

**Common Course Outline**  
**CHEM 223**  
**Medical Laboratory Techniques IV:**  
**Introduction to Clinical Chemistry and Urinalysis**  
2 Credits

**The Community College of Baltimore County**

**Description**

**Medical Laboratory Techniques IV**

Introduction to Clinical Chemistry and Urinalysis

Provides preparation for internships (MLTC 240, 241) in a Clinical Chemistry lab; includes human chemistry in health, physiological changes in disease states, and routine diagnostic tests done in a laboratory.

2 lecture hours a week

Prerequisites; CHEM 146, CHEM 147, MATH 135, MLTC 101, Hepatitis B vaccination; CHEM 225 must be taken concurrently. (Offered Fall, Friday only).

**Overall Course Objectives**

Upon completion of this course, students will be able to:

1. Describe principles of commonly encountered clinical chemistry instruments.
2. Identify appropriate specimen collection techniques, specimen processing transportation requirements for selected chemistry determinations.
3. State chemistry laboratory safety principles and procedures.
4. Perform and interpret quality control procedures & calculations.
5. Plot and interpret standard curves.
6. Correlate patient condition and symptoms with clinical results.
7. Identify normal, abnormal and panic values for BUN, glucose, and electrolytes.
8. Calculate dilution, molarity, and normality problems.
9. Describe assay methodologies with respect to analytical principles, clinical correlations, reagents, calculations, & any special handling requirements for the following broad categories:
  - proteins & amino acids
  - enzymes
  - electrolytes
  - carbohydrates
  - hormones
  - lipids & lipoproteins
  - non protein nitrogen compounds
  - acid-base balance

porphyrins/hemoglobin/myoglobin

10. Explain test principles, interpret results, & correlate patient status with a toxicology test and therapeutic drug monitoring test.
11. Participate in a tour of a clinical chemistry laboratory to observe workflow and types of current instrumentation in use.
12. Characterize body fluids with respect to source, laboratory analyses routinely performed, normal and abnormal test results and clinical significance of test results.
13. Explain chemical theories used to formulate urine strips
14. Relate abnormal urinalysis results (chemical, physical, or microscopic) to disease states.

**Major Topics**

|   |                                 |
|---|---------------------------------|
| Quality Control & Statistics            | Blood Gases, pH, Buffer systems |
| Analytical Techniques & Instrumentation | Liver Function                  |
| Amino Acids & Proteins                  | Endocrinology                   |
| Enzymes                                 | Cardiac Function                |
| Carbohydrates                           | Renal Function                  |
| Lipids & Lipoproteins                   | Pancreatic Function             |
| Nonprotein Nitrogen                     | Body Fluid Analysis             |
| Porphyrins & Hemoglobin                 | Toxicology                      |
| Electrolytes                            | Urinalysis                      |

**Course Requirements**

Students are expected to participate in a group project that involves viewing a video on automated lab instruments & reporting to the class, plus a written research paper based on a current journal article. There will be 3 unit exams and a comprehensive final examination.

**Other Course Information**

Prior to beginning any lab exercises, students are required to present proof of current health insurance and hepatitis B vaccination certificate or waiver.