PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

MICROBIOLOGY
BIOL 2230

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

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:
None; (Recommended prerequisite: CHEM 1010 or 1110 or BIOL 1110 or 2010)

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

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | Lecture: Chapter 1, 3: History, Microscope  
Lab: 1 and 2 |
| 2    | Lecture: Chapter 3: Cell Structure  
Lab: 7-8; 9-10 |
| 3    | Lecture: Chapter 4, 5: Requirements for Growth; Controlling Growth  
Lab: 14-16 |
| 4    | Lecture: Chapter 5, 6: Controlling Growth, Metabolism  
Lab: 18-19 |
| 5    | Lecture: Chapter 6: Metabolism  
Lab: 20-22; 33-34 |
| 6    | Lecture: Chapter 21: Antimicrobial Drugs  
Lab: finish 21; 25-31 |
7 Lecture: Chapter 8: Genetics
   Lab: 25, 27; 42-44

8 Lecture: Chapter 9, 10: Recombinant DNA, Biotechnology, Classification
   Lab: 27, 42-44; Practical

9 Lecture: Chapter 11: Bacteria
   Lab: 39, 53

10 Lecture: Chapter 12: Fungi, Algae, Protozoa, Helminths
   Lab: 53, 59; unknowns

11 Lecture: Chapter 13, 14: Viruses
   Lab: unknowns

12 Lecture: Chapter 15, 16: Nonspecific and Specific Immunity
   Lab: unknowns

13 Lecture: Chapter 16, 18: Specific Defense: Immune Disorders
   Lab: unknowns

14 Lecture: Chapter 19, 20: Host-Microbe Interactions; Epidemiology
   Lab: 46, 50, 51

15 Lecture: Chapter 32: Food Microbiology
   Lab: 46; Practical

16 Final

II. Course Objectives*:

A. Acquire a working knowledge of basic staining and culturing techniques and concepts. I.5
B. Be familiar with prokaryotic and eukaryotic characteristics. I.5
C. Understand microbial metabolism and growth. I.5
D. Classify microorganisms. I.5, III.1
E. Understand the epidemiology, pathogenicity and drug treatment of specified microbial organisms. I.5, III.2
F. Recognize microbes associated with individual body systems. I.5
G. Know the principles of immunology. I.5
H. Achieve familiarity with applied microbiology. I.5
I. Read and apply critical thinking to topics in the field of microbiology. III.1, III.2, VI.1
J. Become familiar with resources available on recent research and current information in the library in the field of microbiology. I.5

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

III. Instructional Processes*:
Students will:

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

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: 500 points

Five exams, each worth 100 points, will be given. The lowest of these exam grades will be dropped. These exams will be noncumulative, although students are expected to retain basic information acquired in previous chapters. Exams will consist of a combination of multiple choice, matching, short answer and essay questions. There will be no make up exams.

In addition, there will be a final exam worth 100 points. The final exam will consist of multiple choice and matching questions only: 50% of the exam will be cumulative and 50% will cover new material. This exam will be conducted in the classroom at the scheduled final examination period.

B. Laboratory Expectations: 300 points

Participation in laboratory exercises is mandatory. Laboratory assignments constitute 500 points broken down as follows: laboratory data sheets (90 points), laboratory reports (30 points), practical exams (100 points), unknown identification (30 points), and work sheets (20 points). The remaining 30 points will be based on attitude, teamwork, technique, lab safety, 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, lab coat and safety glasses to lab. Students MUST wear a lab coat and safety glasses in lab at all times!! Students must supply their own laboratory coat and glasses. Short lab jackets are not acceptable.

Laboratory data sheets: Data sheets for each laboratory will be submitted at the end of the laboratory period in which the assignment is completed. Each data sheet is worth 3 points; only the top 30 scores will be kept. The data sheets will be evaluated on neatness, completeness, and accuracy. Illegible data sheets will not be given credit. Students can not receive credit for a lab which they did not attend. The review questions at the end of each lab will NOT be required; however, answering these questions will serve as an excellent review for the laboratory practicals.

Laboratory reports: Six laboratory reports, requiring analysis of class data, will be completed by students. Laboratory reports will be worth 6 points each and will include completion of the data sheets in the laboratory manual, as well as a purpose and conclusion submitted on a separate sheet of paper. The purpose and conclusion will be grammatically correct, double-spaced and typed. The purpose will answer the question "Why are we doing the exercise(s)?" and will be no longer than 30 words. The conclusion will answer "What does the data tell us beyond what it says?" and will be no longer than 300 words. Additional information will be provided by the laboratory instructor. Due dates will be announced by the laboratory instructor.

Practical Exams: Laboratory practical exams 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 practical exams, students must maintain complete laboratory data sheets.

Unknown Identification: 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 stains and biochemical 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.

Work sheets: Two worksheets will be assigned in the laboratory during the semester. These will be submitted to the laboratory instructor on the due date announced in lab. All other grading procedures will be discussed by the laboratory instructor when assignments are made.

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. If you know in advance that you will need to miss a lab, please discuss this with your laboratory instructor. Laboratory practical exams must be taken on the date announced. There are ABSOLUTELY NO make-ups of these exams!

C. Field Work: 60 points

Library research and writing are an integral part of this course. Students will write short abstracts of current articles as well as a prepare a presentation on a disease caused by a microorganism. The distribution of points among these assignments will be discussed by the lecture instructor.

Abstracts: Students will write four abstracts of current articles (no more than three months old) pertaining to microbiological issues covered in the course, following guidelines discussed in class. Abstracts will be collected at the beginning of lecture on the assigned due dates. See the handout "Instructions for Abstract Assignments" for additional details on writing and grading of abstracts, as well as a sample abstract. Each abstract is worth 10 points.

Disease Presentation: Students will be assigned a disease caused by a microorganism (virus, bacteria, fungus or helminth) from a list provided by the instructor the second week of class. Students will make a four to five minute presentation. This presentation should be interesting and informative, and should include characteristics of the causative agent, symptoms, tests for identification, mode of transmission and treatment/prevention. Students will be given a one minute warning, and they will be stopped after 5 minutes. Students are expected to utilize a variety of references, including (minimally) two reference books (textbooks are acceptable), one journal article and one internet resource. A typed bibliography of resources utilized must be submitted at the time of the presentation. The presentation is worth 20 points. Students may alternately select to complete two additional abstracts in lieu of the disease presentation.

D. Other Evaluation Methods:

Bonus Opportunities - up to 40 points

Book Report: You may select to read one of the following books and write a two page, double spaced report about the book, including a paragraph of your reflections. It must have enough detail to show that you have read the book, but must be written in the style of an abstract. Maximum bonus points from this assignment: 20. These bonus points will hopefully broaden your horizons and help you to appreciate the world around you. Please remember that clear communication (proper grammar and spelling, etc.) is important in getting your views across! Due date for the assignment will be announced in class.

* indicates we have this book in the PSTCC library. [Most of the others are in the Knox County Libraries.]

*The Hot Zone
*The Coming Plague
*Yellow Fever, Black Goddess
Virus X
Virus Hunters of the CDC
Virus Hunter
*Deadly Feasts

Video Viewing: You may select to view any of 12 videos from the Unseen Life on Earth series. Each of these videos is from 25 to 30 minutes long. Worksheets for each of these
videos will be posted on the course website; you should print a worksheet before viewing the video. You must complete the worksheet, along with a short paragraph of your personal reflections, and submit it by the due date posted on the website for credit. Each video worksheet is worth 2 points (up to a maximum of 20 points).

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 (860).

The following grading scale will be used.

- 774-800 points 90% - 100% A
- 748-773 points 87% - 89% B+
- 688-747 points 80% - 86% B
- 662-687 points 77% - 79% C+
- 602-661 points 70% - 79% C
- 516-601 points 60% - 69% D
- below 516 points 59% and below F

VI. Policies:

A. Attendance Policy:

Pelissippi 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: Late assignments will not be accepted.

Course Website: The master syllabus, lecture outlines, learning objectives, video worksheets, and other useful information pertaining to the course will be posted at the website: http://www.pstcc.cc.tn.us/mfhicks/biol2230/biol2230notes.htm

All lecture outlines and chapter learning objectives will be posted no later than Monday afternoon, one week prior to the date the material for the chapter will be covered in class. Announcements will be made in class or lab if any additional information is posted. Please note that if several students attempt to access the website at the same time, the web server may respond with a message that states the information is not accessible. This is similar to calling someone on the telephone and getting a busy signal. Try again later. If you cannot access the information after trying several times (different times, days, etc.), please
email mfhicks@pstcc.cc.tn.us and describe the problem, including the days and times you attempted to access the material, as well as your web browser version.