2014

161-07 General Biology I Lab

Howard Pecquet
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GENERAL BIOLOGY I LAB (BIOL 161), FALL 2014, XAVIER UNIVERSITY
(Satisfies 1d, 1e, 3a, 3b, 9a, 9b, 9c, 9d of NSTA Science Standards)
syllabus – short version

Section, Days, Time, and Location | Instructor (Office in Albers; Phone Number; Email)
--- | ---
01 MW 8:00 - 9:50 | Neema Nourian (Albers 105 C; 745-3808; nourian@xavier.edu)
02 MW 10:00 - 11:50 | Matthew Neatrour (Albers 105D; 745-3048; neatrourm@xavier.edu)
03 MW 12:00 - 1:50 | Neema Nourian
04 MW 2:00 - 3:50 | Matthew Neatrour
05 MW 4:00 - 5:50 | Kathy Tehrani (Albers 105 A; 745-3494; tehranik@xavier.edu)
06 TR 8:00 - 9:50 | Neema Nourian
07 TR 10:00 - 11:50 | Howard Pecquet (Albers 312C; 745-3623*; pecqueth@xavier.edu)
08 TR 12:20 - 2:10 | Neema Nourian
09 TR 2:30 - 4:20 | Waltke Paulding (Albers 002B; 745-3805; paulding@xavier.edu)
10 TR 4:30 - 6:20 | Dorothy Engle (Albers 108; 745-3807; engle@xavier.edu)
11 MW 6:30 - 8:20 | Sara Baltz (Albers 002A; 513-745-3806; baltzs@Xavier.edu)

* This phone number is the Department phone number, not the individual faculty’s. When you dial this number, you will reach Mrs. Deborah Kostoff; you can leave a message with her for your instructor.

Required Texts

There are older versions of Pechenik available. However, the page numbers referenced in this course refer the 2012 version of the book. If you bought the older version, it is your responsibility to find the appropriate pages in the older version.

Course Objectives
This laboratory course, which supplements General Biology I lecture (BIOL 160), is designed to provide students with hands-on experience for the principles learned in lecture. This will be achieved by carrying out observations and experiments. Furthermore, students will gain experience using laboratory equipment, such as the compound light microscope, spectrophotometers, and electrophoresis devices. Additionally, students will gain experience in writing scientific papers.

Learning Outcomes
By the end of this course the successful student will understand:
1. Components, functions, and proper use of the compound light microscope
2. Components and functions of prokaryotic and eukaryotic cells, including cell membrane, cell wall, ribosomes, and various eukaryotic organelles
3. Major chemical components of living organisms
4. Basic principles of fermentation and photosynthesis
5. Basic statistical analyses used by biologists
6. Mitosis, meiosis, and gametogenesis
7. Electrophoresis and transformation
8. Mendelian genetics
9. Composition and functions of animal tissues
10. Major components and functions of the digestive, respiratory, circulatory, cardiovascular, urogenital/reproductive, nervous, and skeletal systems
11. Components of scientific experiment (independent, dependent, and controlled variables), and how to design a scientific experiment
12. How a scientific paper is designed, organized, and written

Grades
Your grade for the course will be calculated in the following way:
1. Tests (4): 75% of your final grade
2. Quizzes: 15% of your final grade
3. Writing and graphing assignments: 10% of your final grade

Please note: You will need at least a grade of C- in this course in order to enroll in some upper Biology courses.
SCHEDULE (The schedule and procedures in this course are subject to change in the event of extenuating circumstances.)

<table>
<thead>
<tr>
<th>Lab Number</th>
<th>Dates</th>
<th>Days</th>
<th>Topics</th>
<th>Due Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug. 25/26</td>
<td>M/T</td>
<td>Chapter 1: The Microscope and Observations of Cells and Tissues</td>
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<tr>
<td>2</td>
<td>Aug. 27/28</td>
<td>W/R</td>
<td>Chapter 1 Continued</td>
<td></td>
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<tr>
<td></td>
<td>Sept. 1/2</td>
<td>M/T</td>
<td>No Lab (due to Labor Day)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sept. 3/4</td>
<td>W/R</td>
<td>Chapter 2: Identifying Biological Molecules</td>
<td>Writing Assignment 1</td>
</tr>
<tr>
<td>4</td>
<td>Sept. 8/9</td>
<td>M/T</td>
<td>Chapter 3: Experimental Design and Enzyme Activity</td>
<td>Writing Assignment 2A</td>
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<tr>
<td>5</td>
<td>Sept. 10/11</td>
<td>W/R</td>
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<td>6</td>
<td>Sept. 15/16</td>
<td>M/T</td>
<td>PREPARATORY QUIZ 1</td>
<td>Graphing Assignment Ch 3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Chapter 4: Cell Membranes and Osmosis</td>
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</tr>
<tr>
<td>7</td>
<td>Sept. 17/18</td>
<td>W/R</td>
<td>Chapter 5: Photosynthesis</td>
<td>Writing Assignment 2B</td>
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<tr>
<td>8</td>
<td>Sept. 22/23</td>
<td>M/T</td>
<td>TEST 1 (on all the material covered since the first meeting)</td>
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<tr>
<td>9</td>
<td>Sept. 24/25</td>
<td>W/R</td>
<td>Chapter 6: Fermentation in Yeast Cells</td>
<td>Writing Assignment 3A</td>
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<td></td>
<td></td>
<td></td>
<td>Graphing Assignment Ch 5</td>
</tr>
<tr>
<td>10</td>
<td>Sept. 29/30</td>
<td>M/T</td>
<td>Chapter 7: Mitosis in Eukaryotic Cells</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Graphing Assignment Ch 6</td>
</tr>
<tr>
<td>11</td>
<td>Oct. 1/2</td>
<td>W/R</td>
<td>Chapter 8: Meiosis and Gamete Formation</td>
<td>Writing Assignment 3B</td>
</tr>
<tr>
<td>12</td>
<td>Oct. 6/7</td>
<td>W/R</td>
<td>PREPARATORY QUIZ 2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Chapter 9: Genetics I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct. 8/9</td>
<td>M/T</td>
<td>No Lab (due to Fall Holiday)</td>
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</tr>
<tr>
<td>13</td>
<td>Oct. 13/14</td>
<td>M/T</td>
<td>Chapter 10: Genetics II</td>
<td>Writing Assignment 4A</td>
</tr>
<tr>
<td>14</td>
<td>Oct. 15/16</td>
<td>W/R</td>
<td>TEST 2 (on all the material covered since Test 1)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Oct. 20/21</td>
<td>M/T</td>
<td>Chapter 11: DNA Technology</td>
<td>Writing Assignment 4B</td>
</tr>
<tr>
<td>16</td>
<td>Oct. 22/23</td>
<td>W/R</td>
<td>Chapter 11 Continued</td>
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<tr>
<td>17</td>
<td>Oct. 27/28</td>
<td>M/T</td>
<td>Chapter 11 Continued (Data Analysis)</td>
<td>Writing Assignment 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chapter 12: Survey of Animal Tissues</td>
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<tr>
<td>18</td>
<td>Oct. 29/30</td>
<td>W/R</td>
<td>Chapter 13: The Fetal Pig: External Anatomy and the Digestive System</td>
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<tr>
<td>19</td>
<td>Nov. 3/4</td>
<td>M/T</td>
<td>PREPARATORY QUIZ 3</td>
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<td></td>
<td></td>
<td></td>
<td>Chapter 14: The Fetal Pig - Respiratory System</td>
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<tr>
<td>20</td>
<td>Nov. 5/6</td>
<td>W/R</td>
<td>Chapter 15: The Mammalian Heart</td>
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<tr>
<td>21</td>
<td>Nov. 10/11</td>
<td>M/T</td>
<td>TEST 3 (on all the material covered since Test 2)</td>
<td>Writing Assignment 6 (tentative)</td>
</tr>
<tr>
<td>22</td>
<td>Nov. 12/13</td>
<td>W/R</td>
<td>Chapter 16: The Fetal Pig - Circulatory System</td>
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</tr>
<tr>
<td>23</td>
<td>Nov. 17/18</td>
<td>M/T</td>
<td>Chapter 17: The Fetal Pig - Urogenital System</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Nov. 19/20</td>
<td>W/R</td>
<td>Chapter 18: Animal Development</td>
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<td></td>
<td>NOV. 24: LAST DAY TO WITHDRAW FROM CLASS</td>
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</tr>
<tr>
<td>25</td>
<td>Nov. 24/25</td>
<td>M/T</td>
<td>Chapter 19: The Mammalian Nervous System</td>
<td>Writing Assignment 7A (tentative)</td>
</tr>
<tr>
<td></td>
<td>Nov. 26/27</td>
<td>W/R</td>
<td>No Lab (Thanksgiving)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Dec. 1/2</td>
<td>M/T</td>
<td>Chapter 19 Continued</td>
<td>Writing Assignment 7B (tentative)</td>
</tr>
<tr>
<td>27</td>
<td>Dec. 3/4</td>
<td>W/R</td>
<td>PREPARATORY QUIZ 4</td>
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<tr>
<td></td>
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<td></td>
<td>Chapter 20: The Human Skeleton</td>
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<tr>
<td>28</td>
<td>Dec. 8/9</td>
<td>M/T</td>
<td>Chapter 20 Continued</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Dec. 10/11</td>
<td>W/R</td>
<td>TEST 4 (on all the material covered since Test 3)</td>
<td></td>
</tr>
</tbody>
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Scale
A 93% - 100% C+ 77% - 79% F < 60%
A- 90% - 92% C 73% - 76%
B+ 87% - 89% C- 70% - 72%
B 83% - 86% D+ 67% - 69%
B- 80% - 82% D 63% - 66%
Description of Quizzes and Tests
1. Pre-Lab and Preparatory Quizzes. There will be two types of quizzes in this course, pre-lab quizzes and preparatory quizzes. Pre-lab quizzes will consist of a few general questions designed to determine whether you have read the assigned material for that day’s lab. There will be a pre-lab quiz at the beginning of every lab except on days when an exam or a preparatory quiz is scheduled. Preparatory quizzes, on the other hand, are more comprehensive (and longer) quizzes intended to determine whether you have learned the material from the previous lab meetings, and to help you prepare for the upcoming lab test. The date for each preparatory quiz is listed on the schedule below. Pre-lab quizzes will constitute 1/5 or 20% of your quiz grade, and long quizzes will constitute 4/5 or 80% of your quiz grade. (The number of questions and points on each quiz may vary from section to section, as each instructor makes his/her own quizzes, but the percentages will remain the same for all sections.)

2. TESTS. There will be four (4) lab tests given throughout the course of the semester. Each test will consist of both written questions and practical questions. The practical questions will require you to identify biological specimens/structures and answer questions about those specimens/structures.

Description of Writing and Graphing Assignments
Written communication (i.e., writing and publishing articles, papers, books, etc.) is an important and integral component of all areas of science, for the simple reason that without written communication there would be no progress in science. Therefore, displaying data and writing will be important components of any lab course you will take in the Biology Department at Xavier, including General Biology I Lab. These assignments are intended to help you learn this process. The sum of all these assignments will constitute 10% of your final grade.

Graphing Assignments
Graphing assignments are embedded in the lab manual.

Chapter 3 Enzymes: Graphing Data An Introduction to using a spreadsheet program (usually EXCEL).
Chapter 5 Photosynthesis: Data Analysis An exercise to reinforce graphing skills.
Chapter 6: Fermentation: A graphing assignment leading to a figure for Writing Assignment 6 Results Section.

Writing Assignments
Writing assignments will be given as handouts.

Assignment 1: Introduction to Scientific Writing. This assignment will set the stage for the other assignments.

Assignment 2: Plagiarism. Plagiarism is a serious offense. This assignment will help you avoid any form of plagiarism.

Assignment 3: Fermentation. One of the experiments that you will perform in the lab, and about which you will do your writings, will be fermentation. This assignment will help you to better understand the process of fermentation.

After you have completed the above assignments, you will next complete a series of assignments in which you will first learn how the different sections of a scientific paper are organized and written, and then you will you write each of the following sections of the scientific paper:

1. Title 3. Introduction 5. Results 7. References/Literature Cited

This order represents the order in which these sections appear in many, but not all, peer-reviewed science journals where new scientific findings are published. However, although this is the order in which these sections appear in a paper, this is not the order in which they are written. In fact, the Title and the Abstract are the very last segments that are written. Therefore, the order of the assignments you will receive this semester will reflect the order in which these sections are written, not the order in which they appear in the final paper. The following will be the order in which you will receive these writing assignments this semester:

Assignment 4: Introduction Section Assignment 6: Results Section Assignment 8: Title/Abstract/Literature Cited
Assignment 5: Materials and Methods Section Assignment 7: Discussion Section

(‘ Writing assignments with asterisks are tentatively placed in the schedule. These may change later in the semester.)

You will be using the following sources to guide you in these assignments:
1. *A Short Guide to Writing about Biology*
2. Appendix A in the lab manual
3. Pesticide exposure in honey bees results in increased levels of the gut pathogen Nosema (Pettis et al., 2012). This will serve as our example of a scientific paper published in a peer-reviewed scientific journal. We will point out the strengths and the weaknesses of this paper as we examine its various sections. We can learn both from the strengths and the weaknesses of this paper.
Policies on Missed Quizzes and Tests, and Late Assignments

1. MISSED QUIZZES AND TESTS. If you miss a quiz or a test because of an unexcused absence, you will receive a zero for that quiz or test. If you miss a quiz or test because of an excused absence, as defined below, talk to your instructor as soon as possible.

2. LATE ASSIGNMENTS. For any assignment that is turned in late, 10% will be deducted from your grade for that assignment for each day the assignment is late. Furthermore, for some of the writing assignments, you will be asked to submit a copy to http://turnitin.com/, as well as turn in a printed copy. If you fail to submit any writing assignment to turnitin.com, and you turn in a printed copy late, there will be a 20% reduction for each day that assignment is late.

Attendance Policy

Attendance is mandatory. Unexcused absences will affect your grade, because of missed quizzes, tests, and/or assignments. Please keep in mind that you will be considered absent if you attend a section other than the one for which you are registered, unless you obtain prior approval from your instructor. Also, being late to class will hurt your grade. In other words, don’t miss any lab, don’t be late, and attend the section for which you are registered.

Excused Absences – An absence is considered excused only if it meets either of the two following criteria:

1. ILLNESS/EMERGENCIES. An absence is considered excused if it is due to an illness or an emergency. However, you will need to convince your instructor that the absence was indeed due to an illness or an emergency.

2. UNIVERSITY-SPONSORED EVENTS. An absence is also considered excused if it is due to a university-sponsored event (e.g., you are part of a team and the team is traveling at the time). You will need to provide evidence, however, that the event was university-sponsored.

Resources For Studying

The following resources will be available to help students succeed in this course:

1. Review materials, models, photos, and other helpful items will be available in the lab until the day before each test to help you to prepare for each test. On weekdays, if a lab is in session, go quietly to the review area to study. On Fridays the lab is available from 9 am to 5 pm (if the lab is locked on Fridays, find one of the faculty members to open it for you). Also, room 207 may be open on Saturdays for your review (look for announcements). Furthermore, photos of some of the material may be posted on Blackboard for your convenience.

2. The Learning Assistance Center runs study groups for General Biology; call 745-3280 for information or go there to sign up. Tutors are available for students who need individual help.

Conduct

No talking while the instructor is talking

No use of cell phones (for any purpose)

Computer use limited to lab work

Return everything you use to its proper location

Leave lab clean and organized

Academic Honesty

Academic Honesty (From the 2006-2008 Xavier University Catalog, page 54): “The pursuit of truth demands high standards of personal honesty. Academic and professional life requires a trust based upon integrity of the written and spoken word. Accordingly, violations of certain standards of ethical behavior will not be tolerated at Xavier University. These include theft, cheating, plagiarism, and unauthorized assistance in assignments and tests...(and) the falsification of results and material submitted in reports. All work submitted for academic evaluation must be the student’s own. Certainly, the activities of other scholars will influence all students. However, the direct and unattributed use of another’s efforts is prohibited as is the use of any work untruthfully submitted as one’s own. Penalties for violations of this policy may include one or more of the following: a zero for that assignment or test, a grade of F in the course, and expulsion from the University.”