PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

CELL BIOLOGY
BIO 2010

Class Hours: 3.0 Credit Hours: 4.0
Laboratory Hours: 3.0 Date Revised: Fall 99

Catalog Course Description:

Study of basic biomolecules, cell structure and function, cellular respiration and photosynthesis, molecular genetics, cellular communication, cancer, and evolution of the cell. Course includes 3 hours of lecture and 3 hours of laboratory per week.

Entry Level Standards:

The student should have a good understanding of basic biology and chemistry.

Prerequisites:

BIO 1010 and 1020 and CHM 1010 and 1020, or two years of high school biology and ACT natural science score of 26 or higher, or permission of the instructor.

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

Cell Biology Laboratory Manual provided by instructor

I. Week/Unit/Topic Basis:

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<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Lecture: Chapter 1: Introduction; Chapter 2: Chemistry&lt;br&gt;Lab: No lab: holiday</td>
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<tr>
<td>2</td>
<td>Lecture: Chapter 3: Macromolecules&lt;br&gt;Lab: Critical Thinking, Reading Scientific Papers</td>
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<tr>
<td>3</td>
<td>Lecture: Chapter 3: Macromolecules; EXAM I&lt;br&gt;Lab: Amino Acids</td>
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<tr>
<td>4</td>
<td>Lecture: Chapter 4: Enzymes &amp; Energetics&lt;br&gt;Lab: Enzyme Measurement</td>
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<tr>
<td>5</td>
<td>Lecture: EXAM II; Chapter 5: The Cell&lt;br&gt;Lab: Enzyme Control</td>
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<tr>
<td>6</td>
<td>Lecture: Chapter 6: Membranes and Transport&lt;br&gt;Lab: Field Trip: UT Electron Microscopy Laboratory</td>
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II. Course Objectives*:

A. Develop a thorough understanding of the structure and function of the cell and all its parts. III

B. Develop a thorough understanding of the chemistry of the cell, including enzymatic action. III

C. Understand energy flow within the cell. III

D. Understand information flow within the cell, including current ideas on gene regulation. III

E. Understand current ideas on chemical signalling and the development of cancer. III

F. Know how to read a scientific paper critically. II, IV

G. Plan and execute a scientific experiment. II, IV, V

H. Understand the use of various laboratory techniques and equipment common to cell biology. V

I. Have an understanding of careers in biology. I, IV

*Roman numerals after course objectives reference goals of the Natural Sciences department.

III. Instructional Processes*:
Students will:

1. Engage in teamwork to facilitate cooperative learning. *Active Learning Strategies*

2. Approach problems both mathematically and verbally. *Communication Outcome, Problem Solving and Decision Making Outcome, Numerical Literary Outcome*

3. Use critical thinking to solve problems, both in lecture and experimentally in lab. This will be done in groups to encourage idea-sharing. *Problem Solving and Decision Making Outcome, Active Learning Strategies*

4. Use critical thinking to evaluate the scientific literature. *Information Literacy Outcome, Communication Outcome*

5. Participate in laboratory research by doing student-directed experiments. *Active Learning Strategies, Numerical Literary Outcome, Problem Solving and Decision Making Outcome, Personal Development Outcome*

6. Participate in career discussions in three modes: in-class student discussions, outside speakers coming into class, and field trips. *Transitional Strategies*

7. Learn the use of cell biology related technology. *Personal Development Outcome, Technological Literacy Outcome*

8. Gain the knowledge to have the solid foundation in Cell Biology which is necessary for moving on to upper level biology courses and eventually to the job. This will be done by a variety of means, including listening to lectures, experimenting, participating in field trips, viewing videotapes and videodiscs, and participating in group discussions. *Communication Outcome, Personal Development Outcome, Numerical Literary Outcome, Transitional Strategies, Active Learning Strategies*

*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. Discuss the organic chemistry of the cell, especially with regard to the four types of macromolecules. B

2. Describe the internal and external components of the cell, and discuss their physiological mechanisms. A

3. Explain the manner in which enzymes are active within the cell. B

4. Discuss the structure of membranes and the physiological mechanisms of cellular transport across the membranes. A

5. Discuss intermediary metabolism and photosynthesis. C

6. Explain the concept and details of the Central Dogma: the transfer of information from DNA to RNA to proteins. D

7. Explain regulation of gene expression. D
8. Discuss the current theories concerning regulation of gene expression. D
9. Explain the use of hormones and receptors by the cell. E
10. Discuss the manner in which normal cells become cancerous. E
11. Read a scientific paper analytically. F
12. Write a scientific paper. F,G,H
13. Plan an experiment and carry it out to reach a logical conclusion. G,H
14. Discuss the possible careers in biological sciences. I
15. Use biological instrumentation and techniques successfully. H

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

V. Evaluation:

A. Testing Procedures:

There will be 6 exams consisting of a mixture of essay and multiple choice questions. Each test is worth 1/6 of the overall lecture grade. The final exam is not comprehensive. Lecture tests will comprise 2/3 of the overall grade. Any student missing an exam without a valid, documented excuse will receive a 0 on that exam. Valid excuses include severe illness, death in the family, jury duty, and military service. The instructor should be notified by phone ahead of time, if possible, and a written excuse will be required.

B. Laboratory Expectations:

The lab grade will be determined from lab reports, scientific paper writeup, and two exams. The laboratory component will comprise 1/3 of the overall grade. Labs may not be made up. Late writeups will be docked 10% per weekday.

C. Field Work:

None

D. Other Evaluation Methods:

None

E. Grading Scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90 - 100</td>
<td>A</td>
</tr>
<tr>
<td>80 - 89</td>
<td>B</td>
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<tr>
<td>70 - 79</td>
<td>C</td>
</tr>
<tr>
<td>60 - 69</td>
<td>D</td>
</tr>
<tr>
<td>below 60</td>
<td>F</td>
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Pluses will be given when warranted.

VI. Policies:

A. 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.

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 or dismissal from the institution.

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.