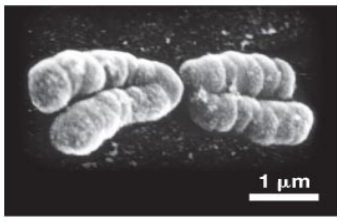


Bi 211 General Biology I: Cells

Information Sheet and Syllabus for Fall Quarter 2013

Instructors: Dr. John Postlethwait & Dr. Cristin Hulslander

Course Overview

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 with interests in any area of biology.
- Any major with an interest in fields related to life science or professions in the health field.
- 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. Bi214 requires completion of both Bi212 and a year of general chemistry. 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, we recommend that you take Ch111, Ch113 or Ch114 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: Because Bi211 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: Science and technology strongly influences our lives. It is important for all citizens to be scientifically literate, whether or not they are in a science profession. A part of science literacy is the skill to find information, recognize the difference between opinion and fact, appreciate the fact that not all opinions are equally valid, evaluate information, and communicate or act on collected 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: Society can function better if everyone, not just scientists, understand the process of science. Science is a special way of learning how our universe functions. 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 hypothesis testing and modeling.

Course Format

Lectures (Monday, Wednesday and Friday, 8:00-8:50 & 9:00-9:50 in 123 GSH)
You must attend the lecture for which you are registered. Do the assigned readings before coming to the 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 (Wednesdays and Thursdays in 129 & 130 Huestis)
The lab is a small group of 24 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. Attend only 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 Sessions (with Dr. Postlethwait; time & location TBA and Dr. Hulslander; time and location TBA) 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 generally can't be solved by memorization of facts, but by the application of facts to novel situations. In problem solving sessions, we will go over practice problem sets and discuss ways to approach the problems. Attendance is not required, but you may want to attend them on a regular basis, regularly attend GTF office hours, or visit tutoring sessions of a Biology Tutor for Undergraduates (BTU) to better understand the course material.

Office Hours and Tutor Sessions Times will posted on blackboard during week 1.

Problem Sets (practice & graded) Practice problem sets will be made available on blackboard (postings will be announced in class and on blackboard). While you are not required to turn these in, you are very strongly encouraged to work on the practice problems. We will help you understand how to solve these problems in the staff office hours, tutoring sessions, and problem solving sessions. The practice problems are very similar to the types of questions you will see on the exams, in fact most of the problems are from previous exams. The practice problems are designed to help you master the material needed to successfully solve the graded problem sets.

There will be six graded problem sets posted on blackboard from Tuesday 5 p.m. until Thursday 5 p.m. (except problem set 5; see class schedule for weeks with graded problem sets due). You will submit your answers to these graded questions on blackboard. **No late homeworks will be accepted.** The solutions to each problem set will be posted on blackboard soon after each due date. You must do your own work on these graded questions. Copied work will be treated as academic dishonesty (see *Professional conduct* below)

Laboratory Activities Lab handouts will be turned in at the end of each lab period or at the beginning of lab the following week as 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 Project Each of you will work on an issue related to cellular biology. You will choose your issue topic during the 3rd week and work on the project during the entire term. The project, worth 20% of your grade, consists of two parts: proposal (5%),and a paper (15%). Late work on both parts will be accepted but deducted 3% for each day (including weekends) that it is late. No work will be accepted more than one week late.

If you are retaking this course, you will not be allowed to resubmit issues project work from the previous time you took Bi211. The work you turn in this term must be original.

Clickers (Personal Response Systems) Clickers will be used in almost every class to encourage participation and to provide feedback to instructors and students. Each student should purchase a clicker for use in this class. You should register your clicker on the course blackboard site. If you've already registered your clicker *this term*, for another class, then you don't need to register it again. Questions during lecture that require clickers will be multiple choice. Points will be earned two different ways: (1) 2-point questions: 2 points will be awarded based on participation alone, not on whether the question is answered correctly; (2) 4-point questions: 4 points for the correct answer, 2 points for an incorrect answer. Total percent for the clicker portion of your grade will be based on 85% of the total possible points: your clicker grade = total points earned/85% of total points possible.

Exams: This course has three exams: two 50-minute, in-class midterms and a 2-hour final. All exams will use the same short answer format. The final exam is cumulative. Exams will cover material from all aspects of the course including lectures, labs, readings, and homeworks. Exams will probe a deep understanding of the concepts and principles discussed, not merely a recitation of facts, 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 scheduled for **Monday 12/9 from 6-8 p.m.** This is a combined final exam for both sections of 211. **No early or late exams will be 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**, we will use version B to calculate your final grade.

Exam regrade policy: To be fair to all students, it is essential that all exams be graded according to the same criteria. If you wish to submit a midterm for a regrade, you must use the following guidelines. First, refer to the exam key available on blackboard to compare your answer to the key. If you still wish to have a midterm exam answer regraded, you must submit a written statement within one week of the return of the exam, along with your original exam, explaining specifically why your answer merits a higher score. Keep in mind that we will regrade the entire exam and a regrade may result in a higher, lower, or unchanged score. Please do not abuse this system. We reserve the right to eliminate this option at our discretion.

Posting of Grades Scores for assignments and exams will be posted online a couple of times during the term. We will make announcements in class when they are posted. Check your scores every time we post them as you will have only three days after the posting to notify us about mistakes or omissions.

Evaluation

Component	Percent of Grade
Laboratory activities (1% each)	**9%**
Problem Sets (homework) (1% each)	**6%**
Clicker questions	**5%**
Exams Version A	**60%**
Both Midterm Exams (15% each)	
Final Exam (30%)	
Exams Version B	**60%**
Best midterm exam (20%)	
Final Exam (40%)	
Issues Project	**20%**
Proposal (5%)	
Paper (initial paper and final paper) (15%)	

Learning Environment
The University of Oregon is working to create inclusive learning environments. Please notify us if there are aspects of the instruction or design of this course that result in barriers to your participation. You may also wish to contact the Accessible Education Center in 164 Oregon Hall at 346-1155 or uoaec@uoregon.edu

If you have a documented disability and anticipate needing accommodations in this course, please talk to your instructors during the first week of class. Please request that the Counselor for Students with Disabilities send a letter verifying your disability.

Professional conduct We will work hard to make this course valuable to your learning. 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 to lab and lecture on time and stay until class is over without making unnecessary noise that could distract your classmates.

Cheating devalues the reputation of our institution, its faculty, its students, and your academic degree. Academic misconduct is particularly unfair for students who do their work with integrity and honor. The University Student Conduct Code (http://studentlife.uoregon.edu/StudentConductandCommunityStandards/StudentConductCode/tabid/69/Default.aspx) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at http://library.uoregon.edu/guides/plagiarism/students/index.html

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. There is a crisis center on campus that you should not hesitate to call if you, or a friend, are in need of assistance. Their phone number is 346-3227. 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.

Textbook The text, *Biological Science* by S. Freeman, 4rd **or** 5th edition, will be used as a general reference throughout the first three quarters of General Biology. Readings include background material useful to prepare you for lecture and to study for exams. We don't expect you to remember all details in this material. A good strategy is 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.

Copies of both editions of the textbook are on reserve in the Science Library.

Week	Date	Lectures	Lab Activity
1	9/30 10/2 10/4	L1: Macromolecules: carbs & lipids (case: Gaucher disease) L2: Macromolecules: proteins & nucleic acids (case: Gaucher) L3: Cell Structure & Function (case: Gaucher disease)	Lab 1: Discovering Molecules
2	10/7 10/9 10/10 10/11	L4: Cell Structure & Function L5: Energy and ATP ***Problem set #1 due by 5:00 p.m. (blackboard)** L6: Enzymes	Lab 2: Discovering Cells
3	10/14 10/16 10/18	L7: Harvesting Chemical Energy (case: Kristine) L8: Harvesting Chemical Energy (case: Kristine) L9: Harvesting Chemical Energy (case: Kristine)	Lab 3: Introduction to Issues Project & Finding References
4	10/21 10/23 10/24 10/25	L10: Photosynthesis L11: Photosynthesis ***Problem set #2 due by 5:00 p.m. (blackboard)** L12: DNA Structure	Lab 4: Modeling Cellular Respiration & Fermentation ***Issues project proposal due in lab**
5	10/28 10/30 11/1	**Midterm 1 on lectures 1-9 and labs 1-4** L13: Cell Cycle: introduction, DNA replication L14: Cell Cycle: mitosis	Lab 5: Modeling Photosynthesis
6	11/4 11/6 11/7 11/8	L15: Cell cycle and cancer L16: Transcription ***Problem set #3 due by 5:00 p.m. (blackboard)** L17: Translation	Lab 6: Cell Cycle in Onion Root Tips and Introduction to *Drosophila* Genetics
7	11/11 11/13 11/14 11/15	L18: Mutation & Regulation L19: Meiosis & Sexual Life Cycle (case: Down syndrome) ***Problem set #4 due by 5:00 p.m. (blackboard)** L20: Meiosis & Transmission Genetics	Lab 7: Modeling Protein Synthesis
8	11/18 11/2 11/22	**Midterm 2 on lectures 10-18 and labs 5-7** L21: Genetics: Mendel's 1st Law L22: Genetics: Mendel's 2nd Law	Lab 8: *Drosophila* Genetics, peer review exercise, introduction to Virtual Genetics Lab (VGL) ***Initial issues paper due in lab**
9	11/25 11/26 11/27 11/29	L23: Genetics: Recombination and Gene Mapping ***Problem set #5 due by 5:00 p.m. (blackboard)** L24: Genetic Basis of Sex (case: Maria Patino) NO CLASS: HAPPY THANKSGIVING	No labs this week ***Final issues paper due Wednesday by 4 p.m.**
10	12/2 12/4 12/5 12/6	L25: Sex-linked Traits and Pedigrees L26: Incomplete Dominance, Codominance & Multiple Alleles ***Problem set #6 due by 5:00 p.m. (blackboard)** L27: Complex Traits (case: BRCA genes)	Lab 9: Modeling Genetic Traits (VGL)
final	12/9	**Monday 6-8 p.m.: Final exam on entire course**	Issues paper returned at final exam

Lectures	Readings (Freeman 4th edition)
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. 5-8), and science as a process (p. 8-12). 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. 82-88 (types, structure of lipids); skim pgs. 89-91 to review diffusion and osmosis
2	• Ch 3: read pgs. 38-51 to focus on protein structure and function • Ch 4: read pgs. 59-62 for an introduction to nucleic acid structure and function
3 & 4	• Ch 28-32: skim over the chapters to answer questions about domains and Lab #1 • Ch 7: read the entire chapter on cells; focus on characteristics of prokaryote and eukaryote cells and organelles (p. 103-114); read pgs. 115- 122 to gain a deeper understanding of cell dynamics. • Ch 6: read about cell membranes and membrane proteins on pgs. 92-94
5 & 6	• Ch 2: read pgs. 27-33 to focus on chemical reactions and energy • Ch 3: read pgs. 51-56 to focus on enzymes, effects of temperature and pH on enzymes • Ch 9: read pgs. 149-152 for basic understanding of ATP and redox reactions
7, 8 & 9	• 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. 153-154 provide a nice overview of cellular respiration, pgs. 155-166 provide more detail of the processes of cellular respiration, and pgs. 166-168 discuss fermentation.
10 & 11	• 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. 173-174 provide a brief overview of photosynthesis, pgs. 179-184 (light reactions) and pgs. 184-186 (Calvin Cycle) cover the details of photosynthesis. • The Big Picture: pgs. 192-193 provides a nice overview of energy concepts
12	• Ch 4: read pgs. 62-66 on DNA structure and function
13, 14 & 15	• Ch 11: read pgs. 194-196 for an introduction to the cell cycle; pgs. 197-200 for details of mitosis; pgs 202-205 for control of the cell cycle; pgs. 206-209 for cancer and the cell cycle • Ch 14: read pgs. 258-263; focus carefully on pgs. 263-268 (DNA synthesis); read pgs. 271-274 (correcting mistakes in DNA synthesis)
16, 17 & 18	• Ch 15: read pgs. 277-285 for an introduction to genes, the central dogma, and the genetic code; pgs. 285-286 discuss mutations • Ch 16: read the entire chapter for the details of protein synthesis • Ch 4: read pgs. 66-68 for RNA structure and function
19 & 20	• Ch 12: read pgs. 211-223 for details of meiosis; pgs. 225-227 discuss mistakes in meiosis
21 & 22	• Ch 13: read pgs. 230-239; pgs. 232-236 discuss Mendel's 1st Law; pgs. 236-238 discuss Mendel's 2nd Law; pg. B19 (Bioskills 13) discusses some simple rules of probability that are useful for understanding Mendelian genetics
23	• Ch 13: read pgs. 239-241; 243-245 and Box 13.1 on pg. 246
24 & 25	• Ch 13: read pgs. 241-242 to focus on sex chromosomes and sex-linked inheritance; pgs. 250-252 discuss human genetics and pedigrees
26 & 27	• Ch 13: read pgs. 245-247 to focus on incomplete dominance, codominance and multiple alleles

Lectures	Readings (Freeman 5th edition)
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. 6-9), and science as a process (p. 9 -14). 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. 84-90 (types, structure of lipids); skim pgs. 91-93 to review diffusion and osmosis
2	• Ch 3: read the entire chapter on protein structure and function • Ch 4: read pgs. 57-64 for an introduction to nucleic acid structure and function
3 & 4	• Ch 29-33: skim over the chapters to answer questions about domains and Lab #1 • Ch 7: read the entire chapter on cells; focus on characteristics of prokaryote and eukaryote cells (p. 107-110) and organelles (p. 110-127); skim the remainder of the chapter to gain a deeper understanding of cell dynamics • Ch 6: read about cell membranes on pgs. 88-90
5 & 6	• Ch 8: read pgs. 137-144 to focus on chemical reactions and energy; for a basic understanding of ATP and redox reactions; read pgs. 144-150 to focus on enzymes, effects of temperature and pH on enzymes
7, 8 & 9	• 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. 155-158 provide a nice overview of cellular respiration, pgs. 158-172 provide more detail of the processes of cellular respiration, and pgs. 172-173 discuss fermentation.
10 & 11	• 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. 176-184 provide a nice overview of photosynthesis, pgs. 184-190 (light reactions) and pgs. 190-192 (Calvin Cycle) cover the details of photosynthesis. • The Big Picture: pgs. 198-199 provides a nice overview of energy concepts
12	• Ch 4: read pgs. 58-65 on DNA structure and function
13, 14 & 15	• Ch 12: read pgs. 219-223 for an introduction to the cell cycle; pgs. 223-228 for details of mitosis; pgs 229-232 for control of the cell cycle; pgs. 232-234 for cancer and the cell cycle • Ch 15: read pgs. 284-301; focus on pgs. 289-295 (DNA synthesis)
16, 17 & 18	• Ch 16: read pgs. 304-312 for an introduction to genes, the central dogma, and the genetic code; pgs. 313-315 discuss mutations • Ch 17: read the entire chapter for the details of protein synthesis • Ch 4: read pgs. 65-68 for RNA structure and function
19 & 20	• Ch 13: read pgs. 237-246 for details of meiosis; pgs. 249-251 discuss mistakes in meiosis
21 & 22	• Ch 14: read pgs. 256-267; pgs. 261-263 discuss Mendel's 1st Law; pgs. 263-266 discuss Mendel's 2nd Law; B8 discusses some simple rules of probability that are useful for understanding Mendelian genetics
23	• Ch 14: read pgs. 269-271; read Quantitative Methods 14.1 on pg. 274 for creating genetic maps
24 & 25	• Ch 14: read pgs. 267-269 to focus on sex chromosomes and sex-linked inheritance; pgs. 277-279 discuss pedigrees
26 & 27	• Ch 14: read pgs. 271-272 to focus on incomplete dominance, codominance and multiple alleles