PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

HONORS BIOLOGY I
BIO 1510

Class Hours: 3.0
Laboratory Hours: 2.0
Credit Hours: 4.0
Date Revised: Spring 01

Catalog Course Description:
An in-depth, interactive lecture and laboratory study of scientific methods and philosophies, cell chemistry, structure and function, genetics and the mechanisms of evolution. Students not achieving a C in this course must complete the sequence with Biology 1020. Courses must be taken in sequence and both consist of 3 hours of lecture and 2 hours of laboratory applications each week.

Entry Level Standards:
Must be eligible for enrollment in ENG 1010 and DSM 0840 or higher.

Prerequisites:
ACT composite of 25 or consent of instructor.

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

Textbook:
Laboratory book:

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | Lecture: Introduction to the study of Biology  
       Lab: Scientific method |
| 2    | Lecture: The nature of science  
       Lab: Scientific tools |
| 3    | Lecture: Critical Reading  
       Lab: Microcosm |
| 4    | Lecture: Atoms & Molecules  
       Lab: Chemistry basics |
| 5    | Lecture: Organic molecules & Cells  
       Lab: Macromolecules |
| 6    | Lecture: Membranes & Enzymes |
Lab: Enzymes

7 Lecture: Cellular respiration
Lab: Respiration

8 Lecture: Photosynthesis
Lab: Photosynthesis

9 Lecture: Cellular reproduction
Lab: The cell cycle

10 Lecture: DNA & protein synthesis
Lab: DNA isolation

11 Lecture: Mendelian genetics
Lab: Mendelian genetics 1

12 Lecture: Mendelian genetics
Lab: Mendelian genetics 2

13 Lecture: Population genetics
Lab: Population genetics

14 Lecture: Evolution & speciation
Lab: Phylogentic analysis

15 Lecture: Origin of life & primate evolution
Lab: Human evolution

16 Lecture: Student Presentations
Lab: None

II. Course Objectives*:

A. Understand the scientific process of investigation; its application, advantages, and limitations. III.1, III.2

B. Understand the basic unit of life (the cell), and its complexity and diversity. I.5

C. Understand the basic principles of heredity and how they relate to inheritance of traits in humans. I.5

D. Understand the structure and function of DNA as a repository of genetic information and how mutations of the DNA affect cellular function. I.5

E. Understand how natural selection, mutations, genetic drift, migration and non-random mating affect the frequency of genes from generation to generation (evolution). I.5, IV.1

F. Exhibit enhanced critical thinking skills. III.5

G. Process skills related to observing, measuring, classifying, communicating and inferring I.2, I.5, III.1

H. Exhibit the ability to interpret related biological information and determine its validity. III.1, III.2
III. Instructional Processes*:

Students will:

1. Read and critique scientific writings, including those from the text, biological journals, books and the internet. Information Literacy Outcome

2. Listen to and discuss biological information presented by the instructor, educational videos, guest speakers and peers. Information Literacy Outcome

3. Practice the scientific method by working in teams to develop hypothesis, experimental protocols and execute experimental procedures. Problem Solving and Decision Making Outcome

4. 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. Technological Literacy Outcome, Active Learning Strategy

5. Write a formal laboratory paper based on the experimental procedures and results accomplished in class. Communication Outcome

6. Develop a vocabulary that allows them to communicate more effectively with scientific literature and community. Information Literacy Outcome

7. Locate and evaluate related published scientific information. Information Literacy Outcome

8. Participate in a learning experience that promotes independent thinking and required sustained effort and time such as a research project or field trip. Active Learning Strategy, Transitional Strategy

9. Examine ethical issues related to biology, such as the use of reproductive technology, and environmental issues such as global warming, the greenhouse effect and human population growth. Cultural Diversity and Social Adaptation Outcome, Personal Development Outcome, Transitional Strategy

*Strategies and outcomes listed after instructional processes reference Pellissippi State’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 appropriate taxonomic groups based on the organism’s characteristics. A, B, E, F

2. Identify the structure and reactivity of the atom related to its bonding properties and the formation of biological compounds. B, G, H

3. Describe the four classes of organic compounds found in living systems. B, C

4. Describe the structure and function of the components of a eukaryotic cell. B, D

5. Compare and contrast photosynthesis and respiration. B, C, F
6. Describe the basic structure of DNA, the method by which it holds the genetic information, how the DNA molecule is replicated and passed to offspring. C, D, E, F

7. Understand the method of protein synthesis. C, D, E, F

8. Be able to work standard Mendelian genetic problems, as well as problems with multiple alleles and sex-linked traits. C, D, H, G


10. Locate biologically related material in the ERC and on the world wide web. A, F, G, H

11. Be able to evaluate biological information. A, F, H

12. Interpret and draw conclusions from graphically presented data. A, F, G, H

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

V. Evaluation:

A. Testing Procedures:

For evaluation purposes the course material will be divided into four units of approximately equal length. Within each unit a combination of exam and assignments will be given worth a 150 points. The exams will be a mixture of objective and discussion questions.

B. Laboratory Expectations:

Students are expected to attend and complete the laboratory exercises assigned each week. Make-up laboratory times are not available.

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.

Drink, food, and any form of tobacco are not allowed in the classroom or laboratory. Some laboratory activities may require the sacrifice of the organisms being studied. As are ALL laboratory exercises in Honors Biology I and II, the laboratory investigations involving dissections or sacrifice are mandatory. All students enrolled in the course are expected to participate. However in consideration of religious and/or moral objections of isolated individuals, students wishing to be excused from the actual physical dissection may petition for a waiver by submitting a written request to the Honors Bio I Lead Instructor. Students requesting waivers should support their request with pertinent evidence or documentation. Requests for waivers MUST be submitted at least two weeks prior to the start of dissections.

Full time biology faculty members reserve the right to grant or deny waivers. Appeals may be made to the Office of the Vice President for Academic Affairs.

Students waiving exercises will be excused only from the actual physical sacrifice and expected to attend lab, master all materials presented in laboratory, and be responsible for all assignments and quizzes. All students are required to take the laboratory exams which include material from all laboratory exercises.

Pregnant students or students whose health is at high risk are advised to consult their physician about their attendance of the dissection labs. With proper documentation from the physician, alternate activities will be assigned to pregnant students.

C. Field Work:
Class activities may take place out-of-doors. Students may be required to read supplemental articles or papers on reserve in the library.

D. Other Evaluation Methods:

A term paper worth a possible 100 points is required of every student. Additional evaluation methods may be arranged at the discretion of the lead instructor and lecture instructor.

VI. Policies:

A. Attendance Policy:

Consistent tardiness and excessive absenteeism may lower the final grade. Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent 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, department head, and dean. 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 laboratory without instructor approval.