



Bi 211 General Biology I: Cells

Information Sheet and Syllabus for Winter Quarter 2011

Personnel	office hours	e-mail	Course Role (lab times)
Peter Wetherwax	W 12 -12:50 in 313 Pacific problem solving sessions M 1-1:50 in 5 Klamath most weeks (see syllabus)	pwax@uoregon.edu	lectures, course planning
Misty McLean	by appt. in 120-F Huestis	mistym@uoregon.edu	lab prep and coordination
Klarea Boose	F12-12:50 in 360 Onyx	boose@uoregon.edu	GTF labs W12, W2
Leah DeBlander	M10-10:50 in 360 Onyx	ldebland@uoregon.edu	GTF labs W4, Th8
Maya Evelyn	W3-3:50 in 360 Onyx	mayag@uoregon.edu	GTF labs Th10, Th12
Clayton Merz	M12-12:50 in 360 Onyx	merz@uoregon.edu	GTF labs Th2, F8
Nicole Nishimura	F4-4:50 in 5 Klamath	nnishimu@uoregon.edu	GTF lab Th4
Kate Ituarte	Tu 2-2:50 in 25 Klamath	cituarte@uoregon.edu	Peer Tutor labs W12, W2
Alexander Litzenberg	F10-10:50 in 25 Klamath	alitzenb@uoregon.edu	Peer Tutor labs Th8, Th10
Heather Roblin	F9-9:50 in 25 Klamath	hroblin@uoregon.edu	Peer Tutor labs W4, Th4
Jennah Rouse	Th11-11:50 in 25 Klamath	jrouse@uoregon.edu	Peer Tutor labs Th12, Th2
Anna Streitz	M 9-9:50 in 25 Klamath	streitz@uoregon.edu	Peer Tutor labs W4, F8

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 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 Bi211 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, 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 (Monday, Wednesday and Friday, 11:00-11:50 in room 282 Lillis)

You should do the assigned readings before coming to the lectures. During some of the lectures there will be activities (handouts are in the course packet) 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 (Wednesdays 12, 2 and 4; Thursdays 8, 10, 12, 2 and 4; Fridays 8. All in room 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 GTF. Attendance is mandatory; it is not possible to make up labs.

Problem Solving Sessions (Mondays 1:00, 5 Klamath; Note: these are not offered during some weeks, see schedule)

The single biggest problem students have in general biology is solving the kinds or 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 both homework problems and discuss ways to approach these problems. Although attendance is not required, we strongly encourage you to attend these sessions on a regular basis, or to regularly attend the office hours of one of the GTFs or tutoring session of one of the Biology Peer Tutors.

Office Hours and Help Sessions are listed at the top of this syllabus. There are 12 hours every week!

Problem Sets (homeworks) There are six problem sets 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 by 4PM on Tuesdays in the homework box located outside of 5 Klamath. No late homework will be accepted. The solutions to each week's problems will be posted on the course website on Tuesdays after 4PM. We will not have time to return homeworks weeks 4, 7 and 10 before the exams so we suggest that you photocopy your homework before turning it in and then compare your answers to those posted. Every staff member will be happy to discuss the problems during their office hours and in the peer tutor center. There are problem solving sessions on Mondays where the problems sets will be discussed. See the schedule for a list of these sessions.

Laboratory Activities Lab handouts will be turned in at the end of each lab or, occasionally at a later time. The due date for each lab will be announced in 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 because they involve additional materials. Late labs will not be accepted. All of the labs are held on Wednesdays, Thursdays and Fridays.

Issues Paper 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, consist of three parts: proposal (2%), paper outline (3%) 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 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. 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 correct answer, 2 points for 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 possible.

Exams There will be three exams: two midterms 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. Exams are graded by the GTFs under the supervision of the faculty. To promote consistency, a single person grades each question. Everyone is required to take the final exam which is on **Wednesday** of final's week. **There will be no early or late exams given.** Your final grade will be 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 for calculating your final grade.

Posting of Grades Scores for assignments and exams will be posted on the web three times during the term: right after each midterm and during the 10th week of class. Check your scores every times we post them as you will have only three days after the posting to notify us about mistakes or omission

Students with disabilities 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 Disability Services in 164 Oregon Hall at 346-1155 or disabsrv@uoregon.edu

Professional conduct 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 www.libweb.uoregon.edu/guides/plagiarism/students.

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.

Textbook The text, *Biological Science* by S. Freeman, 3rd or 4th 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.

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

Schedule

Week	Date	Lectures	Lab/Discussion
1	1/3	L1: Macromolecules: carbohydrates & lipids (case: Gaucher disease)	No lab this week
	1/5	L2: Macromolecules: proteins & nucleic acids (case: Gaucher)	
	1/7	L3: Cell Structure & Function (case: Gaucher disease)	
2	1/10	L4: Cell Structure & Function (case: Gaucher disease) <i>Problem solving session in 5 Klamath Monday at 1</i>	Lab 1: Discovering Cells
	1/11	Homework due by 4PM Tuesday	
	1/12	L5: Energy and ATP	
	1/14	L6: Enzymes	
3	1/17	<i>No Class: Martin Luther King Day</i>	Lab 2: Finding References for Project
	1/19	L7: Harvesting Chemical Energy (case: Kristine)	
	1/21	L8: Harvesting Chemical Energy	
4	1/24	L9: Harvesting Chemical Energy <i>Problem solving session in 5 Klamath Monday at 1</i>	Lab 3: Modeling Cellular Respiration *Issues paper proposal due
	1/25	Homework due by 4PM Tuesday	
	1/26	L10: Photosynthesis	
	1/28	L11: Photosynthesis	
5	1/31	Midterm Exam on lectures 1-8 and labs 1-3	Lab 4: Modeling Photosynthesis
	2/2	L12: DNA Structure	
	2/4	L13: Cell Cycle (case: HER2 gene)	
6	2/7	L14: Cell Cycle: mitosis <i>Problem solving session in 5 Klamath Monday at 1</i>	Lab 5: Cell Cycle/Intro to <i>Drosophila</i> genetics *Issues paper outline due
	2/8	Homework due by 4PM Tuesday	
	2/9	L15: Cell Cycle: cancer	
	2/11	L16: Protein Synthesis (case: cystic fibrosis)	
7	2/14	L17: Protein Synthesis (case: cystic fibrosis) <i>Problem solving session in 5 Klamath Monday at 1</i>	Lab 6: Modeling Protein Synthesis
	2/15	Homework due by 4PM Tuesday	
	2/16	L18: Protein Synthesis (case: cystic fibrosis)	
	2/18	L19: Meiosis & Sexual Life Cycle (case: Down syndrome)	
8	2/21	Midterm Exam on lectures 9-18 and labs 4-6	Lab 7: Modeling Meiosis and <i>Drosophila</i> Genetics *Initial paper due in lab
	2/23	L20: Meiosis & Transmission Genetics	
	2/25	L21: Genetics: Mendel's Laws	
9	2/28	L22: Genetics: Recombination and Gene Mapping <i>Problem solving session in 5 Klamath Monday at 1</i>	Lab 8: Modeling Simple Genetic Traits *Final paper due in lab
	3/1	Homework due by 4PM Tuesday	
	3/2	L23: Genetic Basis of Sex (case: Maria)	
	3/4	L24: Sex-linked Traits and Pedigrees	
10	3/7	L25: Incomplete Dominance, Codominance and Multiple Alleles <i>Problem solving session in 5 Klamath Monday at 1</i>	Lab 9: Modeling Complex Genetic Traits
	3/8	Homework due by 4PM Tuesday	
	3/9	L26: Complex Traits (case: BRCA genes)	
	3/11	L27: Wrap-up (case: Leber disease)	
final	3/16	Wednesday 10:15: Final Exam on entire course	Issues paper returned at final exam

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 (2%)	
outline (3%)	
paper (initial paper and final paper) (15%)	

Lectures	Readings (Freeman 3rd edition)
1	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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
5	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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
12, 13 & 14	<ul style="list-style-type: none"> 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
15, 16 & 17	<ul style="list-style-type: none"> 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
18 & 19	<ul style="list-style-type: none"> 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
20 & 21	<ul style="list-style-type: none"> 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 For more info: study area at www.masteringbio.com: Ch 13 Web Animation: Mendel's Experiments, The Principle of Independent Assortment
22	<ul style="list-style-type: none"> Ch 13: read pgs. 274-276
23 & 24	<ul style="list-style-type: none"> Ch 13: read pgs. 276-278 to focus on sex chromosomes and sex-linked inheritance; pgs. 286-289 discuss pedigrees
25, 26 & 27	<ul style="list-style-type: none"> Ch 13: read pgs. 281-283 to focus on incomplete dominance, codominance and multiple alleles

Lectures	Readings (Freeman 4th edition)
1	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 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 For more info: study area at www.masteringbio.com: Ch 7 BioFlix Animations: Tour of an Animal Cell, Tour of a Plant Cell
5	<ul style="list-style-type: none"> 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
6, 7 & 8	<ul style="list-style-type: none"> 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. For more info: study area at www.masteringbio.com: Ch 9 BioFlix Animations: Cellular Respiration
9 & 10	<ul style="list-style-type: none"> 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. For more info: study area at www.masteringbio.com: Ch 10 BioFlix Animations: Photosynthesis The Big Picture: pgs. 192-193 provides nice overview of energy concepts
11	<ul style="list-style-type: none"> Ch 4: read pgs. 62-66 on DNA structure and function For more info: study area at www.masteringbio.com: Ch 4 Web Animation: Nucleic Acid Structure
12, 13 & 14	<ul style="list-style-type: none"> 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) For more info: study area at www.masteringbio.com: Ch 11 BioFlix Animations: Mitosis; Web Animation: The Phases of Mitosis; Ch 14 BioFlix Animations: DNA Replication; Web Animation: DNA Synthesis
15, 16 & 17	<ul style="list-style-type: none"> Ch 15: read pgs. 277-285 for an introduction to genes, the central dogma, and the genetic code; pgs. 285-286 discusses mutations Ch 16: read the entire chapter for the details of protein synthesis Ch 4: read pgs. 66-68 for RNA structure and function For more info: study area at www.masteringbio.com: Ch 16 BioFlix Animations: Protein Synthesis; Web Animation: Synthesizing Proteins
18 & 19	<ul style="list-style-type: none"> Ch 12: read pgs. 211-223 for details of meiosis; pgs. 225-227 discuss mistakes in meiosis For more info: study area at www.masteringbio.com: Ch 12 BioFlix Animation: Meiosis
20 & 21	<ul style="list-style-type: none"> 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 For more info: study area at www.masteringbio.com: Ch 13 Web Animation: Mendel's Experiments, The Principle of Independent Assortment
22	<ul style="list-style-type: none"> Ch 13: read pgs. 239-241; 243-245 and Box 13.1 on pg. 246
23 & 24	<ul style="list-style-type: none"> Ch 13: read pgs. 241-242 to focus on sex chromosomes and sex-linked inheritance; pgs. 250-252 discuss human genetics and pedigrees
25, 26 & 27	<ul style="list-style-type: none"> Ch 13: read pgs. 245-247 to focus on incomplete dominance, codominance and multiple alleles