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 in any area of Biology.
- Any major with an interest in field related to life science or professions in the health field.
- Students who are interested in teaching.

Students beginning the General Biology sequence with Bi211 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. Bi211 is the only prerequisite for Bi212 and Bi213. Students completing Bi213 should be eligible to take some, but not all, upper division biology courses. Completion of Bi211-214 will allow students to take any 300-level biology course and major in biology.

Course Prerequisites
Students need to have taken Ch111 or higher. A year of general chemistry (Ch221-223), with lab, is required for biology majors and several other science majors. If you going to take one chemistry course, we recommend you take one of the 100-level courses offered at the UO, rather than the general chemistry sequence. Prerequisites for Bi211-214 are strictly enforced

Course Goals
There are three major goals for this course (and the entire Bi211-Bi214 sequence)

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 hypothesis testing (this will even occur in lecture) and modeling.

Course Format

Lectures (Monday, Tuesday, Wednesday, Thursday & Friday 9:00-10:50 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 learn difficult concepts; these will often be done collaboratively with two or three students discussing the problem together for a few minutes before discussing the problem as a whole class. Your active participation in lecture will help you to better understand the material and prepare you for exams.

Labs (Tuesdays, Wednesdays, Thursdays 12:00-1:50 & 2-3:50 in 13 & 21 Klamath)
You will explore the structure and properties of major biological macromolecules, 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 lab instructor. Attendance is mandatory; it is not possible to make up labs.
Course Staff
Contact information, along with office hour time and location for each member of the 211 staff can be found on blackboard and will be announced in lecture.

Course Evaluation

Problem sets (homeworks)
There will be five problem sets posted on blackboard during the session. The problems are similar to the types of problems used in exams. They will be graded on a 5-point scale and will be collected in lecture (see syllabus for due dates). No late homework will be accepted. The solutions to each week's problems will be posted on blackboard 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 period or at the beginning of the following lab. 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.

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. Questions during lecture that require clickers will most likely 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 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 or taken early.

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Laboratory activities (1% each)</td>
<td>9%</td>
</tr>
<tr>
<td>Problem sets (2% each)</td>
<td>10%</td>
</tr>
<tr>
<td>Clicker questions</td>
<td>6%</td>
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<tr>
<td>Exams</td>
<td>75%</td>
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midterm exam (30%)
final exam (45%)
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 assistant. Their phone number is 346-4488. 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.
Readings

*Textbook:* The text, *Biological Science* by S. Freeman, 4th or 5th 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 handouts you will need for labs.

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### Lecture and Lab Schedule

*please bring your textbook to lab on these days*

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Lecture</th>
<th>Lab</th>
<th>Problem Sets</th>
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</thead>
<tbody>
<tr>
<td>M</td>
<td>6/23</td>
<td>L1: Macromolecules</td>
<td></td>
<td></td>
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<tr>
<td>Tu</td>
<td>6/24</td>
<td>L2: Cell structure and function</td>
<td>Lab 1: Discovering molecules*</td>
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<tr>
<td>W</td>
<td>6/25</td>
<td>L3: Energy, enzymes and ATP; Harvesting chemical energy</td>
<td>Lab 2: Discovering cells*</td>
<td>Problem set 1 due at start of lecture</td>
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<tr>
<td>Th</td>
<td>6/26</td>
<td>L4: Harvesting chemical energy</td>
<td>Lab 3: Modeling cellular respiration*</td>
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<tr>
<td>Fr</td>
<td>6/27</td>
<td>L5: Photosynthesis</td>
<td></td>
<td></td>
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<tr>
<td>M</td>
<td>6/30</td>
<td>L6: DNA structure and the cell cycle</td>
<td></td>
<td>Problem set 2 due at start of lecture</td>
</tr>
<tr>
<td>Tu</td>
<td>7/1</td>
<td>L7: Cell cycle continued. . .</td>
<td>Lab 4: Modeling photosynthesis*</td>
<td></td>
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<tr>
<td>W</td>
<td>7/2</td>
<td>L8: Protein synthesis</td>
<td>Lab 5: Cell cycle</td>
<td>Problem set 3 due at start of lecture</td>
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<tr>
<td>Th</td>
<td>7/3</td>
<td>Midterm exam (lectures 1-7 and labs 1-5)</td>
<td>Lab 6: Protein synthesis</td>
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<tr>
<td>Fr</td>
<td>7/4</td>
<td>4th of July holiday, no class</td>
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<tr>
<td>M</td>
<td>7/7</td>
<td>L9: Meiosis and the sexual life cycle</td>
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<tr>
<td>Tu</td>
<td>7/8</td>
<td>L10: Genetics; Mendel's laws</td>
<td>Lab 7: Modeling simple genetic traits (VGL)</td>
<td>Problem set 4 due at start of lecture</td>
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<tr>
<td>W</td>
<td>7/9</td>
<td>L11: Recombination; Sex-linked traits and pedigrees</td>
<td>Lab 8: Modeling complex genetic traits (VGL)</td>
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<tr>
<td>Th</td>
<td>7/10</td>
<td>L12: Beyond Mendelian genetics</td>
<td>Lab 9: Final exam review</td>
<td>Problem set 5 due at start of lecture</td>
</tr>
<tr>
<td>Fr</td>
<td>7/11</td>
<td>Final exam (entire course; exam given at normal lecture time)</td>
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<tr>
<td>Lecture</td>
<td>Readings from 4th Edition</td>
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</table>
| 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  
  * 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 |
| 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 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 |
| 3       | * 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 |
| 3 & 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. 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 |
| 5       | * Most students will have to carefully read Ch 10 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 |
| 6       | * 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 |
| 6 & 7   | * 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 |
| 8       | * 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 |
| 9       | * 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 |
| 10 & 11 | * 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  
  * Ch 13: read pgs. 239-241; 243-245 and Box 13.1 on pg. 246  
| 12      | * Ch 13: read pgs. 241-242 to focus on sex chromosomes and sex-linked inheritance; pgs. 250-252 discuss human genetics and pedigrees  
  * Ch 13: read pgs. 245-247 to focus on incomplete dominance, codominance and multiple alleles |
<table>
<thead>
<tr>
<th>Lecture</th>
<th>Readings from 5th Edition</th>
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</table>
| 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. 2-5), classification (p. 6-8), and science as a process (p. 9-13). 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. 84-88 (types, structure of lipids); skim pgs. 89-94 to review diffusion and osmosis  
  • Ch 3: read pgs. 41-52 to focus on protein structure and function  
  • Ch 4: read pgs. 57-59 for an introduction to nucleic acid structure and function  
| 2       | • Ch 29-33: skim over the chapters to answer questions about domains, kingdoms and Lab #2  
  • Ch 7: read the entire chapter on cells; focus on characteristics of prokaryote and eukaryote cells and organelles (p. 106-117); read pgs. 118-127 to gain a deeper understanding of cell dynamics.  
  • Ch 6: read about cell membranes and membrane proteins on pgs. 94-96  
  • For more info: study area at [www.masteringbio.com](http://www.masteringbio.com); Ch 7 BioFlix Animations: Tour of an Animal Cell, Tour of a Plant Cell  
| 3       | • Ch 2: read pgs. 30-32 to focus on chemical reactions and energy  
  • Ch 8: read pgs. 136-150 for basic understanding of ATP and redox reactions, and to focus on enzymes, effects of temperature and pH on enzymes  
| 3 & 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. 154-158 provide a nice overview of cellular respiration, pgs. 159-172 provide more detail of the processes of cellular respiration, and pgs. 172-173 discuss fermentation.  
  • For more info: study area at [www.masteringbio.com](http://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. 176-178 provide a brief overview of photosynthesis, pgs. 178-189 (light reactions) and pgs. 190-192 (Calvin Cycle) cover the details of photosynthesis.  
  • For more info: study area at [www.masteringbio.com](http://www.masteringbio.com); Ch 10 BioFlix Animations: Photosynthesis  
| 6       | • Ch 4: read pgs. 57-65 on DNA structure and function  
  • For more info: study area at [www.masteringbio.com](http://www.masteringbio.com); Ch 4 Web Animation: Nucleic Acid Structure  
| 6 & 7   | • Ch 12: read pgs. 219-223 for an introduction to the cell cycle; pgs. 223-229 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. 284-295; read pgs. 297-300 (correcting mistakes in DNA synthesis)  
  • For more info: study area at [www.masteringbio.com](http://www.masteringbio.com); Ch 11 BioFlix Animations: Mitosis; Web Animation: The Phases of Mitosis; Ch 15 BioFlix Animations: DNA Replication; Web Animation: DNA Synthesis  
| 8       | • Ch 16: read pgs. 304-312 for an introduction to genes, the central dogma, and the genetic code; pgs. 313-315 discusses mutations  
  • Ch 17: read the entire chapter for the details of protein synthesis  
  • Ch 4: read pgs. 65-68 for RNA structure and function  
  • For more info: study area at [www.masteringbio.com](http://www.masteringbio.com); Ch 17 BioFlix Animations: Protein Synthesis; Web Animation: Synthesizing Proteins  
| 9       | • Ch 13: read pgs. 237-249 for details of meiosis; pgs. 249-251 discuss mistakes in meiosis  
  • For more info: study area at [www.masteringbio.com](http://www.masteringbio.com); Ch 13 BioFlix Animation: Meiosis  
| 10 & 11 | • Ch 14: read pgs. 256-259; pgs. 259-263 discuss Mendel’s 1st Law; pgs. 263-266 discuss Mendel’s 2nd Law; pg. B8 (Bioskills 5) discusses some simple rules of probability that are useful for understanding Mendelian genetics  
  • Ch 14: read pgs. 266-275 and Box 14.1 on pg. 274  
  • For more info: study area at [www.masteringbio.com](http://www.masteringbio.com); Ch 14 Web Animation: Mendel’s Experiments, The Principle of Independent Assortment  
| 12      | • For more info: study area at [www.masteringbio.com](http://www.masteringbio.com); Ch 14 Web Animation: Mendel’s Experiments, The Principle of Independent Assortment |