GENERAL BIOLOGY I
BIOL 1110

Class Hours: 3.0  Credit Hours: 4.0
Laboratory Hours: 2.0  Revised: Spring 05

Catalog Course Description:

Chemical basis of life; cell structure and function including energy metabolism; cell division; DNA and gene regulation; Mendelian and molecular genetics; evolution.

Entry Level Standards:

Must be eligible for enrollment in English 1010 and DSPM 0850 or higher

Prerequisites:

None

Corequisites:

Students enrolled in lecture must be registered for the corequisite laboratory during the same semester.

Textbook(s) and Other Reference Materials Basic to the Course:

*Biology: The Unity and Diversity of Life*. 10th edition. Starr and Taggart. Thomson/Brooks Cole. 2004. The text is required, and the student should take the text to each lecture and laboratory session. This textbook will be used for both Biology 1110 and Biology 1120.


Optional Materials:

A study guide to accompany the textbook is available at the bookstore. It is not required, and will not be referred to in class. However, many students find it helpful.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<table>
<thead>
<tr>
<th>Unit</th>
<th>Lecture Topics</th>
<th>Lab Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unit I: Molecules of Life</td>
<td>Lecture: Chapter 1: Concepts and Methods in Biology, Lab: No Labs</td>
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<tr>
<td>2</td>
<td>Lecture: Chapter 2: Chemical Foundations for Cells</td>
<td>Lab: Metric Measurement and Microscopy</td>
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<tr>
<td>3</td>
<td>Lecture: Chapter 3: Carbon Compounds in Cells, Chapter 6: Ground Rules of Metabolism</td>
<td>Lab: Chemical Composition of Cells</td>
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<tr>
<td>4</td>
<td>Test or Tests from Unit I (chapters 1-3, 6)- 100 points</td>
<td>Begin Unit II: The Cell and Cellular Processes, Lecture: Chapter 4: Cell Structure and Function, Lab: Enzymes</td>
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<tr>
<td>5</td>
<td>Lecture: Chapter 5: A Closer look at Membranes</td>
<td>Lab: Cell Structure and Function</td>
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<tr>
<td>6</td>
<td>Lecture: Chapter 7: How Cells Acquire Energy</td>
<td>Lab: Photosynthesis</td>
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<tr>
<td>7</td>
<td>Test or Tests from Unit II (chapters 4,5,7)- 100 points</td>
<td>Begin Unit III: Glycolysis/Cellular Respiration and DNA, Lecture: Chapter 8: How Cells Release Stored Energy, Lab: Laboratory Practical Exam</td>
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<tr>
<td>8</td>
<td>Lecture: Chapter 13: DNA Structure and Function</td>
<td>Lab: Cellular Respiration</td>
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<td>9</td>
<td>Lecture: Chapter 14: From DNA to Proteins, Chapter 16: Recombinant DNA and Genetic Engineering</td>
<td>Lab: DNA and Biotechnology</td>
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<td>10</td>
<td>Test or Tests from Unit III (chapters 8,13,14,16)- 100 points</td>
<td>Begin Unit IV: Mitosis, Meiosis and Genetics, Lecture: Chapter 9: Cell Division and Mitosis, Chapter 10: Meiosis, Lab: Mitosis and Meiosis</td>
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<tr>
<td>11</td>
<td>Lecture: Chapter 11: Observable Patterns of Inheritance</td>
<td>Lab: Mendelian Genetics</td>
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<td>12</td>
<td>Lecture: Chapter 12: Human Genetics</td>
<td>Lab: Human Genetics, Test or Tests from Unit IV (chapters9-12)- 100 points</td>
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<tr>
<td>13</td>
<td>Begin Unit V: Evolution</td>
<td>Lecture: Chapter 17: Microevolution, Chapter 18: Speciation, Lab: Evolution Simulation Exercises (supplemental)</td>
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II. Course Objectives*

A. Understand the basic unit of life (the cell), and its complexity and diversity. V.3, V.4

B. Understand the basic principles of heredity and how they relate to inheritance of traits in humans. V.3, V.4

C. Understand the structure and function of DNA as a repository of genetic information and how mutations of the DNA affect cellular function. IV.5, V.3, V.4, V.5

D. Understand how natural selection, mutations, genetic drift, migration and non-random mating affect the frequency of genes from generation to generation (evolution). V.3, V.4, V.5, VI.4

E. Understand the importance of biological cycles and the interdependence that results from these cycles (i.e. the carbon cycle: autotrophs --> heterotrophs --> autotrophs). V.3, V.4

F. Exhibit enhanced critical thinking skills. V

G. Process skills related to observing, measuring, classifying, communicating and inferring. VI.6, V.4, V.2

H. Interpret related biological information and evaluate its validity. I.1, I.6, I.7, V.1, V.2, V.3, VII.

*Roman numerals after course objectives reference TBR's general education goals.

III. Instructional Processes*

Students will:

1. Read and critique scientific writings, including those from the text, biological journals, books and the Internet. Communication Outcome, Technological Literacy Outcome, Natural Sciences Outcome

2. Listen to and discuss biological information presented by the instructor, educational videos, guest speakers and peers. Communication Outcome, Natural Sciences Outcome

3. Work in teams to collect data, generate graphs and tables and summarize the data and draw conclusions using process skills such as: observing, measuring, classifying, communicating and inferring. Natural Sciences Outcome, Technological Literacy Outcome, Mathematics Outcome, Communication Outcome

4. Write a formal laboratory paper based on one of the laboratory exercises completed. The paper will include introduction, materials and methods, results, conclusion and reference sections. Communication Outcome, Technological Literacy Outcome, Natural Sciences Outcome
5. Write essays. **Communication Outcome**

6. Develop a vocabulary that allows them to communicate more effectively with health care providers. **Communication Outcome, Natural Sciences Outcome**

7. Locate and evaluate related scientific information in the ERC and on the World Wide Web. **Technological Literacy Outcome**

* Strategies and outcomes listed after instructional processes reference TBR’s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

**IV. Expectations for Student Performance***:

Upon successful completion of this course, the student should be able to:

1. Classify organisms into one of the Domains and Kingdoms of living things based on characteristics such as cell type, cell number, and means of nutrition. A, F, G

2. Identify the structure and reactivity of the atom related to bonding and the formation of biological compounds. A, F

3. Describe the four classes of organic compounds. A, F, G

4. Describe the structure and function of parts of the eukaryotic cell. A

5. Compare and contrast photosynthesis and cellular respiration. E

6. Explain the basic concepts of DNA and the role of DNA in protein synthesis and thus cellular control. C, F

7. Work standard Mendelian genetics problems, as well as problems with multiple alleles and sex-linked traits and illustrating inheritance. B, F

8. Explain the main bodies of evidence, which support evolution and the mechanisms by which evolution occurs. D, F


10. Locate biologically related material in the ERC and on the WWW. Evaluate biological information they read about or see on TV. H, F

11. Interpret and draw conclusions from graphically presented data. G, F

*Letters after performance expectations reference the course objectives listed above.

**V. Evaluation:**

A. Testing Procedures: 75% of grade

Each lecture unit will be evaluated using one or more tests totaling 100 points. Exams will be a mix of discussion questions and objective questions. There are no makeup lecture tests. There will be a comprehensive final for the course worth 100 points. The comprehensive final may be used to take the place of one missed exam if there is evidence of a valid and reasonable excuse. The comprehensive final exam score may also be used to replace the lowest unit exam score if all exams were attempted. The additional 50 points
associated with lecture will be earned by doing a variety of activities determined by your instructor.

Students will receive one grade for General Biology 1110. The total number of points on which your grade will be based is 865. In lecture, you may accumulate as many as 650 points, which constitutes about 75% of the grade. In lab, you may accumulate as many as 215 points, which constitutes about 25% of the grade.

B. Laboratory Expectations: 25% of grade

1. Students are expected to go to the appropriate laboratory for which they are enrolled and complete the assignments in a timely manner. Laboratory work will not be accepted late.

2. Students are expected to dress appropriately for the laboratory to minimize the possibility of the spread of contamination and risk to personal safety. No open-toed shoes are allowed, and garments that cover the legs are recommended. Students are required to report to their laboratory instructor any concern for personal safety or injury sustained during various exercises.

3. Students are encouraged to work cooperatively together to complete the exercises in a timely fashion but not to plagiarize notebook work nor to communicate during the practical.

4. During and after each lab exercise, students are required to complete the post-laboratory report. These post-laboratory reports will be collected and graded on 5 randomly selected dates. Each graded set of post laboratory report questions will be worth 12 points. Post-laboratory reports will not be accepted late.

5. Students are required to read the scheduled lab exercise before coming to class.

6. Students will write a formal scientific paper dealing with a lab exercise selected by the instructor. The report will include an introduction, methods and materials, results, conclusion, and bibliography. A draft version of the formal report must be turned in to the by the 10th week. The draft must have text information in ALL 5 sections, data, references, and be typed. The instructor will not grade the draft, but will make suggestions for improvement to be incorporated into the final paper. The final laboratory report will be due the 12th week and is worth 40 points. Failure to turn in a draft version will reduce the possible points that can be earned for the paper from 40 to 30.

7. Students may be expected to complete computer simulations of selected laboratory exercises on their own time periodically during the semester. Students will purchase a CD-ROM with these programs and can use their home computer or the computers in the open laboratory on any campus.

8. Drink, food or any form of tobacco is not allowed in the classroom or laboratory.

C. Field Work:

Students may be required to read supplemental articles or papers on reserve in the library.

D. Other Evaluation Methods:

See instructor for specific information when warranted.

E. Grading Scale:

**Grading Scale** (out of a total 865 possible points)

- 90-100%  (778-865 points)  A
- 87-89%   (752-777 points)  B+
- 80-86%   (692-751 points)  B
- 77-79%   (666-691 points)  C+
- 70-76%   (604-665 points)  C
60-69%   (519-603 points)   D
0-59%     (0-518 points)     F

**Point Distribution**

<table>
<thead>
<tr>
<th>Lecture tests and assignments</th>
<th>Laboratory</th>
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<tbody>
<tr>
<td>Unit 1 100 points</td>
<td>Post Laboratory Reports  60 points (5x12)</td>
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<tr>
<td>Unit 2 100 points</td>
<td>Formal Scientific Paper  40 points</td>
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<tr>
<td>Unit 3 100 points</td>
<td>Lab Practical- Midterm   40 points</td>
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<tr>
<td>Unit 4 100 points</td>
<td>Final                     40 points</td>
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<tr>
<td>Unit 5 100 points</td>
<td>Assignments               35 points</td>
</tr>
<tr>
<td>Assignments 50 points</td>
<td>Assignments               35 points</td>
</tr>
<tr>
<td>Final 100 points</td>
<td>TOTAL                     215 points</td>
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<tr>
<td>TOTAL 650 points</td>
<td>TOTAL                     215 points</td>
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**VI. Policies:**

A. **Attendance Policy:**

As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75% of their scheduled class and laboratory meetings in order to receive credit for the course. Consistent tardiness and excessive absenteeism may lower the final grade.

B. **Academic Dishonesty:**

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices: cheating, plagiarism, purchasing or otherwise obtaining prewritten papers, taking an exam for another student, and providing others with information and/or answers regarding exams, or assignments.

C. **Accommodations for disabilities:**

If you need accommodation because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Privately after class or in the instructor's office.

To request accommodations students must register with Services for Students with Disabilities: Goins 127 or 131, Phone: (865) 539-7153 or (865) 694-6751 Voice/TDD.

D. **Other Policies:**

Classroom disruptions during lecture or laboratory, any form of communication during testing, or any other form of behavior that may prove distracting to others will not be tolerated and may lower the final grade.

Students are expected to work on biology related materials and participate in meaningful discussion where time permits.

Visitors are not allowed in the classroom or the laboratory.

**LABORATORY SUBSTITUTION POLICY:**

There may be a time during the semester that you will not be able to attend your regularly scheduled laboratory section. Since attendance is so critical to your laboratory grade, we do
have a policy that will allow you to attend an alternate lab section ONE time during the semester. Lab substitution is only allowed in the case of an emergency and with adequate approval.

When attending an alternate lab, the STUDENT has the following responsibilities:

a. The student must inform his/her regular instructor, and obtain permission from the substituting instructor. A schedule of lab times and instructors is posted outside the laboratory door. A student should not assume that they could just "show up" and participate in an alternate lab.

b. The student must obtain a signature and date from the substituting instructor at the top of the laboratory report for that particular exercise.

c. If the substituting instructor collects laboratory report questions, the student MUST write the name of his/her regular instructor at the top of those documents. This will enable the substituting instructor to make the regular instructor aware of your attendance.

d. If the substituting instructor did not collect laboratory report questions, it is the student's responsibility to find out if they missed an assignment from their regular instructor as quickly as possible. The regular instructor will advise the student of options.