CONCEPTS OF BIOLOGY
BIOL 1310

Class Hours: 2.0  Credit Hours: 3
Laboratory Hours: 3.0  Date Revised: Spring 03

Catalog Course Description:
A survey of biology concepts and content as applicable to the Tennessee K-8 curriculum standards and the National Science Education Standards. Instructional topics to include: scientific method, cell structure and function, food production and energy for life, heredity and reproduction, diversity and adaptation among living things, interactions between living things and their environment, and biological change; develop, design, and implement hands-on science activities for K-8 students; create and develop course portfolio; collect and evaluate biologically related resources. This course will only count toward the science requirement in Tennessee Technological University's K-8 teacher education programs.

Entry Level Standards:
Must be eligible for enrollment in English 1010 and DSPM 0850 or higher. Must be interested in teaching K-8 science and applying to Tennessee Technological University's teacher education program.

Prerequisites/Corequisites:
Successful completion of one year of high school science. Students enrolled in the lecture must also participate in the accompanying laboratory hands-on activities and outside class assignments.

Textbook(s) and Other Reference Materials Basic to the Course:
A general biology textbook (TBA) is required, and the student should take the text to each lecture and laboratory session. A laboratory manual (TBA) is required and should be taken to each laboratory period.

World Wide Web:
Access to World Wide Web and other online services and databases. Home access is recommended, but these services can be accessed on campus.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Unit 1; Introduction to K-8 Science Curriculum Standards and the National Science Education Standards</td>
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<tr>
<td>2</td>
<td>Access to Science Resources</td>
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<td>3</td>
<td>Nature of Science and the Scientific Method</td>
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II. Course Objectives*:

A. Develop an understanding of the K-8 curriculum content with respect to science education. I.5, VII

B. Develop, design, and implement hands-on curriculum-based science activities for K-8 students. I.5, III.2, VII

C. Interpret and access related biological information and educational resources. I, III

D. Develop and demonstrate skills related to observing, measuring, classifying, communicating and inferring. III, IV

E. Apply the scientific method in scientific research. III.1, III.2

F. Develop an understanding of the basic unit of life, the cell, and its structure and function. I, III.2

G. Develop an understanding of the basic parts of plants, and investigate how plants produce food. I, III.2

H. Develop an understanding of the basic principles of heredity and how they relate to inheritance of traits in humans. I, III, IV

I. Develop an understanding of the structure and function of DNA as a repository of genetic information. I, III, IV

J. Develop an understanding of the diversity and adaptation among living things. I, III, IV

K. Develop an understanding of the biological changes in the plant and animal kingdoms. I, III, IV

L. Develop an understanding of how living things interact with one another and with non-living elements of their environments. I, III, IV

M. Demonstrate critical thinking skills. III
III. Instructional Processes*

Students will:

1. Read and evaluate scientific writings, including those from the text, biological journals, books, World Wide Web and on-line reference sites. Communication Outcome, Problem Solving and Decision Making Outcomes, 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 in a laboratory setting 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. Develop portfolio notebook based on course content topics, laboratory hands-on activities, and collection of science resources. Communication Outcome, Personal Development Outcome, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Information Literacy Outcome

5. Write essays. Communication Outcome, Information Literacy Outcome

6. Design, develop, and implement curriculum-based hands-on science activities for K-8 students. Communication Outcome, Cultural Diversity, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Information Literacy Outcome

7. Locate, evaluate, and collect related scientific information on the Internet. Personal Development Outcome, Technological Literacy Outcome, Information Literacy Outcome

*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. Develop, design, and conduct K-8 science hands-on activities. C, D, E, F

2. Locate biologically related material and science education resources on the Internet. Evaluate biological information read about or seen on TV. D, E, F

3. Know current state of Tennessee science curriculum standards. A

4. Explain the scientific method and be able to use in scientific inquiry. E

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

6. 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
7. Recognize relationships within food chains and interactions among living things and with non-living elements. L

8. Compare and contrast photosynthesis and cellular respiration E

9. Explain the basic concepts of DNA and the role of DNA in inheritance. C, F

10. Work standard Mendelian genetics problems. B, F

11. Describe the differences among plants and animals of the same kind. K

12. Explain biological changes, which relate past and present organisms. H


14. Interpret and draw conclusions from data presented in graphic form. F, G

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

V. Evaluation:

A. Testing Procedures:

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.

B. Laboratory Expectations:

Hands-on science activities

C. Field Work:

American Museum of Science and Energy poster presentation

D. Other Evaluation Methods:

Portfolio: Catalog of science resource materials

VI. Policies:

Attendance Policy:

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. Individual departments/program/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.