



# **INSTRUCTIONAL PACKAGE**

MLT 131  
Clinical Chemistry

Effective Term  
Fall 2023/Spring 2024/Summer 2024

# INSTRUCTIONAL PACKAGE

## Part I: Course Information

Effective Term: Spring 2024

COURSE PREFIX: MLT 131

COURSE TITLE: Clinical Chemistry

CONTACT HOURS: 3 hours

CREDIT HOURS: 3 hours

### **RATIONALE FOR THE COURSE:**

This course focuses on the study of nutritional, functional and excretional chemicals in blood and body fluids, including testing techniques and clinical significance.

### **COURSE DESCRIPTION:**

This course focuses on the study of nutritional, functional and excretional chemicals in blood and body fluids, including testing techniques and clinical significance.

### **PREREQUISITES/CO-REQUISITES:**

NOTE: Co-Req MLT 210, MLT 115, 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.

### **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\*:

1. Compare and contrast the types of glassware and plasticware.
2. Define molarity and mole and perform the calculations needed for preparing and working with molar solutions.
3. Categorize examples of preanalytical, analytical and post analytical parts of the Clinical Chemistry testing process.
4. Describe the relationships among wavelength, frequency, energy, and color of the ultraviolet and visible spectra. Discuss the goals of automating clinical chemistry tests.
5. Describe the four levels of an enzyme.
6. Describe the role laboratory tests play in confirming or ruling out a diagnosis.
7. Discuss laboratory findings in compensated respiratory acidosis and alkalosis and in metabolic acidosis and alkalosis.

#### Week 1

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 1

1. Describe the types of centrifuges used in the laboratory.
2. Define g/dL and mg/dL units and perform calculations necessary to prepare solutions of a desired g/dL and mg/dL concentration.

#### Chapter 3

1. Describe the properties of Light
2. Describe the principle of each of the following methodologies:
  - a. Spectrophotometry
  - b. Fluorometry
  - c. Luminometry
  - d. Nephelometry and Turbidimetry
  - e. Electrochemistry and Chemical Sensors
  - f. Chromatography
  - g. Mass Spectrometry

#### Week 2

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 7

1. Discuss the purpose of preventive maintenance.
2. Discuss the purpose of service contracts.
3. Discuss the purpose of troubleshooting.

4. Describe how purchasing and inventory contribute to the laboratory's QMS.

### Week 3

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 8

1. Describe the four levels of an enzyme.
2. Describe why enzyme reactions do not require standards or use a standard curve to determine concentrations of unknowns.

### Week 4

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 15

1. Identify the 20 common amino acids.
2. Describe a peptide bond.
3. Compare and contrast the four levels of structure of a protein.

### Week 5

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 13

1. Describe the purpose of measuring blood gases and pH.
2. Describe how gases are exchanged in the body.
3. Interpret the interrelation between  $p\text{CO}_2$ , pH, and  $\text{HCO}_3^-$ .

### Week 6

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 19

1. Identify the main structures in the respiratory tract.
2. Illustrate gas exchange in the lungs.
3. Compare and contrast breathing and respiration.
4. State the reference ranges for pH and for the partial pressures of carbon dioxide ( $p\text{CO}_2$ ) and oxygen ( $p\text{O}_2$ ).

### Week 7

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 16

1. Define the terms cancer, benign, and malignant.

2. Describe the classifications of tumors.
3. Describe the mechanisms that produce cancer.
4. Describe metastases and the types of cancers that most frequently produce them.
5. Describe the grading and staging systems for cancerous tumors.

## Week 8

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

### Chapter 17

1. Describe how fatty acids are broken down.
2. Evaluate the role of fatty acids in ketone formation.
3. Describe the structure of triglycerides and their importance.
4. Describe the function of phospholipids, sterols, sphingolipids, and cholesterol.
5. Compare and contrast the structure, function, and importance of chylomicrons, VLDL, LDL, IDL, and HDL.

## Week 9

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

### Chapter 18

1. Define myocardial infarction and list the contributing factors.
2. Compare and contrast the blood tests and other tests used for detection of myocardial infarction.
3. Describe the disease processes associated with congestive heart failure.
4. Discuss and evaluate the tests used to diagnose congestive heart failure.

## Week 10

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

### Chapter 20

1. Identify the primary and secondary organs of the gastrointestinal system.
2. Describe the digestive process.
3. Explain the physiology of the gastrointestinal system, including carbohydrate digestion, protein digestion, and lipid digestion.
4. Compare the various tests for identifying *Helicobacter pylori* infection and how *H. pylori* infection is associated with gastric and duodenal ulcers.

## Week 11

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

### Chapter 21

1. List the anatomy of the liver and the biliary system.
2. Discuss the liver's role in the metabolism of carbohydrates, proteins, and lipids.
3. Explain the liver's role in the excretion of metabolic products such as ammonia and urea.
4. Discuss the major functions of the liver including synthesis of proteins, bile, and coagulation factors; detoxification and metabolism of porphyrins; and storage of various compounds.

#### Week 12

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 22

1. Contrast Type 1 and Type 2 Diabetes.
2. Discuss various methods of glucose testing.

#### Week 13

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 11

1. Describe the defense mechanisms used by the body maintain health.
2. Describe the inflammatory process.
3. Differentiate the roles of the complement, clotting, and kinin systems in the inflammatory process.

#### Week 14

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

#### Chapter 12

1. Describe the two body water compartments.
2. List the common cations and anions in the body.
3. Evaluate the anion gap.

#### Week 15

Materials Covered: Clinical Chemistry: Fundamentals and Laboratory Techniques, Larson

Final Exam Review

***\*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	60%
Homework Assignments	5%
In class quizzes	10%
Final Exam	25%
	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](mailto:sstc@hgtc.edu) or self-schedule in the Penji iOS/Android app or at [www.penjiapp.com](http://www.penjiapp.com). Email [sstc@hgtc.edu](mailto: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](mailto: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](mailto:Jacquelyne.Snyder@hgtc.edu)