2016

161-05 General Biology I Laboratory

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In this majors' level introduction to biology, we will explore the basic organization of living things, and of life science. Life science concerns everything from atoms through whole ecosystems; this first semester focuses on "little things"—atoms, molecules, cells, organs and organ systems. In General Biology II, your exploration will continue to individuals, populations, communities and ecosystems.

This course is part of the Xavier Core Curriculum, which aims to develop people of learning and reflection, integrity and achievement, in solidarity for and with others. It addresses the following core learning objectives at the introductory level:

1a: Students recognize and cogently discuss significant questions in the humanities, arts, and the natural and social sciences.
2b: Students evaluate problems using quantitative methods and arguments.
4b: Students discuss and evaluate what constitutes human wellness.
5b: Students examine the interconnections between humans and the natural environment.

Co-requisite: All students should also be enrolled in BIOL160: General Biology I.

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
**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>Topics</th>
<th>Due Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug. 22-25</td>
<td>Chapter 1: The Microscope and Observations of Cells and Tissues</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Aug. 29-Sep. 1</td>
<td>Chapter 2: Identifying Biological Molecules</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sept. 6-8</td>
<td>Chapter 3: Experimental Design and Enzyme Activity <strong>NOTE:</strong> Monday sections need to make up this lab in other sections throughout the week!</td>
<td></td>
</tr>
</tbody>
</table>
| 4          | Sept. 12-15 | Preparatory Quiz 1
Chapter 4: Cell Membranes, Osmosis, and Photosynthesis                  | HW Assignment Graphing Data from Chapter 3: Pages 3-11-3-1                  |
| 5          | Sept. 19-22 | TEST 1 (Chapters 1-4)
Chapter 5: Fermentation in Yeast Cells                                    | Data Analysis and HW from Chapter 4: Page 4-10                              |
| 6          | Sept. 26-29 | Chapter 6: Mitosis and Meiosis, and Gamete Formation                      |                                                                             |
| 7          | Oct. 3-6    | **Fall Holiday-No Labs**                                                 |                                                                             |
| 8          | Oct. 10-13  | Chapter 7: Genetics                                                      | Writing Assignment: The Scientific Article                                  |
| 9          | Oct. 17-20  | Chapter 8: DNA Technology                                                 |                                                                             |
| 10         | Oct. 24-27  | Preparatory Quiz 2
Chapter 9: Survey of Animal Tissues
Chapter 10: The Human Skeleton                                             |                                                                             |
| 11         | Oct. 31-Nov. 3 | Test 2 (Chapters 5-9)
Chapter 11: Digestive and Respiratory Systems                               |                                                                             |
| 12         | Nov. 7-10   | Chapter 12: Mammalian Heart and Circulation                               |                                                                             |
| 13         | Nov. 14-17  | Chapter 13: Urogenital System                                             | Writing Assignment: Group Paper Due                                          |
| 14         | Nov. 21-24  | **Thanksgiving Holiday-No Labs**                                          |                                                                             |
| 15         | Nov. 28-Dec. 1 | Preparatory Quiz 3
Continue Chapter 14: Nervous System                                        |                                                                             |
| 16         | Dec. 5-8    | Test 3 (Chapters 10-14)                                                  |                                                                             |

**Grades**

Tests: There will be three (3) lab tests given throughout the course of the semester. Each test will consist of both written questions and practical questions.

Quizzes: Preparatory quizzes are comprehensive 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.

Assignments: These assignments are intended to help you begin to learn the process of scientific communication. In this semester we will emphasize written communication.

Your grade for the course will be calculated in the following way:

1. Tests (3): 75% of your final grade
2. Quizzes: 15% of your final grade
3. Writing and graphing assignments: 10% of your final grade

**Scale**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>93% - 100%</td>
</tr>
<tr>
<td>A-</td>
<td>90% - 92%</td>
</tr>
<tr>
<td>B+</td>
<td>87% - 89%</td>
</tr>
<tr>
<td>B</td>
<td>83% - 86%</td>
</tr>
<tr>
<td>B-</td>
<td>80% - 82%</td>
</tr>
<tr>
<td>C</td>
<td>77% - 79%</td>
</tr>
<tr>
<td>C-</td>
<td>73% - 76%</td>
</tr>
<tr>
<td>D+</td>
<td>67% - 69%</td>
</tr>
<tr>
<td>D</td>
<td>63% - 66%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60%</td>
</tr>
</tbody>
</table>

**Please note:** You will need at least a grade of C- in this course in order to enroll in some upper level Biology courses.
Description of Quizzes and Tests
1. Preparatory Quizzes. Preparatory quizzes are comprehensive 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. (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 three (3) 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.

Please note: Individual instructors may also choose other tools to assist you in your learning, for example, short daily quizzes or homework activities. He/she may use part of the Preparatory Quiz score for this purpose.

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.

Assignment 1: Graphing Data An Introduction to using a spreadsheet program (usually EXCEL). Lab Manual Chapter 3.

Assignment 2: Graphs as Communication Tools An exercise to reinforce graphing skills and figure caption. Lab Manual Chapter 4.

Assignment 2.1: Final Graph Practice A final exercise in graph generation. Lab Manual Chapter 5 (Optional for additional practice)

Assignment 3: Introduction to Scientific Writing This assignment will set the stage for the other assignments

Assignment 4: Scientific Group Paper This assignment is a group assignment that includes writing an entire scientific paper done on the Fermentation Lab

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 in Canvas for your convenience.

2. The Office of Academic Support offers tutoring, Supplemental Instruction (SI), and study groups. For information about these services, contact Stephanie Daniels at daniells3@xaver.edu. The Office of Disability Services provides accommodations and support for students who have a documented disability. Cassandra Jones is the Director of Disability Services and can be reached at jonesc20@xaver.edu. Karla Helton continues to support both offices and can be reached at heltonk1@xaver.edu.

Conduct
No talking while the instructor is talking  Computer use limited to lab work  Leave lab clean and organized
No use of cell phones (for any purpose)  Return everything you use to its proper location

Academic Honesty
“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 standards of ethical behavior will not be tolerated at Xavier University. These include, but are not limited to cheating, plagiarism, unauthorized assistance in assignments and tests, and the falsification of research results and material.

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, but are not limited to, one or more of the following: a zero for that assignment or test, an “F” in the course, and expulsion from Xavier. The Academic Dean of the college in which the student is enrolled is to be informed in writing of all acts of academic dishonesty, although the faculty member has authority to assign the grade for the assignment, test, or course. If disputes regarding the applicability or enforcement of this policy arise, the student, faculty member and department chair should attempt to resolve the issue. If this is unsatisfactory, the Academic Dean of the college will rule on the matter. As a final appeal, the Provost will call a committee of tenured faculty for the purpose of making a final determination.”