Bi 211 General Biology I: Cells
Information Sheet and Syllabus for Summer Session 2010

Lecture Instructor
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Course Background

This course is designed for both biology majors and non-biology majors with a professional interest in science who want an overview of the field of biology. This includes:

- Biology majors whose interests lie more in the areas of ecology or whole-organism biology.
- Students who intend 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 basic competency in math and chemistry, but should continue their studies in these areas if they want to be able to take Bi 214 and leave open the option of becoming biology majors. Students may also stop the sequence after completing Bi 213 and 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 that you take Ch111 or Ch113 rather than the general chemistry sequence. A year of general chemistry (Ch221-223), with lab, is required for biology majors. **The prerequisites for Bi211-214 will be strictly enforced.**

Course Goals

There are 3 major goals for this course (and the entire Bi211-Bi213 sequence).

- *Concepts* Since this is a survey course, it is important that we cover the major areas of biology. However, biology is a large field so we will concentrate on a few major areas of biology, rather than try to cover everything superficially. To pass this course, students will need to demonstrate understanding of the major concepts of cellular biology: how cells carry out functions of living organisms; genetic basis of inheritance; 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 all people, not just scientists, to understand how to do science. To learn to be a better scientist you will read papers from various sources (including original research paper). You will perform the methods of science whenever possible including such scientific methods as hypothesis testing (this can even occur in lecture) and modeling.

Course Format

Lectures (Mondays, Tuesdays, Wednesdays and Thursdays, 10:00-11:50 in 182 Lillis)
You should do the assigned readings before coming to the lectures. During some of the lectures there will be activities that will help you to stay actively involved during the lecture. These 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.

Lab/Discussion (Mondays and Wednesdays 1:00-2:50 or 3:00-4:50 in 5 Klamath)
The lab/discussion is a small group (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 mechanisms 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 lab instructor. Attendance is mandatory; it is not possible to make up labs.

Schedule

Day	Date	Lecture	Lab	Assignments
M	6/21	L1: Macromolecules	Lab 1: Discovering cells	
Tu	6/22	L2: Cell structure and function		
W	6/23	L3: Energy, enzymes and ATP Harvesting chemical energy	Lab 2: Finding references for issues project	Homework 1 due 10AM
Th	6/24	L4: Harvesting chemical energy		Issues paper proposal due 4pm Friday
M	6/28	L5: Photosynthesis	Lab 3: Modeling cellular respiration*	Hard-copy of articles due by 10AM
Tu	6/29	L6: DNA structure and the cell cycle		Homework 2 due 10AM
W	6/30	L7: Cell cycle including mitosis	Lab 4: Modeling photosynthesis*	
Th	7/1	Midterm exam (lectures 1-5 and labs 1-4)		Issues paper outline due Friday 4PM
M	7/5	no class: 4th of July holiday		
Tu	7/6	L8: Protein synthesis		Homework 3 due 10AM
W	7/7	L9: Meiosis and the sexual life cycle	Lab 5: Cell cycle/Modeling protein synthesis*	
Th	7/8	L10: Genetics: Mendel's laws and pedigrees		
M	7/12	L11: Recombination and mapping	Lab 6: Modeling simple genetic traits/Mapping	Initial paper and review due beginning of lecture
Tu	7/13	L12: Genetic basis of sex		Homework 4 due 10AM
W	7/14	L13: Beyond Mendelian genetics	Lab 7: Modeling complex genetic traits	Final paper due at beginning of lecture
Th	7/15	Final exam (entire course; exam given at normal lecture time)		

*** - It will be helpful to bring your book to lab for labs 3-5**

Evaluation

Component	Percent of Grade
Laboratory activities (1% each)	**7%**
Problem Sets (homework) (1% each)	**4%**
Clicker questions	**5%**
Exams	**64%**
midterm exam (22%)	
Final Exam (42%)	
Issues Project	**20%**
proposal (2%)	
outline (3%)	
paper (initial paper and final paper) (15%)	

Posting of Grades Scores for assignments and exams will be posted on the web two times during the term: right after the midterm and after the final exam. Check your scores every times we post them as you will have only two days after the posting to notify us about mistakes or omission

Problem Sets (homeworks)
There are four problem sets posted on blackboard during the term. The problems are similar to the types of problems used in exams. They will be graded on a 5-point scale and are due at the beginning of lecture (see syllabus for due dates). No late homework will be accepted. The solutions to each week's problems will be posted on the course website on the day they are due. We will be happy to discuss the problems during our office hours.

Laboratory Activities
Lab handouts will be turned in at the end of each lab. Each lab will be graded on a 5-point scale. Part of this grade will be based on participation in lab. Labs cannot be made up. 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 the 1st week and work on the project during the entire term. The project, worth 20% of your grade, consists of three parts: proposal (2%), paper outline (3%) and a paper (15%). Late work on all three parts will only be accepted one lecture day late and will be deducted 10%.

Clickers (Personal Response Systems)
Clickers will be used in almost every class to encourage participation and to provide valuable feedback to instructors and students. Each student is expected to purchase a clicker for use in this class. Questions during lecture that require clickers will be multiple choice. 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 you clicker grade will be calculated will be discussed during class in week 1.

Exams
There will be two exams: a midterm and a final. All exams will be the same format: short-answer. The final 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.

Professional Conduct
We will work hard to make this a course from which you can learn much 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. Please read the student conduct code at the back of the time schedule; 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 one of the instructors 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 classmates.

Readings

Textbook: Biological Science by S. Freeman, 3rd edition or 4th edition, should 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 specific pages that are assigned.

Lectures	Readings from 3rd Edition (4th Edition pages will be posted on Blackboard, if needed)
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 • 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
2	• 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 cell 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
3	• 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
3 and 4	• 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
5	• 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
6	• Ch 4: read pgs. 71-75 on DNA structure and function • For more info: study area at www.masteringbio.com: Ch 4 Web Animation: Nucleic Acid Structure
6 and 7	• 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 • Ch 14: read pgs. 295-313; focus on pgs. 303-307 (DNA synthesis) • For more info: study area at www.masteringbio.com: Ch 11 BioFlix Animations: The Phases of Mitosis; Mitosis; Ch 14 Web Animation: DNA synthesis
8	• 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
9	• 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
10-11	• 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
12	• Ch 13: read pgs. 276-278 to focus on sex chromosomes and sex-linked inheritance; pgs. 286-289 discuss pedigrees
13	• Ch 13: read pgs. 281-283 to focus on incomplete dominance, codominance and multiple alleles