PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

MICROBIOLOGY
BIO 2220

Class Hours: 2.0
Laboratory Hours: 4.0
Credit Hours: 3.0
Date Revised: Fall 1999

Catalog Course Description:

An introductory course in microbiology dealing with bacteria, fungi, yeast and viruses to include discussions of cell structure, identification, taxonomy, metabolism, genetics, resistance, infection, disease, and immunity.

Entry Level Standards:

High school biology; students are expected to read and write at the college level.

Prerequisites/Corequisites:

None

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

Required:

Recommended:

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brief History of Microbiology; Microscope</td>
</tr>
<tr>
<td>2</td>
<td>Anatomy of Prokaryotic and Eukaryotic Cells</td>
</tr>
<tr>
<td>3</td>
<td>Anatomy; Microbial Metabolism</td>
</tr>
<tr>
<td>4</td>
<td>Metabolism</td>
</tr>
<tr>
<td>5</td>
<td>Microbial Growth; Control of Microbial Growth</td>
</tr>
<tr>
<td>6</td>
<td>Control of Growth; Antimicrobial Drugs; EXAM 1</td>
</tr>
<tr>
<td>7</td>
<td>Genetics</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Acquire a working knowledge of basic staining and culturing techniques and concepts. V
B. Be familiar with prokaryotic and eukaryotic characteristics. III
C. Understand microbial metabolism and growth. III
D. Be able to classify microorganisms. II, III
E. Understand the epidemiology, pathogenicity and drug treatment of specified microbial organisms. II
F. Recognize microbes associated with individual body systems. III
G. Know the principles of immunology. III
H. Achieve familiarity with applied microbiology. II, V
I. Be able to read and apply critical thinking to topics in the field of microbiology. II
J. Become familiar with resources available on recent research and current information in the library in the field of microbiology. IV
K. Become self motivated and self empowered learner. IV

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

III. Instructional Processes*:

Students will:

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

2. Use related equipment and tools for making biological measurements and observations. *Technological Literacy Outcome
3. Use Intranet course list serve to share information pertaining to the course with classmates. *Communication Outcome, Technological Literacy Outcome, Information Literacy Outcome*

4. Collect data, generate graphs and tables of the collected data, summarize the data, draw conclusions from the data, and apply these conclusions to related situations. *Numerical Literacy Outcome*

5. Read and critique scientific writings. *Communication Outcome, Personal Development Outcome*

6. Develop a vocabulary that allows them to communicate more effectively with their health care providers as well as in preparing for health care professions. *Transitional Strategies*

7. Participate in laboratory exercises which develop teamwork, problem solving skills and data analysis. *Problem Solving and Decision Making Outcome; Active Learning Strategies*

8. Utilize skills and procedures developed in the laboratory to design an implement plan to identify unknown microorganisms. *Personal Development Outcome, Problem Solving and Decision Making 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. Identify microbes through the use of cultures and staining techniques. A
2. Describe procaryotic cell characteristics as they relate to organism identification. B
3. Describe microbe metabolism and growth and their controlling factors. C
4. Describe genetic operations within microbes. H
5. Explain the mechanisms of classifying microbes and viruses, bacteria, protists, fungi, and helminths. D
6. Explain epidemiology. E
7. Explain pathogenicity and its causes. E
8. Describe drug action and treatment for specified microbes. E
9. Know the specific microbes associated with the different body systems. F
10. Explain operation of the immune system. G
11. Learn to read and abstract articles pertaining to microbiology. I, J
12. Learn to research and synthesize in written form current information in microbiology. I, J

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

### V. Evaluation:
A. Testing Procedures: 37.5% of grade (300 points)

Three exams, each worth 100 points, will be given. The first two exams will be administered in the testing center at each campus. These exams will be noncumulative, although students are expected to retain basic information acquired in previous chapters. Students will need to take the exam on the campus at which they attend the lecture. Students will have one week in which to take the exam; NO extensions will be given. Any student who does not complete the exam before the deadline (to be announced in class) will not receive credit for the exam. It is imperative that students NOT discuss the exam with other students until after the deadline for completion of the exams. Exams will consist of a combination of multiple choice, matching, short answer and essay questions.

The final exam will be an cumulative exam involving multiple choice and matching questions only. This exam will be conducted in the classroom at the scheduled final examination period.

B. Laboratory Expectations: 50% of grade (400 points)

Participation in laboratory exercises is mandatory. Laboratory assignments constitute 50% of the final grade, broken down as follows: laboratory reports (25%; 200 points), practicals (12.5%; 100 points), unknown identification (3.75%; 30 points), quizzes (2.5%; 20 points) and work sheets (2.5%; 20 points). The remaining 3.75% [30 points] will be based on attitude, teamwork, technique, effort and attendance. Students must come prepared to laboratory. Preparation includes, but is not limited to: reading exercises in advance, completing purpose statement of exercises in advance, bringing lab manual and lab coat to lab. Students MUST wear a lab coat and safety goggles in lab at all times!! Goggles will be provided, but students must supply their own laboratory coat. Short lab jackets are not acceptable.

**Laboratory reports:** Laboratory reports will include completion of the data sheets in the laboratory manual, as well as assigned questions. These will be evaluated as follows: Is the report complete? Is the report neat? Do the answers to assigned questions reflect an understanding of the concepts presented in the lab? Are changes in procedure or additional observations noted in the report? Are answers written legibly and in complete, grammatically correct sentences? Additional criteria and requirements for the laboratory reports will be discussed further by the laboratory instructor. All lab reports will be due at the beginning of the lab the Friday after the lab is completed, unless otherwise noted in lab. Lab reports submitted late (after beginning of lab) will be docked 10% per day.

**Practicals:** Laboratory practicals will consist of a number of stations. Students will rotate from station to station, answering questions. Stations may contain slides, culture plates, equipment or data from previous labs. Each station will have one to three questions based on the materials present. Sample questions will be provided in lab before the first lab practical. In order to prepare adequately for the practicals, students must maintain complete laboratory data sheets. Students may find a set of colored pencils to be useful in the lab.

**Unknown Identification:** Students will receive a list of organisms at the beginning of the semester, as well as a list of all the identification procedures to be learned in the laboratory. At the conclusion of each procedure, students will record the data for each organism. During the final portion of the lab, students will receive a mixture of two organisms which must be isolated and identified. Students will design and utilize a flow chart of the techniques and tests to identify these organisms. The flow chart and a daily log, as well as a typed purpose and conclusion, will be submitted for evaluation.

**Quizzes:** Lab quizzes will be noncumulative and will include identification and interpretation of lab materials. Format and frequency of quizzes will be discussed by the laboratory instructor. Laboratory instructors MAY give quizzes without prior notice and may include procedural information on exercises to be conducted that day. It is important that students come to lab prepared. Exercises should be read in advance so that students know what they will be doing. The laboratory instructor will provide information on procedural changes at the
beginning of each lab. It is imperative that students be on time for lab!

**Missed labs:** Missed labs can not be made up. Students may use a lab partner's data or set-up but points will be taken off of each exercise for each day of the experiment that was missed. Laboratory practicals must be taken on the date announced. There are ABSOLUTELY NO make-ups of these exams!

**Work sheets:** All other grading procedures will be discussed by the laboratory instructor when assignments are made.

C. Field Work: 12.5% of grade (100 points)

Library research and writing are an integral part of this course. Students will write short abstracts of current articles, worth 7.5% [60 points] of the grade. A disease paper is worth 5% [40 points] of the final grade.

**Abstracts:** Students will write 6 abstracts of current articles (no more than 8 months old) pertaining to microbiological issues covered in the course, following guidelines discussed in class. Abstracts will be collected at the beginning of the first laboratory of each week. Students may submit only one abstract per week, and no abstracts will be accepted following the twelfth week of classes. Graded abstracts will be returned to students at the beginning of the second laboratory period each week. See the handout "Instructions for Abstract Assignments" for additional details on writing and grading of abstracts, as well as a sample abstract.

**Disease Paper:** Students will select one disease caused by a microorganism (virus, bacteria, fungus or helminth). Students will write a research paper of 1000-1300 words (5 pages), typewritten, double-spaced, including symptoms, tests for identification, and treatment. Students are expected to utilize a variety of references, including two reference books (textbooks are acceptable), one journal article and one internet resource. Sources should be cited in the body of the paper and a bibliography should be included at the end of the paper. Format for the paper will be discussed in greater detail in class. Papers will be collected at the beginning of the first lab during the fourteenth week of classes.

D. Other Evaluation Methods:

None

E. Grading Scale:

The final grade will be based on accumulation of points from both lecture and lab which will then be divided by the total possible number of points (800).

The following grading scale will be used.

- 720-800 points  90% - 100%  A
- 696-719 points  87% - 89%  B+
- 640-695 points  80% - 86%  B
- 616-639 points  77% - 79%  C+
- 560-615 points  70% - 79%  C
- 480-559 points  60% - 69%  D
- below 480 points  59% and below  F

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. If a student is absent from class, it is the student's responsibility to make up the missed
material prior to the next class period.

B. Academic Dishonesty:

Plagiarism is any form of using another person’s words or ideas without giving proper credit. Plagiarism includes, though is not limited to, the following:
- Copying sentences from a source without putting them in quotes and citing the source.
- Borrowing a sentence from another author and simply substituting a few synonyms or rearranging the order of the sentence.
- Copying from another student.

Plagiarism is a form of mental laziness and will not be tolerated. Any plagiarized assignments will receive an automatic 0 and may not be dropped or replaced by resubmitting the assignment.

Cheating will not be tolerated. Students who are caught cheating may be given a 0 for the assignment; second offenses will result in an automatic failure of the class.

C. Other Policies:

Late assignments will be docked 10% per day.