



INSTRUCTIONAL PACKAGE

MLT 115
Immunology

Effective Term
Fall 2023/Spring 2024/Summer 2024

INSTRUCTIONAL PACKAGE

Part I: Course Information

Effective Term: Spring 2024

COURSE PREFIX: MLT 115

COURSE TITLE: Immunology

CONTACT HOURS: 5 hours

CREDIT HOURS: 3 hours

RATIONALE FOR THE COURSE:

This course provides a study of the immune system, disease states, and the basic principles of immunological testing.

COURSE DESCRIPTION:

This course provides a study of the immune system, disease states, and the basic principles of immunological testing.

PREREQUISITES/CO-REQUISITES:

Co-Req MLT 210, MLT 131, and 205 pre-Req MLT 102 and MLT 105 with a minimum grade of C

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*:

After successful completion of this course, the student will be able to:

1. Describe Theory of Immunologic and Serologic procedures
2. Discuss Pre-analytical, analytical and post analytical testing components for Immunology/Serology Department.
3. Differentiate Immunologic manifestations of Infectious Diseases
4. Discuss Transplantation & Tumor Immunology
5. Explain procedures of serologic testing used in Immunology & Serology laboratories.

Week 1

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon

Chapter One

1. Explain the functions of the immune system.
2. Describe the characteristics of five mature leukocytes and their immune function.
3. Differentiate and compare the function of primary and secondary lymphoid tissues.
4. Describe the maturation of a B lymphocyte from origination to plasma cell development.
5. Describe the first, second, and third lines of body defense against microbial diseases.
6. Compare innate and adaptive immunity.

Chapter Two

1. describe the mechanisms and consequences of complement activation.
2. explain the biological functions of the complement system.
3. briefly describe the assessment of complement levels.
4. discuss the clinical applications of C-reactive protein.
5. compare acute-phase reactant methods.

Lab:

Materials Covered: Lab handouts.

1. Perform Dilutions.
2. Explain serial dilution procedures.

Week 2

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon

Chapter Three

1. compare the characteristics of major histocompatibility complex (MHC) classes I and II.
2. differentiate the characteristics of each of the five immunoglobulin classes.
3. name the four phases of an antibody response.
4. describe the characteristics of a primary and secondary (anamnestic) response.

5. compare the terms antibody avidity and antibody affinity.
6. describe the method of production of a monoclonal antibody.

Lab:

Materials Covered: lab handouts.

1. Perform Serial Dilutions
2. Explain justification for serial dilutions.

Week 3Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon
Chapter Four

1. differentiate and compare the functions of primary and secondary lymphoid tissues.
2. describe the maturation of a B lymphocyte from origination to plasma cell development.
3. compare the function of T lymphocytes and B lymphocytes in immunity.
4. describe the evaluation of suspected lymphocytic or plasma cell defects.
5. describe the assessment of the cellular immune response.

Lab:

Materials Covered: Package Insert

1. In order to perform and report the C-Reactive Protein test properly, the student must be able to:
 - a. Follows the directions accurately.
 - b. Recognize when test results are falsely positive or falsely neg.
 - c. Interpret test results as to what the results mean for the patient.
 - d. Identify potential sources of error of the test.
 - e. Resolve discrepancies.
 - f. Provide justification for the ordering of the test.

Week 4Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon
Chapter 6

1. identify the regulatory and accrediting organizations that influence quality assessment in clinical laboratories.
2. describe the use of the coefficient of variation and give the formula.
3. define true positive, true negative, false positive, and false negative.
4. provide the equations for calculating percentage sensitivity and percentage specificity.
5. define positive predictive value and negative predictive value.
6. describe how a new procedure is validated.

Chapter 7

1. identify and explain the parts of a procedure.
2. describe the preparation of blood specimens for testing.
3. explain how complement is inactivated in a serum sample.
4. compare the characteristics of the acute and chronic phases of illness.
5. differentiate among the four different types of testing categories.

6. describe the principle and clinical application of one POCT assay.

Lab:

Materials Covered: Lab handout

1. Identify the 5 normal Leucocyte cells seen on blood smears.
2. Discuss Quality Control when performing lab testing

Week 5

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon

Chapter 8

1. name and describe various types of precipitation assays.
2. describe the principles of particle agglutination.
3. identify and compare the characteristics of agglutination methods.
4. explain methods for enhancing agglutination.
5. describe the characteristics of graded agglutination reactions.
6. describe the principle, advantages, and disadvantages of nephelometry.

Chapter 9

1. describe the electrophoresis technique.
2. identify the fractions into which serum proteins can be divided by electrophoresis.
3. draw and label a serum electrophoresis pattern.
4. describe the principle, expected results, reference values, and clinical interpretation of the serum protein electrophoresis procedure.
5. explain the principle of immunofixation electrophoresis (IFE).

Lab:

Materials Covered: Lab handout

1. ABO tube testing
 - a. Follows the directions accurately.
 - b. Interpret test results as to what the results mean for the patient.
 - c. Identify potential sources of error of the test.

Week 6

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon Chapter 10

1. compare heterogeneous and homogeneous immunoassays.
2. describe and compare chemiluminescence, enzyme immunoassay (EIA), and immunofluorescence techniques.
3. briefly compare direct immunofluorescent, inhibition immunofluorescent, and indirect immunofluorescent assays.
4. describe the direct fluorescent antibody test for Neisseria gonorrhoeae.

Lab:

Materials Covered: Package insert

1. In order to perform and report the Anti-Streptolysin O (ASO) test properly, the student must be able to:
 - a. Follows the directions accurately.

- b. Recognize when test results are falsely positive or falsely neg.
- c. Interpret test results as to what the results mean for the patient.
- d. Identify potential sources of error of the test.
- e. Resolve discrepancies.
- f. Provide justification for the ordering of the test.

Week 7

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon
Chapter 11

1. identify and give examples of the three phases in automated instrumentation.
2. define the terms associated with Flow Cytometry.
3. explain the conjugation of antibody to a fluorophore.
4. describe the flow process.
5. explain the use of monoclonal antibodies.
6. summarize the characteristics of tandem dyes in flow cytometry.

Lab:

Materials Covered: Lab handout.

1. Explain the need for the Basic lab skills.
 - a. Micropipetting
 - b. Manual pipetting
 - c. Labeling working tubes and bottles
 - d. Open & Expiration dates
 - e. Temperatures
 - f. Safety measures
2. Demonstrate lab work bench organization.

Week 8

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon
Chapter 12

1. describe the polymerase chain reaction (PCR) amplification technique.
2. describe the technique and clinical applications of Real-Time PCR.
3. outline the generalized steps in Massively Parallel Sequencing/Next-Generation Sequencing (NGS).
4. discuss additional applications of molecular diagnostic testing.
5. describe the principle, advantages, and disadvantages of fluorescence in situ hybridization.
6. describe the composition of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA).
7. explain how microarrays are applied to immunologic testing.
8. outline the generalized steps in next-generation sequencing (NGS).

Chapter 13

1. Explain the signs and symptoms of acquired and congenital rubella infection.
2. Compare the immunologic manifestations of acquired and congenital rubella infection.

3. Explain the laboratory diagnostic evaluation of rubella infection.
4. Explain the signs and symptoms of acquired and congenital CMV infections.

Lab:

Materials Covered: Mini PCR procedure.

1. Explain the Mini PCR testing procedure.
2. Set up specimens for PCR testing.

Week 9

MLT hosted Blood Connection Blood Drive

Learning Objectives:

1. Explain the process of hosting a community blood drive.
2. Discuss advantages of donating blood.

Week 10

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon

Chapter 15

1. describe the etiology, epidemiology, and signs and symptoms of primary, secondary, latent, and late (tertiary) syphilis.
2. describe the incidence and clinical characteristics of congenital syphilis.
3. explain the immunologic manifestations and diagnostic evaluation of syphilis.
4. discuss the principles and clinical applications of the rapid plasma reagin (RPR) card test and VDRL procedure.
5. discuss the principles and clinical applications of confirmatory syphilis testing, such as the fluorescent treponemal antibody absorption (FTA) test.

Chapter 16

1. describe the etiology, epidemiology, and signs and symptoms; analyze the immunologic manifestations and diagnostic evaluation; explain the principle, interpretation, and limitations of an antibody detection assay; and describe prevention strategies for the following:
 - a. ehrlichiosis.
 - b. Rocky Mountain spotted fever.
 - c. babesiosis.
 - d. chikungunya virus infection.
 - e. dengue virus infection.
 - f. West Nile virus infection.
 - g. Zika virus infection.

Lab:

Materials Covered: Package Insert

1. In order to perform and report the Rapid Plasmin Reagin test properly, the student must be able to:
 - a. Follows the directions accurately.
 - b. Recognize when test results are falsely positive or falsely neg.
 - c. Interpret test results as to what the results mean for the patient.

- d. Identify potential sources of error of the test.
- e. Resolve discrepancies.
- f. Provide justification for the ordering of the test.

Week 11

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon
Chapter 18

1. identify and describe the characteristics of the various forms of primary infectious hepatitis, including laboratory assays.
2. compare the etiology, epidemiology, signs and symptoms, laboratory evaluation, and prevention of the various types of hepatitis.
3. analyze case studies related to the immune response for various forms of hepatitis.
4. describe the principle, results, and limitation of the rapid hepatitis C virus test.

Lab:

Materials Covered: Lab handout.

1. Perform Mini PCR and Gel Electrophoresis test on specimens.
 - a. Follows the directions accurately.
 - b. Provide justification for testing.
 - c. Analyze results.

Week 12

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon
Chapter 19

1. compare the major characteristics of primary versus secondary immunodeficiencies.
2. briefly describe the characteristics of the most commonly reported primary immune deficiency disorders.
3. describe the etiology and viral characteristics of human immunodeficiency virus (HIV-1).
4. explain the epidemiology, including modes of transmission and prevention, of HIV-1.
5. discuss the signs and symptoms of various stages and the classification of HIV infection.
6. describe the immunologic manifestations and cellular abnormalities of HIV-1 infection.
7. explain the serologic markers and diagnostic evaluation of HIV.

Chapter 20

1. define the terms hypersensitivity, allergy, sensitization, and immunization.
2. identify and explain the three categories of antigens.
3. compare the basic differences among types I, II, III, and IV hypersensitivity reactions and give examples.
4. discuss the acquisition and consequences of various types of latex sensitivity.
5. describe the etiology, immunologic activity, signs and symptoms, laboratory evaluation, and treatment of type I hypersensitivity reactions.
6. discuss examples of type II hypersensitivity reactions, including laboratory evaluation.

Lab:

Materials Covered: Lab handouts.

2. Perform Mini PCR and Gel Electrophoresis test on specimens.
 - a. Follows the directions accurately.
 - b. Recognize when test results are falsely positive or falsely neg.
 - c. Interpret test results as to what the results mean for the patient.
 - d. Identify potential sources of error of the test.
 - e. Resolve discrepancies.
 - f. Provide justification for the ordering of the test.
3. Describe methodologies used on Siemens EXL chemistry analyzer.

Week 13Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon

Chapter 21

1. describe the principle and application of the Bence Jones Protein Screening Procedure.
2. Compare the general characteristics of monoclonal and polyclonal gammopathies.
3. Describe and compare the etiology, epidemiology, signs and symptoms, immunologic manifestations, diagnostic evaluation, and treatment of multiple myeloma and Waldenström primary macroglobulinemia.

Chapter 23

1. compare the different forms of lupus, citing manifestations, incidence, and other features.
2. name the two most common drugs that can cause drug-induced lupus.
3. explain the epidemiology and signs and symptoms of SLE.
4. describe the immunologic manifestations of SLE, including diagnostic evaluation.
5. discuss the laboratory evaluation of antinuclear antibodies.

Lab:

Materials Covered: EXL manual.

1. Perform hands on maintenance of Siemens EXL
 - a. Fluid change
 - b. Syringe change
 - c. Tubing change
 - d. Probe change

Week 14Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon

Chapter 24

1. name significant factors related to the development of arthritis.
2. describe the etiology, epidemiology, and signs and symptoms of rheumatoid arthritis.
3. discuss the immunologic manifestations and diagnostic evaluation of rheumatoid arthritis.

4. briefly describe juvenile rheumatoid arthritis.
5. explain diagnostic procedures used in the identification and evaluation of rheumatoid arthritis.

Chapter 25

1. identify and describe the histocompatibility antigens.
2. explain the clinical applications of histocompatibility antigens and human leukocyte antigens.
3. name and describe the five goals of pre-transplantation screening.
4. name three types of stem cell transplants.
5. discuss the laboratory evaluation of patients and donors for transplantation.
6. explain the etiology, epidemiology, signs and symptoms, manifestations, diagnosis, and prevention of graft-versus-host disease.

Chapter 26

1. compare the characteristics of benign and malignant tumors.
2. describe the epidemiology of cancer in adults and children.
3. explain the characteristics of the three major causative factors in human cancer.
4. compare the stages of carcinogenesis.
5. identify and discuss the characteristics of tumor markers.
6. discuss what's new in cancer diagnostic testing.

Lab:

Materials Covered:

1. In order to perform and report the Rheumatoid Factor test properly, the student must be able to:
 - g. Follows the directions accurately.
 - h. Recognize when test results are falsely positive or falsely neg.
 - i. Interpret test results as to what the results mean for the patient.
 - j. Identify potential sources of error of the test.
 - k. Resolve discrepancies.
 - l. Provide justification for the ordering of the test.

Week 15

Lecture

Materials Covered: Immunology & Serology in Laboratory Medicine, Turgeon
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:

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 an **online/hybrid** 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