Lamar University
College of Arts and Sciences

Fall 2014

**Department:** Biology

**Course Number/Section:** BIOL 1406/(Section)

**Course Title:** General Biology I Lab

**Professor:** Instructor of Record

**Class Meeting:** Hayes Biology, Room 102

**Course Description:**
A survey of organisms, molecules, cells, tissues, photosynthesis, genetics, and evolution. Offered: Fall, Spring, Summer

**Required/Optional Texts and/or Course Materials:**
*Required Text:*

**Course Outcomes:**

**Learning Outcomes:**
Following this laboratory course students will be able to:
1. Be able to apply scientific reasoning to investigate questions, and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data.
2. Use critical thinking and scientific problem-solving to make informed decisions in the laboratory.
3. Communicate effectively the results of investigations.
4. Explain the reasoning used by scientists.
   a. list the components of the scientific method and describe how they relate to one another as part of a broader problem-solving process.
      i. Distinguish between observations and inferences.
      ii. Given observations, formulate questions appropriate for the methods of science.
      iii. Use creativity and insight to recognize and describe patterns in data.
      iv. Distinguish between independent, dependent, and nuisance variables.
v. Distinguish between experimental and control treatments and create reasonable and appropriate experimental controls.
vi. Describe ways in which scientific knowledge is tentative.
5. Understand and apply standards for creating scientific tables and graphs.
   a. Organize raw data into tables.
   b. Create graphs using appropriate computer applications.
   c. Interpret data presented in graphs, tables and figures.
6. Compare and contrast the structures of prokaryotic and eukaryotic cells.
7. Compare and contrast the structures of plant and animal cells.
8. Identify the substrates, products, and important chemical pathways in metabolism.
   a. use scientific rationale to formulate and concisely state a hypothesis that predicts the relationship between photosynthetic rate and light intensity.
   b. identify the independent, dependent, and nuisance variables in an experiment that examines the relationship between light intensity and photosynthetic rate.
   c. as a team, follow standard operating procedures and experimental protocols to establish a setup for collecting photosynthetic rate data.
   d. calculate photosynthetic rate given mL of O2 liberated, time, and grams of plant biomass.
9. Identify the principles of inheritance and solve classical genetic problems.
10. Identify the chemical structures and describe the synthesis of nucleic acids and proteins.
11. Describe the unity and diversity of life.

**Core Curriculum Objectives:**

**Life and Physical Sciences:**

*Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.*

I. Core Curriculum Objectives (Life and Physical Sciences):
   a. Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
   b. Communication Skills: to include effective development, interpretation and expression of ideas through:
      i. written
      ii. oral
      iii. visual communication.
c. Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
d. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

**Course Activities Cross-Referenced to Core Curriculum Objectives**

1. Students will create and properly label graphs using appropriate computer applications. (CCOs Ia, Ib, Ic; Critical Thinking, Written and Visual Communication, Empirical and Quantitative Skills)

2. Students will interpret analytical results presented in graphs and tables. (CCO Ia, Ic; Critical Thinking, Empirical and Quantitative Skills)

3. Students will cooperate effectively as a team in the setup of an experimental apparatus and collection of data. Students will demonstrate effective oral communications in accomplishing cooperative tasks. (COO Ibii, Id; Oral Communication, Teamwork)

**Classroom Management Policies:**

*Accommodations*

Students needing an accommodation based on the impact of a disability should contact me privately to discuss specific needs. Accommodations will be coordinated by the Office of Services for Students with Disabilities (Wimberly Bldg., Room 101; Phone 880-8347) pursuant to federal and state laws and the university policies promoting equal educational opportunities.

*Academic Dishonesty*

Procedures addressing academic dishonesty are included in the Student Handbook. Academic dishonesty includes copying another student’s work, plagiarism, and collusion. Students engaging in these activities will be assigned an “F” for the course and can be reported to the appropriate university authorities.

*Attendance*

Attendance is not included as a basis for grading; however active participation is required to successfully complete the course.

*Dropping the Course*

- In accordance with University policy, the last day to drop the course without penalty (you will receive a Q or W, regardless of your current grade) is **Monday, October 1**.
• The last drop day is **Monday, November 5.** If you drop during the period from October 2 to November 5 you will receive a Q or W if your current average is 60% or higher, or an F if your current average is less than 60%. Drop request after this date will be denied unless due to an unforeseen and documented serious life disrupting event. See the departmental secretary in Rm. 101 of the Hayes Biology Bldg. for the required drop forms.

**Grading and Evaluation:**

**Grading**

- Seventy-five percent (75%) of the final grade comes from lecture, 25% comes from lab.
  - **Lecture Component**
    - There will be four lecture exams. Each is worth 100 pts. for a total of 400 pts. The last lecture exam will be given in the final exam period but is not comprehensive.
  - **Lab Component**
    - There will be three laboratory tests given throughout the semester. The average of the three lab grades will count for 25% of the final grade for the course.

The grading scale on a percentage basis is as follows: 90-100 = A; 80-89 = B; 70-79 = C; 60-69 = D; 0-59 = F.

- **Extra Credit:** No extra credit points are available.
- **Make-up Exams:** You must petition the instructor before the regular exam is given to be considered for a make-up exam. Only university-sponsored events and extenuating circumstances of a serious nature will be considered.

**Course Outline:**

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<thead>
<tr>
<th>Date (Week of:)</th>
<th>Topic</th>
<th>Chapter</th>
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<tbody>
<tr>
<td>TBA</td>
<td>No Labs This Week</td>
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<td></td>
<td>The Process of Science</td>
<td>BB Handout 1</td>
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<td>Analysis of Data;</td>
<td>BB Handout 3</td>
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<td>Creating Charts and Graphs</td>
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<td>Use of the Microscope</td>
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<td>Cells</td>
<td>6</td>
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<td><strong>Exam 1 (8/27 – 9/17 Inclusive)</strong></td>
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<td>Light Intensity and Photosynthetic Rate in <em>Elodea</em></td>
<td>BB Handout 4</td>
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<td>*Photosynthetic Rate Experiment;</td>
<td>BB Handout 5</td>
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*Photosynthetic Rate Experiment;
Data Analysis and Interpretation

Mitosis

Probability; Genetics Problems  BB Handout 6

Exam 2

Survey: Primitive Organisms  2
Survey: Plant Kingdom  3
Survey: Animal Kingdom  4

Review (Open Lab 8am-5 pm: Monday, Tuesday, and Wednesday of this Week)

Exam 3