read pgs. 43-58 to focus on protein structure and function • Ch 4: read pgs. 67-71 for an introduction to nucleic acid structure and function
3 & 4	• Ch 28-32: skim over the chapters to answer questions about kingdoms and Lab #1 • Ch 7: read the entire chapter on cells; focus on characteristics of prokaryote and eukaryote cells (p. 120-124) and organelles (p. 124-130); skim the remainder of the chapter to gain a deeper understanding of cell dynamics • Ch 6: read about membranes on pgs. 107-109 • For more info: study area at www.masteringbio.com: Ch 7 BioFlix Animations: Tour of an Animal Cell, Tour of a Plant Cell
5	• Ch 2: read pgs. 31-35 to focus on chemical reactions and energy • Ch 3: read pgs. 58-64 to focus on enzymes, effects of temperature and pH on enzymes • Ch 9: read pgs. 170-175 for basic understanding of ATP and redox reactions
6, 7 & 8	• Most students will have to carefully read Ch 9 on cellular respiration several times. Read the entire chapter fairly quickly the first time to get the general ideas and vocabulary. Then read again more carefully the specific pages that are listed. You must gain a basic understanding of the following material but don't need to memorize all of the chemicals. Pgs. 175-178 provide a nice overview of cellular respiration, pgs. 180-192 provide more detail of the processes of cellular respiration, and pgs. 192-194 discuss fermentation. • For more info: study area at www.masteringbio.com: Ch 9 BioFlix Animations: Cellular Respiration
9 & 10	• Most students will have to carefully read Ch10 on photosynthesis several times. Read the entire chapter fairly quickly the first time to get the general ideas and vocabulary. Then read again more carefully the specific pages that are listed. Pgs. 199-201 provide a nice overview of photosynthesis, pgs. 207-212 (light reactions) and pgs. 213-215 (Calvin Cycle) cover the details of photosynthesis. • For more info: study area at www.masteringbio.com: Ch 10 BioFlix Animations: Photosynthesis
11	• Ch 4: read pgs. 71-75 on DNA structure and function • Ch 14: read pgs. 295-313; focus on pgs. 303-307 (DNA synthesis) • For more info: study area at www.masteringbio.com: Ch 4 Web Animation: Nucleic Acid Structure; Ch 14 Web Animation: DNA synthesis
12 & 13	• Ch 11: read pgs. 222-226 for an introduction to the cell cycle; pgs. 227-233 for details of mitosis; pgs 233-237 for control of the cell cycle; pgs. 237-240 for cancer and the cell cycle • For more info: study area at www.masteringbio.com: Ch 11 BioFlix Animations: The Phases of Mitosis;
14, 15 & 16	• Ch 15: read pgs. 316-327 for an introduction to genes • Ch 16: read pgs. 329-346 for the details of protein synthesis; pgs. 347-349 discuss mutations • Ch 4: read pgs. 76-77 for RNA structure and function • For more info: study area at www.masteringbio.com: Ch 16 BioFlix Animations: Protein Synthesis; Web Animation: Transcription, Translation
17 & 18	• Ch 12: read pgs. 243-258 for details of meiosis; pgs. 260-262 discuss mistakes in meiosis • For more info: study area at www.masteringbio.com: Ch 12 BioFlix Animation: Meiosis; Ch 12 Web Animation: Meiosis, Mistakes in Meiosis
19, 20 & 21	• Ch 13: read pgs. 265-274; pgs. 268-272 discuss Mendel's 1st Law; pgs. 272-274 discuss Mendel's 2nd Law; B17 discusses some simple rules of probability that are useful for understanding Mendelian genetics • Ch 13: read pgs. 274-281 for discussion of recombination and gene mapping • For more info: study area at www.masteringbio.com: Ch 13 Web Animation: Mendel's Experiments, The Principle of Independent Assortment
22	• Ch 13: reread pgs. 274-276; pgs. 286-289 discuss pedigrees
22, 23 & 24	• Ch 13: reread pgs. 276-278 to focus on sex chromosomes and sex-linked inheritance
25, 26 & 27	• Ch 13: read pgs. 281-283 to focus on incomplete dominance, codominance and multiple alleles