PELLEDISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

GENERAL BIOLOGY I
BIOL 1110

Class Hours: 3.0  Credit Hours: 4.0
Laboratory Hours: 2.0  Date Revised: Spring 02

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: Life on Earth.* Sixth edition. Audesirk, Audesirk, and Byers. Prentice-Hall, Inc. 2001. 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.

*Explorations in Basic Biology.* Eighth Edition. Stanley E. Guenstrem. Prentice-Hall, Inc. The laboratory manual is required. Periodically, pages from the manual will be collected and graded. Xeroxed copies will not be accepted. This laboratory manual will be used for both Biology 1110 and Biology 1120.

*Biology One: An Interactive Tutorial,* Pellissippi Version. Developed by F-One Design, this CD-Rom contains computer simulations of laboratory exercises, and students will be expected to work on these on their home computer, or at the open computer laboratory.

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>
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<th>Week</th>
<th>Topic</th>
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1  Unit I: Molecules of Life
   Lecture: Chapter 1: An Introduction to Life on Earth
   Lab: No Labs

2  Lecture: Chapter 1: An Introduction to Life on Earth; Chapter 2: Atoms, Molecules and Life
   Lab: Orientation; Exercise 1, page 2

3  Lecture: Chapter 2: Atoms, Molecules and Life; Chapter 3: Chemical Aspects
   Lab: Exercise 4, page 28

4  Lecture: Chapter 3: Biological Molecules; Chapter 6: Energy Flow in the Life of Cell
   Test or Tests from Unit 1 (chapters 1-3, 6)- 100 points
   Lab: Enzymes; Exercise 6, page 42

5  Unit II: The Cell and Cellular Processes
   Lecture: Chapter 4: Cell Membrane Structure/Function
   Lab: Diffusion and Osmosis; Exercise 5, page 36

6  Lecture: Chapter 5: Cell Structure and Function
   Lab: The Cell; Exercise 3, page 20

7  Lecture: Chapter 7: Capturing Solar Energy: Photosynthesis
   Test or Tests from Unit II (chapters 4,5,7)- 100 points
   Lab: Photosynthesis; Exercise 7, page 46

8  Unit III: Glycolysis/Cellular Respiration and DNA
   Lecture: Chapter 8: Harvesting Energy: Glycolysis and Cellular Respiration
   Lab: Lab Practical I

9  Lecture: Chapter 9: DNA: The Molecule of Heredity
   Lab: Cellular Respiration; Exercise 8, page 53

10 Lecture: Chapter 10: Gene Regulation and Expression; Chapter 13: Biotechnology
    Test or Tests from Unit III (chapters 8,9,10,13)- 100 points
    Lab: Molecular and Chromosomal Genetics. Ex. 35, page 273

11 Unit IV: Mitosis, Meiosis and Genetics
    Lecture: Chapter 11: The Continuity of Life: Cellular Reproduction
    Lab: Cell Division; Exercise 9, page 58

12 Lecture: Chapter 11: Cellular Reproduction; Chapter 12: Patterns of Inheritance
    Lab: Heredity; Exercise 34, page 264

13 Lecture: Chapter 12: Patterns of Inheritance
    Test or Tests from Unit IV (chapters 11-12)- 100 points
    Lab: Genetics Computer Simulation

14 Unit V: Evolution
    Lecture: Chapter 14: Principles of Evolution; Chapter 15: How Organisms Evolve
    Lab: Evolutionary Mechanisms; Supplemental Handout

15 Lecture: Chapter 15: How Organisms Evolve; Chapter 17: The History of Life on Earth
    Lab: Lab Practical II
II. Course Objectives*:

A. Understand the basic unit of life (the cell), and its complexity and diversity.  I, III.2

B. Understand the basic principles of heredity and how they relate to inheritance of traits in humans.  I, III, IV

C. Understand the structure and function of DNA as a repository of genetic information and how mutations of the DNA affect cellular function.  I, III, IV

D. Understand how natural selection, mutations, genetic drift, migration and non-random mating affect the frequency of genes from generation to generation (evolution).  III, IV

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

F. Exhibit enhanced critical thinking skills.  III

G. Process skills related to observing, measuring, classifying, communicating and inferring.  III, IV

H. Interpret related biological information and evaluate its validity.  I, III

*Roman numerals after course objectives reference goals of the university parallel program.

III. Instructional Processes*:

Students will:

1. Read and critique scientific writings, including those from the text, biological journals, books and the Internet.  Communication Outcome, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Information Literacy Outcome

2. Listen to and discuss biological information presented by the instructor, educational videos, guest speakers and peers.  Communication Outcome, Cultural Diversity and Social Adaptation 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.  Personal Development Outcome, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy 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, Personal Development Outcome, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Information Literacy Outcome, Active Learning Strategy

5. Write essays.  Communication Outcome

6. Develop a vocabulary that allows them to communicate more effectively with health care
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 into 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 are 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>Computer Simulations  35 points</td>
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<tr>
<td>Assignments  50 points</td>
<td></td>
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<tr>
<td>Final  100 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:

Consistent tardiness and excessive absenteeism may lower the final grade. Institutional policy mandates that a student be present for at least 75% of their scheduled class and laboratory meetings in order to receive credit for the course.

B. Academic Dishonesty:

With any form of valid proof of dishonesty with regard to student work or testing the instructor may elect from a range of actions. Academic dishonesty could lead to failure for the entire course on consultation with the lead instructor, program coordinator, and Department head. Additionally, dismissal from the institution is an option and may be sought.

C. 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.