



INSTRUCTIONAL PACKAGE

MLT 205
Advanced Medical Microbiology

Effective Term
Fall 2023/Spring 2024/Summer 2024

INSTRUCTIONAL PACKAGE

Part I: Course Information

Effective Term: Fall 2023/Spring 2024/Summer 2024

COURSE PREFIX: MLT 205

COURSE TITLE: Advanced Medical Microbiology

CONTACT HOURS: 6 hours

CREDIT HOURS: 4 hours

RATIONALE FOR THE COURSE:

This course provides a survey of organisms encountered in the clinical microbiology laboratory, including sterilization and disinfection techniques.

COURSE DESCRIPTION:

This course provides a survey of organisms encountered in the clinical microbiology laboratory, including sterilization and disinfection techniques.

PREREQUISITES/CO-REQUISITES:

NOTE: Pre-Req MLT 105 and MLT 102 with a minimum grade of C; Co-req MLT 115, 210 and 131

REQUIRED MATERIALS:

Please visit the [BOOKSTORE](#) online site for most current textbook information. Use the direct link below to find textbooks.

Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

ADDITIONAL REQUIREMENTS:

Lab coats and goggles are required for the lab skills portion.

TECHNICAL REQUIREMENTS:

Access to Desire2Learn (D2L), HGTC's learning management system (LMS) used for course materials.

Access to myHGTC portal for student self-services.

College email access – this is the college's primary official form of communication.

CLASSROOM ETIQUETTE:

As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

Part II: Student Learning Outcomes

COURSE LEARNING OUTCOMES and ASSESSMENTS*:

Week 1

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon
Chapter 12:

1. Describe the mechanism of action of the different classes of antibacterial agents.
2. Describe and distinguish the difference between intrinsic and acquired resistance.
3. Describe the targets of different antibacterial classes.
4. Be able to draw the beta lactam ring and explain how beta lactam antibiotics work.
5. Understand the mechanisms of microorganism resistance.
6. Explain the definition of a beta lactamase and how it counteracts certain antibiotics.
7. Discuss "antibiotic stewardship" and its purpose.
8. Discuss potential alternatives to treat resistant organisms.

Lab:

Materials Covered: Lab manual.

1. Explain Microbiology laboratory Safety
2. Perform gram stain procedure
3. Interpret gram stain correctly

Week 2

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon
Chapter 13:

1. Explain why we perform antimicrobial testing.
2. Describe how to determine which drugs to test and which to report.
3. Define MICs and understand which antimicrobial methods produce MIC's and which do not.
4. Explain how to determine which method is appropriate for a specific organism.
5. Describe how to determine the antibiotic result interpretation (*susceptible, intermediate, resistant, and non-susceptible*) and what it means.
6. Understand the QC requirements and controlled variables when testing antibiotics.
7. Discuss automated susceptibility test methods and understand several commercially available.
8. Know which organisms are routinely tested for beta-lactamase production in the clinical lab.
9. Explain the best methods to determine *S. aureus* resistance.
10. Discuss the D-zone test and its purpose.
11. Understand the terms MRSA, ESBL, CRE, KPC and CRPA. Explain how they are detected in the laboratory and how they affect antibiotic susceptibility reporting.

12. Describe an antibiogram, know how to make one and how it is used.
13. Describe how a clinical microbiology lab would go about determining its default susceptibility testing method and routinely reported antibiotics.
14. Describe the molecular probe method of determining organism resistance and know the names for some commercial systems.
15. Understand which drugs are evaluated for their levels in the bloodstream during treatment and how the levels are tested.

Lab:

Materials Covered: Lab manual.

1. Perform culture setup procedures
2. List media utilized for each of the following specimens:
 - a. Throat
 - b. Sputum
 - c. Urine
 - d. CSF

Week 3

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon
Chapter 21

1. Describe the general characteristics of nonfermentative, gram-negative rods.
2. Compare the metabolic pathways used by nonfermentative and fermentative organisms.
3. Discuss the natural habitat of the nonfermentative, gram-negative bacilli.

Chapter 22

1. Describe anaerobic bacteria, including their sensitivity to oxygen, why they are sensitive to oxygen, and where they might be found in the environment and human body.
2. Differentiate the various types of anaerobes with regard to atmospheric requirements (i.e., obligate anaerobes, facultative anaerobes, and aerotolerant anaerobes).
3. Describe how anaerobes, as part of endogenous microbiota, initiate and establish infection.

Lab:

Materials Covered: Lab manual.

1. Explain the Kirby Bauer methodology.
2. Perform Kirby Bauer set up
3. Explain when this test would be performed

Week 4

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 23

1. Describe the general characteristics of the genera of spirochetes.
2. List the risk factors associated with relapsing fever infection.
3. Describe the pathogenesis and clinical manifestations of *Borrelia* spp. infection.

Lab:

Materials Covered: Lab manual

1. Interpret of the Kirby Bauer results

Week 5

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 24

1. List the members of the family Chlamydiaceae.
2. Discuss the unique growth cycle of Chlamydia, describing elementary and reticulate bodies.
3. Compare and contrast Chlamydia and Rickettsia and distinguish them from other bacteria and viruses.
4. Discuss the most important human diseases caused by the Chlamydia, Chlamyphila, and Rickettsia species, and similar microorganisms.

Chapter 25

1. Describe the general characteristics of the *Mycoplasma* and how they differ from other bacterial species.
2. Name the clinical specimens from which the mycoplasma species are most likely to be isolated.
3. Compare the clinical diseases caused by *Mycoplasma pneumoniae*, *Mycoplasma hominis*, and *Ureaplasma urealyticum*.

Lab:

Materials Covered: Lab manual

1. Discuss individual parts of the Microscan instrument
2. Explain what tests are performed on this instrument.
3. Discuss the different reagents used on the instrument
4. Perform setup of MIC panels

Week 6

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 26

1. Compare the general characteristics of mycobacteria with those of other groups of bacteria.
2. Discuss the clinical disease caused by *Mycobacterium tuberculosis*.
3. Describe the use of the tuberculin skin test and the interpretation of the results.

Lab:

Materials Covered: Lab manual

1. Interpret the biochemical tests performed on the Microscan instrument.

Week 7

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 27

1. Describe the general characteristics and structures of fungi.
2. Compare asexual and sexual reproduction of fungi.
3. List the divisions of fungi.
4. Describe diseases caused by fungi.

Chapter 28

1. List the major considerations in the collection and handling of specimens for the identification of intestinal and blood and tissue parasites.
2. Describe the general procedures for performing the direct wet mount, fecal concentration, and permanently stained smears

Lab:

Materials Covered: Lab manual.

1. Interpret the susceptibility tests performed on the Microscan instrument.
2. Receive assigned parasite to gather information and present to the lab class.

Week 8

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 30

1. Explain the differences among the categories of bioterror agents
2. Compare the features of the four categories of BSL laboratories.
3. Compare and differentiate the efficiency of the different routes used to disseminate bioterror agents.

Chapter 31

1. Describe the proposed origin of biofilms, in a historic perspective, as a means of microbial survival.
2. Define biofilm.

Lab:

Materials Covered: Lab manual

1. Perform microscopy of Parasitology slides.
2. Discuss the morphology and medical pathology of parasites found on slides
3. Discuss the individual parasite observed.

Week 9

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Assignment

1. Prepare Parasite assignment for Lab class.

Lab:

Materials Covered: Lab manual

1. Present the assigned parasite to the class.

Week 10

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 32

1. Describe the basic anatomy of the respiratory tract, and explain the mechanical defenses of each anatomic site and how alterations to these defenses may result in infectious diseases.
2. Define the importance **of normal biota in the respiratory tract**, and explain how alterations in the normal biota may result in infectious diseases.
3. Discuss the **basic pathogenic mechanisms of infectious diseases** of the respiratory tract and the virulence factors of the organisms that cause disease.
4. Describe the **most common organisms causing** various upper and lower respiratory tract infections.
5. Describe the **pathogenesis, risk factors, and complications associated with respiratory tract** infections and recommend types of specimens that should be collected for diagnosis.

Chapter 33

1. Describe the function of the skin as a host defense mechanism and list the organisms that constitute normal skin biota.

2. Name the manifestations and causative agents of each of the following types of skin infections: dermatitis, folliculitis, furuncle, carbuncle, impetigo, erysipelas, and cellulitis.
3. Describe risk factors, causative agents, and manifestations of the following soft tissue infections: diabetic foot infections, infectious gangrene, mycetoma, and nodular lymphangitis.
4. Name examples of systemic bacterial infections that cause dermatologic manifestations and describe these manifestations.
5. Compare the dermatologic manifestations of fungal infections including systemic candidiasis.

Lab:

Materials Covered: Lab manual

1. Perform set-up procedures for the medical microbiology unknown specimen
2. Perform gram stain and interpret results of each specimen given

Week 11

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 34

1. Explain the normal host defenses at each level of the gastrointestinal tract in preventing infection.
2. Explain the major mechanisms whereby bacteria can cause diarrhea.
3. Associate the onset of symptoms, food ingested, travel history, and clinical manifestations with the possible cause of diarrheal illness.
4. Determine the factors that place individuals at risk of gastrointestinal infection.
5. Describe the various methods whereby *Escherichia coli* can cause diarrhea.

Chapter 35

1. Describe the production and distribution of cerebrospinal fluid (CSF).
2. Describe the characteristics of normal CSF.
3. Describe the collection, transportation, and processing of CSF samples.
4. For each pathogen associated with meningitis, correlate one host-related risk factor and one virulence-related factor.

Lab:

Materials Covered: Lab manual

1. Interpret the colony morphology of unknown specimen
2. Perform biochemical testing on the unknown specimen
3. Perform set up of MIC panel of the unknown specimen

Week 12

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 36

2022-2023

1. Define bacteremia and differentiate this condition from septicemia.
2. Classify each type of bacteremia and describe when each condition occurs.
3. Discuss the epidemiology and pathogenesis of bacteremia.
4. Associate specific organisms with each type of bacteremia.
5. Explain the pathophysiology of sepsis and septic shock.

Lab:

Materials Covered: Lab manual

1. Interpret the susceptibility tests on the Microscan instrument on unknown organisms

Week 13

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 37

1. Discuss various infections that occur in the urinary system.
2. Associate the clinical signs, symptoms, and parameters with each of the disease manifestations.
3. Identify the epidemiology and risk factors associated with the development of a urinary tract infection (UTI).
4. Identify the organisms associated with UTIs.
5. Correlate the urinalysis results with the bacterial colony count, pyuria, and symptoms and signs presented by the patient.

Chapter 38

1. Describe the pathogenesis of these diseases:
 - a. Urethritis
 - b. Cervicitis
 - c. Vulvovaginitis
 - d. Genital ulcer disease
 - e. Acquired immunodeficiency syndrome
2. Recognize the common clinical manifestations, complications, and treatment of pelvic inflammatory disease.
3. Discuss how the advent of molecular testing has affected the identification of sexually transmitted diseases.

Lab:

Materials Covered: Lab manual

No Lab – College Closed

Week 14

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Chapter 40

1. Associate the animal hosts or vectors associated with the following infections:

a. Anthrax	d. Leptospirosis
b. Plague	e. Tularemia
c. Erysipeloid	f. Lyme borreliosis
2. Correlate the pathogen (genus and species) that causes the diseases listed. Discuss the epidemiology and describe the clinical manifestations associated with each disease condition.

a. Anthrax	f. Lyme borreliosis
b. Plague	g. Cat scratch disease
c. Erysipeloid	h. Human granulocytic anaplasmosis
d. Leptospirosis	
e. Tularemia	i. Human monocytic erlichiosis

Chapter 41

1. Identify common ocular structures and describe their functions.
2. Discuss the role of normal biota in protecting ocular structures.
3. List the most frequent ocular infections and their causative agents.
4. Describe the pathogenesis of the various eye pathogens presented in this chapter.

Lab:

Materials Covered: Lab manual

1. Analyze the results of the unknown Medical Microbiology unknown specimens.
2. Explain the pathogenicity and treatment of the organism.

Week 15

Lecture

Materials Covered: Textbook of Diagnostic Microbiology, Mahon

Final Exam Review

Lab:

Materials Covered:

Comprehensive Lab Competency

****Students - please refer to the Instructor's Course Information sheet for specific information on assessments and due dates.***

Part III: Grading and Assessment

EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS*:

Students' performance will be assessed and the weight associated with the various measures/artifacts are listed below.

EVALUATION*

2022-2023

Chapter Tests	50%
Lab Assignments	20%
<ul style="list-style-type: none"> • Lab Comprehensive evaluation 50% • Lab skills competencies 25% • Weekly Affective Skills 25% 	
Homework Assignments	5%
In class quizzes	5%
Final Exam	20%
	100%

****Students, for the specific number and type of evaluations, please refer to the Instructor's Course Information Sheet.***

GRADING SYSTEM:

State the College's or departmental grading system as delineated in the Catalog. Please note the College adheres to a 10 point grading scale A = 100 – 90, B = 89- 80, C = 79 – 70, D = 69 – 60, F = 59 and below. You must have your Dean's approval if changes in the scale are made.

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor about the implications of that course of action. Ds, Fs, Ws, WFs and Is also negatively impact academic progression and financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the [academic calendar](#) for deadlines for add/drop. You must attend at least one meeting of all of your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly.

Part IV: Attendance

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of 80 percent (80%) of their classes in order to receive credit for any course. Due to the varied nature of courses taught at the college, some faculty may require up to 90 percent (90%) attendance. Pursuant to 34 Code of Federal Regulations 228.22 - Return to Title IV Funds, once a student has missed over 20% of the course or has missed two (2) consecutive weeks, the faculty is obligated to withdraw the student and a student may not be permitted to reenroll. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

Part V: Student Resources



THE STUDENT SUCCESS AND TUTORING CENTER (SSTC):

The SSTC offers to all students the following **free** resources:

1. **Academic tutors** for most subject areas, **Writing Center support**, and **college success skills**.
2. Online **tutoring** and academic support resources.
3. Professional and interpersonal communication **coaching** in the EPIC Labs.

Visit the [Student Success & Tutoring Center](#) website for more information. To schedule tutoring, contact the SSTC at sstc@hgtc.edu or self-schedule in the Penji iOS/Android app or at www.penjiapp.com. Email sstc@hgtc.edu or call SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455, or go to the [Online Resource Center](#) to access on-demand resources.



STUDENT INFORMATION CENTER: TECH Central

TECH Central offers to all students the following **free** resources:

1. **Getting around HGTC:** General information and guidance for enrollment, financial aid, registration, and payment plan support!
2. Use the [Online Resource Center \(ORC\)](#) including Office 365 support, password resets, and username information.
3. **In-person workshops, online tutorials and more services** are available in Desire2Learn, Student Portal, Degree Works, and Office 365.
4. **Chat with our staff on TECH Talk**, our live chat service. TECH Talk can be accessed on the student portal and on TECH Central's website, or by texting questions to (843) 375-8552.

Visit the [Tech Central](#) website for more information. Live Chat and Center locations are posted on the website. Or please call (843) 349 – TECH (8324), Option #1.



HGTC LIBRARY:

Each campus location has a library where HGTC students, faculty, and staff may check out materials with their HGTC ID. All three HGTC campus libraries are equipped with computers to support academic research and related school work; printing is available as well. Visit the [Library](#) website for more information or call (843) 349-5268.

STUDENT TESTING:

Testing in this course and in **make-up exam** situations may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms (which may have a fee associated with the usage)

Furthermore, tests may have time limits and/or require a proctor.

Proctoring can be accomplished either face-to-face at an approved site or online through our online proctoring service. To find out more about proctoring services, please visit the [Online Testing](#) section of the HGTC's Testing Center webpage.

The **Instructor Information Sheet** will have more details on test requirements for your course.

DISABILITY SERVICES:

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to HGTC's [Accessibility and Disability Service webpage](#). The Accessibility and Disability staff will review documentation of the student's disability and, in a confidential setting with the student, develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a disability, accommodations may be determined, accepted, and provided.

STATEMENT OF EQUAL OPPORTUNITY/NON-DISCRIMINATION STATEMENT:

Horry-Georgetown Technical College prohibits discrimination and harassment, including sexual harassment and abuse, on the basis of race, color, sex, national or ethnic origin, age, religion, disability, marital or family status, veteran status, political ideas, sexual orientation, gender identity, or pregnancy, childbirth, or related medical conditions, including, but not limited to, lactation in educational programs and/or activities.

TITLE IX REQUIREMENTS:

All students (as well as other persons) at Horry-Georgetown Technical College are protected by Title IX—regardless of their sex, sexual orientation, gender identity, part- or full-time status, disability, race, or national origin—in all aspects of educational programs and activities. Any student, or other member of the college community, who believes that he/she is or has been a victim of sexual harassment or sexual violence may file a report with the college's Chief Student Services Officer, campus law enforcement, or with the college's Title IX Coordinator or designee.

*Faculty and Staff are required to report incidents to the Title IX Coordinators when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).

INQUIRIES REGARDING THE NON-DISCRIMINATION/TITLE IX POLICIES:

Student and prospective student inquiries concerning Section 504, Title II, Title VII, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs.

Dr. Melissa Batten, VP Student Affairs

Title IX, Section 504, and Title II Coordinator

Building 1100, Room 107A, Conway Campus

PO Box 261966, Conway, SC 29528-6066

843-349-5228

Melissa.Batten@hgtc.edu

Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources.

Jacquelyne Snyder, VP Human Resources

Affirmative Action/Equal Opportunity Officer and Title IX Coordinator

Building 200, Room 205B, Conway Campus

PO Box 261966, Conway, SC 29528-6066

843-349-5212

Jacquelyne.Snyder@hgtc.edu