

**J. Sargeant Reynolds Community College
Course Content Summary**

Course Prefix and Number: MDL 262

Credits: 4

Course Title: Clinical Chemistry and Instrumentation II

Course Description: Introduces methods of performing biochemical analysis of clinical specimens. Teaches instrumentation involved in a clinical chemistry laboratory, quality control, and the ability to recognize technical problems. Prerequisites or Co-requisites: MDL 101 and CHM 101 or CHM 111. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose: Provides theory and techniques required to perform chemistry and immunochemistry testing in an automated laboratory. Theory includes background on test methods, application, automation, and the clinical significance of the results as they relate to disease states. Each major organ system is studied, as well as the tests that are specific for that organ system. This course also focuses on quality control--what it is and how it is used in the laboratory. Significant laboratory time is used to familiarize students with working in a chemistry lab, as well as troubleshooting problems within a chemistry laboratory.

Course Prerequisites and Co-requisites:

Prerequisites or Co-requisites: MDL 101 and CHM 101 or CHM 111

Student Learning Outcomes:

Upon completing the course, the student will be able to

- a. Function as a student medical laboratory technician in a clinical laboratory. The student will possess a basic knowledge of QA, QC, QI, specimen collection, specimen processing, and specimen analysis;
- b. To explain the reference range for important chemical analytes and use that information to make decisions about the correct handling of patient results;
- c. To utilize knowledge of body system function to help interpret the analytical results and how they relate to the patient's condition or treatment;
- d. Discuss the following substances in terms of chemical characteristics, normal and abnormal physiology, clinical significance, and test procedures:
 1. Carbohydrates
 2. Lipids
 3. Non-protein nitrogenous compounds
 4. Proteins
 5. Enzymes
 6. Electrolytes
 7. Blood gases and blood pH
 8. Cardiac markers
- e. Describe the appropriate use of laboratory equipment to include: glassware, pipets, centrifuges, and be able to use this knowledge to accurately perform dilutions on chemical analytes;
- f. Discuss common methods of analysis and their use in the laboratory and in automation; and
- g. Discuss therapeutic drug monitoring and toxicology and its use in the clinical laboratory.

Major Topics to Be Included:

- a. Basic principles and practice
- b. Quality assessment/laboratory procedures
- c. Laboratory techniques and instrumentation
- d. Diabetes and other carbohydrate disorders
- e. Hemoglobin production disorders and testing
- f. Assessment of renal function
- g. Assessment of liver function
- h. Assessment of cardiovascular disorders
- i. Assessment of respiratory disorders
- j. Assessment of nutrition and digestive function
- k. Endocrine disorders and function
- l. Reproductive endocrinology and fetal testing
- m. Malignancy disorders and testing
- n. Therapeutic drug monitoring and toxicology

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