BIO 225

Microbiology

Course Description
This is a detailed study of microbiology as it relates to infection and the disease processes of the body. Topics include immunity, epidemiology, medically important microorganisms, and diagnostic procedures for identification.

Prerequisites: BIO 210.

4.0 Cr (2.5 lect/pres, 3.0 lab, 0 other)

Course Focus
Upon successful completion of this course of study, the student should be competent to perform the following tasks:

1. Describe the importance and classification of the major groups of microorganisms to health, disease, and the environment.
2. Discuss the history and fundamental concepts of microbiology.
3. Relate principles of chemistry, specifically biochemistry, to microbiology.
4. Demonstrate the operation of standard equipment and laboratory techniques used in the culture, identification, examination, enumeration, and control of microorganisms.
5. Describe the physical, physiological and etiological characteristics of the major divisions, families, genera, and species of bacteria, fungi, viruses, protozoa, and helminthes.
6. Explain the fundamentals of microbial metabolism, growth, control, and genetics.
7. Identify microorganisms as being normal flora, opportunists, parasites, or pathogens.
8. Explain the basic principles of disease and epidemiology.
9. Analyze the relationship between health and disease, emphasizing host defense mechanisms and mechanisms of pathogenicity in microorganisms.
10. Discuss causative agents, transmission, signs/symptoms, diagnosis, and treatment of microbial diseases in humans.
BIO 225 Core Curriculum Competencies

All courses approved for the general education core curriculum help students develop communication skills and/or critical thinking. Students will demonstrate achievements by assessments on the departmental final exam and on testing developed by individual instructors.

This course develops critical thinking skills through instruction that emphasizes the understanding of microbiology and its association with the process of disease. This will be demonstrated by assessments on the final exam. Students will demonstrate critical thinking in the following areas:

- Understanding how the structures of bacteria, viruses, fungi, and protozoan parasites are involved in the process of infection,
- Discussing the various types of host defense mechanisms and how they prevent infections by microorganisms, Becoming familiar with the importance of antibiotic therapy and antibiotic resistance.

Course Goals
The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives. (*designates a CRUCIAL goal)

1. Define microbiology
2. Characterize microbial groups
3. Describe clinical specimen collection methods
4. Determine exact microbial counts
5. Exhibit lab safety knowledge
6. Generate justifiable hypotheses
7. Analyze scientific data
8. Relate scientific results
*9. Identify unknown organisms
10. Describe microbial groups
11. Explore important macromolecular functions
12. Explain protein synthesis
13. Explain redox reactions
14. Describe microbial enzymatic activity
15. Explain aerobic enzyme activity
16. Expound various metabolic mechanisms
17. Differentiate phosphorylative methods
18. Illustrate aerobic glucose catabolism
19. Illustrate glucose fermentation
20. Calculate disease frequency
21. Characterize eukaryotic groups
22. Characterize prokaryotic groups
23. Explain cytoplasmic membrane functions
24. Differentiate passive-active cell transport
25. Elucidate cellular respiration
26. Describe infectious disease process
27. Expound Koch postulates
28. Discuss infectious disease transmission
29. Discuss microbial nutrition types
30. Elucidate disease causation
31. Explain microbe-host symbiotic relationships
32. Characterize microbial pathogens
33. Describe pathogenic evasion mechanisms
34. Elucidate microbial virulence factors
35. Elucidate infectious disease stages
36. Summarize emerging-reemerging disease challenges
37. Contrast bacterial growth measurement methods
38. Draw bacterial fine structures
39. Illustrate bacterial growth
40. Contrast microbial culture preservation
41. Evaluate staining methods
42. Differentiate gram stained bacteria
43. Explain microbial growth limiting factors
44. Illustrate viral morphology
45. Compare viral replicative mechanisms
46. Explain viral-host specificity
47. Discuss significant viral pathogens
48. Distinguish innate immune responses
49. Distinguish adaptive immune responses
50. Differentiate active-passive immunity
51. Discuss immune hypersensitivity
52. Discuss vaccine types
53. Discuss microbial control methods
54. Contrast antimicrobial drug actions
55. Characterize antimicrobial efficacy
56. Elucidate antimicrobial resistance
57. Characterize body system microbial diseases
58. Describe human disease transmission
59. Contrast incidence versus prevalence
60. Discuss resident micro biota
61. Classify organ-system infectious diseases
62. Elucidate gene transfer methods
63. Discuss microbial bioterrorism
64. Discuss implications and consequences of globalization
65. Practice community outreach

Student Contributions:
Classes are designed to employ a variety of teaching techniques. In order to maximize learning, required readings should be done prior to a unit. If a student is falling behind in lab performance or academic achievement, it is imperative to seek immediate assistance from the instructors.
Course Evaluation

- Student progress will be evaluated through a series of tests, quizzes in-class and out of class assignments and will be detailed in the attachment to this syllabus.
- Blackboard: lecture notes, handouts, podcasts, study hints, tutor information, syllabi, and other course information is available on the course blackboard page.
- Laboratory Component: This course has a required lab component which supplements the information presented in lecture. The lab will be independently evaluated primarily through lab practicals, in class and out of class lab assignments (such as research papers). For specific details about lab evaluations, please refer to the attachment to this syllabus.

GRADING SCALE:
90-100 = A
80-89 = B
70-79 = C
60-69 = D
Below 60= F

Course Schedule
The class meets for 2.5 lecture/presentation hours and 3 lab hours per week.

Developed/Revised: August 10, 2010

ADA STATEMENT
The Technical College of the Lowcountry provides access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request disability accommodation, contact the counselor for students with disabilities at (843) 525-8228 during the first ten business days of the academic term.

ACADEMIC MISCONDUCT
There is no tolerance at TCL for academic dishonesty and misconduct. The College expects all students to conduct themselves with dignity and to maintain high standards of responsible citizenship.

It is the student’s responsibility to address any questions regarding what might constitute academic misconduct to the course instructor for further clarification.

The College adheres to the Student Code for the South Carolina Technical College System. Copies of the Student Code and Grievance Procedure are provided in the TCL Student Handbook, the Division Office, and the Learning Resources Center.

ATTENDANCE
The College’s statement of policy indicates that students must attend ninety percent of total class hours or they will be in violation of the attendance policy.

- Students not physically attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Students taking an online/internet class must sign in and communicate with the instructor within the first ten calendar days from the start of the semester to indicate attendance in the
class. Students not attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.

- Reinstatement requires the signature of the division dean.

- In the event it becomes necessary for a student to withdraw from the course OR if a student stops attending class, it is the student’s responsibility to initiate and complete the necessary paperwork. Withdrawing from class may have consequences associated with financial aid and time to completion.

- When a student exceeds the allowed absences; the student is in violation of the attendance policy. The instructor MUST withdrawal the student with a grade of “W”, “WP”, or “WF” depending on the date the student exceeded the allowed absences and the student’s progress up to the last date of attendance.

- Under extenuating circumstances and at the discretion of the faculty member teaching the class, allow the student to continue in the class and make-up the work. This exception must be documented at the time the allowed absences are exceeded.

- Absences are counted from the first day of class. There are no "excused" absences. All absences are counted, regardless of the reason for the absence.
  - A student must take the final exam or be excused from the final exam in order to earn a non-withdrawal grade.
  - A copy of TCL’s STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL) is on file in the Division Office and in the Learning Resources Center.

HAZARDOUS WEATHER

In case weather conditions are so severe that operation of the College may clearly pose a hardship on students and staff traveling to the College, notification of closing will be made through the following radio and television stations: WYKZ 98.7, WGCO 98.3, WGZO 103.1, WFXH 106.1, WWVV 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WLVH 101.1, WSOK 1230 AM, WAEV 97.3, WTOC TV, WTGS TV, WJWJ TV, and WSAV TV. Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp)

EXTRA:

Emergency Text Message Alert

Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. Participants receive immediate notification of emergency events and weather cancelations via text messaging on their cell phones. Participants can also opt in to receive non-emergency news and announcements. Go to [www.tcl.edu](http://www.tcl.edu). On the homepage, click on “emergency TextAlert at TCL” and fill out the form or go to [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp)

GRADING METHODOLOGY

The final grade must be 70 or more (a grade “C” or better) in order to pass the course and progress to the next course. Students absent from an examination or presentation will receive a “0” grade for the examination unless other arrangements are made with the individual instructor prior to the examination or presentation day or on the examination or presentation day before the test/presentation is scheduled to be given.

The student is responsible for notifying the instructor for the reason of the absence. It is also the responsibility of the student to contact the appropriate instructor to arrange to make up the examination. Arrangements may be completed by telephone.
If the instructor is not available, a message should be left on the instructor’s voice mail AND with another member of the faculty or administrative assistant. The make-up exam will be scheduled and the instructor will decide the method of examination. Messages sent by other students are unacceptable.