Principles of Biology

Portland State University

Bi 214: Principles of Biology I Laboratory      Fall 2015

Instructor
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Email: __________________________
Office Hour: ______________________

Course Description
The Principles of Biology sequence (Bi 211, 212, & 213, along with labs Bi 214, 215 & 216) introduces the foundations of life science. In Bi 211 and 214 we examine the molecular and cellular underpinnings of living organisms. Specific topics include biochemistry, cell biology, molecular biology, biotechnology, microbiology, and genetics.

Co-requisite
Biology 211, Principles of Biology I.

Required Items
The syllabus and lab manual are available for download from the D2L course page.

Learning Objectives
Upon completion of Bi 211 and Bi 214, students should be able to:
• Describe the importance and roles of chemical bonds and chemical energy in biological processes
• Define the macromolecules required for cellular processes, and their synthesis, cellular localization, and structure/function relationships
• Identify cellular structures and their functions
• Interpret and apply models that illustrate energy capture and use in biological systems
• Interpret and apply models that illustrate the mechanisms of heredity and control of gene expression, especially cell division, DNA replication, transcription, and translation
• Explain the utility of molecular biology for human health and biotechnology
• Explain how genetic information influences traits in individuals and their offspring
• Effectively utilize the vocabulary of biochemistry, cellular and molecular biology, and genetics

Skills Development
During this course, students will learn how to:
• Generate hypotheses and test them experimentally
• Create tables and graphs for reporting experimentally derived data
• Communicate experimental design, execution and outcomes using a formal laboratory report format
• Apply common laboratory tools of molecular biology and microbiology
• Work cooperatively to solve scientific problems and carry out organized experimentation
• Read and analyze selections from the primary scientific literature

Grading
The Lab, while a component of the first term of Principles of Biology, is its own 1-credit course as Bi214. Points will be earned from quiz scores, lab write-ups, a formal lab report, and participation.

Grading Policy
Grades will be assigned according to the percentage of possible points earned. As a rough guide, the highest cumulative score can be thought of as 100%. If you earn at least 90% of the highest score you will receive an A- or higher; if you earn at least 80% you will receive a B- or higher; if you earn at least 70% of the possible points you will receive a C- or higher; if you earn at least 60% of the possible points you will receive a D- or higher.

PSU’s policy on the temporary grade of Incomplete (“I”) is strictly adhered to in this course. Please note, you must be passing the course (with a C- or better) in order to be eligible for an “I” grade. See the PSU Bulletin for more information: http://www.pdx.edu/oaa/psu-bulletin.
Disability

If you have a disability and are in need of academic accommodation: first register with the Disability Resource Center (503)725-4150, http://www.drc.pdx.edu, then notify Dr. Bartlett to make appropriate arrangements. Note: exams taken at the PSU Testing Center must be taken at the same time as class exams. No exceptions. Schedule exams at the Testing Center as soon as possible to ensure a spot. If for some reason you are unable to schedule any of your exams at the Testing Center for the appropriate time, let me know as soon as possible so I can arrange an alternative testing location.

Quizzes

- NO MAKE-UP QUIZZES.
- At the beginning of each lab, you will be given a quiz on the previous week’s lab. There will also be one question on the current lab, so be sure you read and understand the lab before you arrive. Quizzes are given at the start of lab with ten minutes allowed for completion. If you arrive late, you will only be given the amount of time remaining, if the quiz is already in progress. Quizzes missed for any reason cannot be made up.
- There will be a quiz every week except weeks 1 and 9. Eight quizzes, five points each. The lowest quiz score is automatically dropped. 35 points total.

Lab write-ups

- NO MAKE-UP LABS.
- You must complete each lab, and answer all questions to receive full credit. There are 10 standard lab write-ups, worth 15 pts. each. The lowest score is automatically dropped. 135 points total.
- Lab write-ups are submitted online through the D2L website, please refer to your TA’s specific instructions.
- Lab write-ups are due the week after each lab is performed, before the start of your next lab. Labs that are submitted late (after class starts) will automatically be reduced by 5 points before grading. Labs may not be submitted more than one week late.
- Drawings need to be large enough for clarity, and labeled with the name of the item, its size, and any of its parts named in the lab notebook.
- Responses to weekly lab questions need to be typewritten in complete sentences on a separate sheet in 12-point font. Show any necessary calculations.
- All submitted assignments MUST have your name on them. If you miss the lab for any reason and do not discuss with your TA, you will not get any points for that lab write-up.
Lab reports

- There is one formal lab report this term on Lab 5, ‘Genetic Transformation’.
  - The first draft of this report is due at the start of lab 7.
  - The final draft of the formal lab report (FLR) is due week 9. This report is worth 25 points and cannot be dropped as a lowest score. Final drafts of the FLR that are turned in late will automatically have 6 points deducted. After one week, FLRs will not be accepted.
- Instructions for writing the lab report will be discussed throughout the quarter in your lab sections.

Attendance

Attendance is required for success in this course. You must stay for the entire lab and actively participate. There is a participation component to each lab report and lack of participation will result in the automatic loss of points for that lab's write-up. **If you do not show up to a lab, you may not turn in a lab report for that lab.**

Missed lab sections cannot be made up. The missed lab session can be dropped at the end of the quarter as your lowest score.

Wednesday lab-only (11/11/15) will not meet on the PSU Veteran's Day holiday. These labs will be made up on a different day--your TAs will have the details.

There are no lab sections held during the entire week of Thanksgiving (11/26/15). Lab 9 will be completed on your own and submitted online during this week.

General Guidelines

- **Read the lab ahead of time.** Arrive on time, and prepared for 3 hours of work.
- Turn your phone off for the duration of the lab.
- The computers are for Bi 214-related work only, e.g. data collection, lab report write-ups, or investigation of topics related to the lab exercise or lectures.
- **Cheating and any other academic dishonesty will result in a zero for the assignment, and will be reported to the University administration. You cannot “copy/paste” from any source: any writing that is not in your own words will be considered cheating.** For details, see the PSU Code of Conduct (http://pdx.edu/dos/psu-student-code-conduct). Your TA will also go over the issue of plagiarism – please ask questions if you are not sure about how to avoid plagiarism.
Follow the “campsite rule”: leave the lab benches cleaner than you find them. Messes that someone else has to clean up will result in point deductions.

I. Safety

- Report any injuries or broken equipment to the TA immediately.
- No sandals or open shoes of any kind. You will be asked to leave the lab if you are not in compliance.
- Leave backpacks and jackets in the shelves next to the door.
- Absolutely no eating or drinking in the lab.
- Waste containers must be used for all designated substances. Your TA will tell you what can be disposed of in the sink.
- Dispose of broken glass and un-used cover slips and slides in the broken glass box.
- Dispose of used cover slips and slides in the red sharps container.
- There are phones at the front desk of each classroom with emergency numbers listed.

II. Your lab manual, table, and partners

- Carefully read the week’s lab before your lab session. If hypotheses are required, think about how to state them succinctly, but wait until the lab material has been introduced before stating hypotheses in final form. Fill out the required questions, drawings, etc. as much as possible during lab. Your lab records are important for your grade. Use a pencil for drawings.
- Lab work should be completed in cooperation with your table partners (see “Expectations for Students” below).
- When you are finished, make sure all equipment and chemicals are stored in the proper place (either in the center of the table or on the back or center benches). Unless instructed otherwise, all glass- and plastic-ware must be cleaned and returned to the center of your lab table for use by the next class. Leave them to dry upside down on a paper towel (or in a test tube rack) in the center of your lab bench. Do not leave them in or by the sink! Used test tubes should be discarded in the sharps waste container.
- Make sure your table is wiped down and push in the chairs.
- Stick around for discussion after you are finished with the lab, if there is time. This will help you understand the lab more thoroughly and will help you complete the questions in your lab manual.
III. Microscopes and Slides

1. **Microscopes**: You will be assigned a specific microscope at your bench. **DO NOT MOVE THE MICROSCOPE FROM YOUR BENCH.**
   - When you are through with the microscope
     - Make sure oil is wiped off the oil immersion lens. Clean the objectives and oculars using only the special lens paper (not paper towels or tissues)
     - Make sure it is stored in the correct position
       - stage down
       - on 4X
       - lamp off
       - **without a slide on it**
   - Report any microscopes that are not stored properly from the previous lab.
   - If you need to move the microscope, do so with care, and always use both hands. Never slide the microscope across the benchtop – this can cause a great deal of damage.

2. **Slides**: Each table will have one box of clean slides and cover slips. Prepared slides will either be on each table or on the back counter.
   - **Prepared slides** must be returned to the box where they were obtained, with the label right side up. Do not mix them up, do not place them in the wrong box.
   - Dispose of slides and coverslips you prepared yourself in the **sharps** container.

IV. Principles of Biology and Plagiarism

The rules concerning plagiarism are very important to know and follow. The PSU policy on academic dishonesty, including plagiarism, is available online (http://pdx.edu/dos/psu-student-code-conduct). Academic dishonesty will result in disciplinary action, ranging from a zero on an assignment, to a failing grade for the course, to expulsion from the University. This short guide contains recommendations regarding plagiarism and specific situations you may encounter in BI 214, 215, and 216.

**Can I use outside sources for my lab reports? If so, how do I do this properly?**

Do **not** use outside sources if a lab report question says:

- “In your opinion…”
- “Based on your observations in lab…”

If you **can** use outside sources:

1) The source material must be paraphrased (put into your own words). One way to be sure you paraphrasing: read
the source materials, take notes on them, and then write your answer based on your notes.

2) The source must be properly cited. See http://owl.english.purdue.edu/owl/resource/747/01/ for MLA style guidelines.
Example: “Murray and Henderson suggested that the moon is made of cheese (Murray, E. and Henderson, L. Journal of the Imagination, Aug 1895, 143-145, print).”

Can I collaborate with fellow students? If so, how do I do this properly?
Although you will often work in groups, each person gets graded individually. Treat a lab discussion like you would when paraphrasing an outside source. Feel free to discuss the answers to the lab questions and take notes on your discussion points. Write your final answers later, on your own, based on these notes.

Developing computer and software skills is an important goal of this class. If one person creates all the graphs and tables for the whole group, those goals will not be reached. Unless noted otherwise, you must create your own graphs and tables from the data sets gathered by your lab group.

Quizzes are never collaborative!

When in doubt, ask!
You cannot get in trouble for asking your TA any question. Here are some examples that can get you on the right track if you’re concerned about plagiarism:
“Is it ok if I answer my questions like this?”
“How much can my tablemates and I collaborate on this section?”

For more information, see:
http://guides.library.pdx.edu/biology
The Biology research home page at the library, contact the Biology librarian for support!

http://guides.library.pdx.edu/cite
A handy tutorial on citing sources from the PSU Library

http://www.writingcenter.pdx.edu/resources/library.php?step09_detail_5.html
PSU’s Writing Center resources about plagiarism
# Bi 214 Laboratory Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Lab ID</th>
<th>Objective</th>
<th>Quiz</th>
<th>Bring to Class</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/2 - 10/1</td>
<td>Lab 1</td>
<td>Plant pigments and pH</td>
<td>--</td>
<td></td>
<td>L1- Questions; create a figure and table of results.</td>
</tr>
<tr>
<td>10/5 - 10/8</td>
<td>Lab 2</td>
<td>DNA purification and protein folding</td>
<td>Quiz 1</td>
<td>L1-Q's, Figure/table</td>
<td>L2- Questions; prepare a methods section citing the lab manual.</td>
</tr>
<tr>
<td>10/12 - 10/15</td>
<td>Lab 3</td>
<td>Microscopes, micro-fossils and living micro-organisms</td>
<td>Quiz 2</td>
<td>L2-Q's, Methods paragraph</td>
<td>L3- Questions; prepare an introduction section.</td>
</tr>
<tr>
<td>10/19 - 10/22</td>
<td>Lab 4</td>
<td>Cellular Respiration</td>
<td>Quiz 3</td>
<td>L3-Q's, Intro paragraph, properly cited</td>
<td>L4- Questions; prepare a data/results section.</td>
</tr>
<tr>
<td>10/26 - 10/29</td>
<td>Lab 5</td>
<td>Genetic transformation</td>
<td>Quiz 4</td>
<td>L4- Q's Data and results paragraph</td>
<td>L5- Questions; prepare a hypothesis for lab 6 experiment and answer pre-lab Q's.</td>
</tr>
<tr>
<td>11/2 - 11/5</td>
<td>Lab 6</td>
<td>Monitoring gene expression</td>
<td>Quiz 5</td>
<td>L5-Q's, L6-hypothesis and pre-lab Q's.</td>
<td>Lab 6- Questions; Prepare a draft FORMAL LAB REPORT (FLR) for Lab 5: Title, intro, methods, data/results, conclusion, references.</td>
</tr>
<tr>
<td>11/9 - 11/12</td>
<td>Lab 7</td>
<td>DNA, restriction enzymes, and electrophoresis</td>
<td>Quiz 6</td>
<td>L6-Q's, draft FLR for peer review</td>
<td>L7- Questions; peer review fellow student FLR.</td>
</tr>
<tr>
<td>11/16 - 11/19</td>
<td>Lab 8</td>
<td>Cell Division</td>
<td>Quiz 7</td>
<td>L7-Q's -receive FLR from peer-reviewer</td>
<td>L8- Questions; prepare drawings on observations. Prepare final draft of FLR.</td>
</tr>
<tr>
<td>11/23 - 11/26</td>
<td>Lab 9</td>
<td>BLAST</td>
<td>--</td>
<td>L8-Q's and drawings -Hand in final FLR</td>
<td>L9- Questions; 1.D. the protein</td>
</tr>
<tr>
<td>11/30 - 12/3</td>
<td>Lab 10</td>
<td>Genetics and statistics</td>
<td>Quiz 8</td>
<td>L9-Q's and protein ID</td>
<td>None; Completed the L10-Q's during lab time</td>
</tr>
<tr>
<td>12/7 - 12/10 Finals</td>
<td>No Lab</td>
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</tbody>
</table>
IMPORTANT INFORMATION: Please fill out on Day 1

Your TA’s name: ________________________

Office hour and location: ________________________

Section number and classroom: ________________________

Your lab-mates’ names and email addresses:

________________________  __________________________
________________________  __________________________
________________________  __________________________
________________________  __________________________
________________________  __________________________
Principles of Biology I Laboratory -- Bi 214

Expectations for Students

Learning in the University environment should be stimulating, demanding, and also fair. We encourage the open discussion and exchange of ideas, particularly in the laboratory setting. However, it is essential that all graded work in this course be your own work, and in your own words.

Below are the expectations for students in this class. This set of expectations is intended to maximize debate and exchange of ideas in an atmosphere of mutual respect while preserving individual ownership of ideas and written words. If you feel you do not understand or cannot agree to these expectations, you should discuss this with your instructor and classmates.

- Students are expected to work cooperatively with other members of the laboratory and show respect for the ideas and contributions of other people.
- When working as part of a group, students should strive to be good contributors to the group, to listen to others in the group and try not to dominate, and to recognize the contributions of others. Students should try to ensure that everyone in the group makes a contribution, and recognize that everyone contributes in different ways to a group process.
- Students should conduct experiments and discuss problems as part of a group, but must write lab reports and exams alone, without copying anyone else’s work.

I have read and understood the expectations for students in this class. If I am uncertain about appropriate behavior in the class I will ask one of the instructors for clarification. I understand that any instances of academic dishonesty will result in a zero for that assignment or exam, and will be reported to the University administration, as outlined in the course syllabus. (see the PSU “Code of Student Conduct and Responsibility” for more information: http://www.pdx.edu/dos/codeofconduct)

__________________________
Name (signed)

__________________________ Date: __________________
Name (printed)