



TECHNICAL COLLEGE OF THE LOWCOUNTRY

Technical College of the Lowcountry
921 Ribaut Road
Beaufort, SC 29901

Arts & Sciences Division
Building 9, Room 102
843-525-8281

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 (3.0 lect/pres, 3.0 lab, 0 other)

Course Focus

This course introduces basic principles and then applies clinical relevance in immunology, bacteriology, mycology, and virology. This rigorous course includes many etiological agents responsible for global infectious diseases. Because the territory covered by infections and the immune response expands each year, we focus on pathogenic mechanisms in order to foster a student's ability to solve problems in their future clinical career.

Text and References

OpenStax College, Microbiology. OpenStax College, 01 November 2016. This is a free text available at the following link: <https://cnx.org/contents/FPtK1z mh@12.8:zMTtFGyH@7/Introduction>

Johnson, Ted R., and Christine L. Case. Laboratory Experiments in Microbiology, 12th Edition. Pearson, 2018. ISBN: 978-0134605203.

Disposable Lab Coats, Sharpies, Goggles and Scantron forms are available at the TCL bookstore

Recommended:

Rust, Thomas. A Guide to Anatomy and Physiology Lab, 2nd Edition. Southwest Education Enterprises, 1986. ISBN: 0-937-02900-9

Optional:

Jones, Shirley. Pocket Anatomy & Physiology, 2nd Edition. F.A. Davis Company, 2013. ISBN: 978-0803632813
Core Curriculum Competencies

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

- This course develops communication skills through instruction on writing lab reports and min-reports on current topics in infectious diseases. These reports will be structured with an Abstract, a Body (Introduction, Materials, Procedures, Results, and Conclusion) and a Summary. These reports will involve oral and/or written presentations.
- 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 assessment on the final exam.
- Students will demonstrate critical thinking in the following areas:
 - Understanding how the structures of bacterial, 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 microbes, 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:

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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.

TCL 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.

STATEMENT OF NON-DISCRIMINATION

The Technical College of the Lowcountry is committed to a policy of equal opportunity for all qualified applicants for admissions or employment without regard to race, gender, national origin, age, religion, marital status, veteran status, disability, or political affiliation or belief.

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) 525-8219 or (843) 525-8242 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

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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** complete an assignment designated by 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 contact the instructor via e-mail requesting to be withdrawn from the class.** Withdrawing from class may have consequences associated with financial aid and time to completion. Students are strongly encouraged to consult with Financial Aid prior to withdrawing from any class, particularly if the student is currently on a warning or probation status.
 - When a student exceeds the allowed absences, the student is in violation of the attendance policy. The instructor **MUST** withdraw 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
- or
- 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.

ONLINE ATTENDANCE PROCEDURE

For all online courses, students must complete an assignment designated by the instructor during the first week of classes. The instructor will drop the student from the course if the initial assignment is not completed.

Instructors will withdraw students from the class when 90% attendance is not maintained. Attendance in an online course is defined by regular course access and by timely completion of assignments as required by the instructor. Each student will be expected to access the web class at least once a week and complete 90% of assignments on time. Additional access is encouraged and may be necessary for successful completion of classes.

Failure to log in and complete assignments will result in the student being withdrawn from the course. The instructor will assign a grade of "W," "WP," or "WF" based upon the student's academic standing as the last date of attendance, which is the last login. Students are responsible for any financial matters associated with an administrative withdrawal. If a student fails to email the instructor (using the my.tcl.edu email account) requesting to be dropped from the course and has not submitted the initial assignment required during the first week of

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class, the instructor will assign a “Never Attended” code in the student information system (web-advisor) no later than ten calendar days after the first day of the class. Students who are dropped as a result of never attending the course are still responsible for all fees associated with the course.

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, WWVW 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. <http://www.tcl.edu/current-students/text-alert>

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 cancellations via text messaging on their cell phones. Participants can also opt in to receive non-emergency news and announcements. Go to www.tcl.edu. On the homepage, click on “emergency TextAlert at TCL” and fill out the form or go to <http://www.tcl.edu/current-students/text-alert>

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.

SAFETY ADDENDUM

Purpose:

The purpose of this safety addendum is to provide each student with safety guidelines during an incident, emergency, or disaster at TCL. In addition, it provides students guidelines for lockdown procedures, evacuation procedures, and active shooter.

Definitions

An incident is any event, potential or actual, that may impact normal operations but has no immediate health or life threatening consideration or serious effect on the overall functional capacity of the College. An event of this nature should be reported to the Office of the Vice President for Administrative Services. Also notify the off-site campus administrator if applicable.

An emergency is any incident, potential or actual, which may endanger life or health or which affects an entire building or buildings, and will disrupt the overall operations of the College. Outside emergency services will

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probably be required, as well as major efforts from campus support services. Major policy considerations and decisions will usually be required from the college administration during times of crises. An emergency should be reported immediately by directly using **911** if life or health/injury considerations exist and then to the Office of the President or Vice President for Administrative Services as quickly as possible. Also notify the off-site campus administrator if applicable.

A disaster is any event or occurrence that has taken place and has seriously impaired or halted the operations of the College. In some cases, mass personnel casualties and severe property damage may be sustained. A coordinated effort of all campus-wide resources is required to effectively control the situation. Outside emergency services will be essential. In all cases of disaster, an Emergency Control Center will be activated, and the appropriate support and operational plans will be executed. The disaster should be immediately reported, first by calling **911** and then to the Office of the President or Vice President for Administrative Services. Also notify the off-site campus administrator if applicable.

Types of Emergencies

- Hurricane
- Tornado
- Fire
- Biochemical or Radiation Spill
- Explosion/Bomb
- Downed Aircraft (crash which directly impacts campus operations)
- Utility Failures
- Violent or criminal behavior
- Psychological Crisis

Procedures:

Active Shooter

Run/hide/fight (<http://www.fbi.gov/about-us/cirg/active-shooter-and-mass-casualty-incidents/run-hide-fight-video>)

Building Evacuation

1. Building evacuations occur when an alarm sounds and/or upon notification by Security or the Emergency Director.
2. When the building evacuation alarm is activated during an emergency, individuals should exit according to the building evacuation plan and alert others to do the same.
3. Once outside, individuals should proceed to a clear area that is at least 500 feet away from the affected building. Streets, fire lanes, hydrant areas and walkways should be kept clear for emergency vehicles and personnel.
4. Individuals should not return to an evacuated building unless told to do so by Security or the Emergency Director.
5. Individuals should assist persons with disabilities in exiting the building. Elevators are reserved for disabled persons

Campus Evacuation

1. A uniformed Security Guard, the Emergency Director, or an Emergency Resource Team member will announce evacuation of all or part of the campus grounds.
2. All persons (students and staff) are to immediately vacate the campus, or in the case of a partial evacuation relocate to another part of the campus grounds as directed.

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Lockdown

1. Clear the halls
2. Report to the nearest classroom/office
3. Assist those needing special assistance
4. Ensure classroom/office doors are closed and locked
5. Turn off lights
6. Stay away from doors and windows (out of the line of sight)
7. BE QUIET and follow instructor's directions
8. Silence cell phones
9. Wait for the "All Clear" before leaving