



South Central College

MDLT 2817 Chemistry I

Course Outcome Summary

Course Information

Description	This course covers the analysis of chemical constituents of plasma, serum, urine, and other body fluids. Emphasis is placed on physiology, methodology, and clinical significance of carbohydrate metabolism, proteins, enzymes, lipids, renal function, non-protein nitrogen, electrolytes, and porphyrins. Accuracy in performance, quality control, and laboratory safety is stressed.
Total Credits	4
Total Hours	80

Types of Instruction

Instruction Type	Credits/Hours
Lecture	3/48
Lab	1/32

Pre/Corequisites

MDLT 1810 may also be taken concurrently or with Program Director permission

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Practice laboratory safety.

Learning Objectives

Discuss safety awareness for clinical laboratory personnel.

Choose appropriate personal protective equipment when working in the laboratory.

Identify hazards found in a laboratory setting that are related to chemical, biologic, and radiologic materials.

Select the appropriate means for the disposal of waste generated in the laboratory.

Outline the steps required in documentation of an accident in the laboratory.

2. Describe the basic principles of instructor-selected clinical chemistry testing methods/techniques used in the clinical chemistry laboratory.

Learning Objectives

Discuss existing clinical applications of clinical chemistry testing methods/techniques determined by the instructor.
Compare and contrast clinical chemistry testing methods/techniques determined by the instructor.
Explain Beer's Law.

3. Discuss the types of clinical chemistry testing methods/techniques used in the diagnosis of clinical diseases/disorders. This is at the instructor's discretion.

Learning Objectives

Compare and contrast clinical chemistry testing methods/techniques determined by the instructor.
Discuss the principals of spectrophotometry.

4. Interpret and report patient outcomes using clinical chemistry testing methods/techniques.

Learning Objectives

Evaluate and interpret patient results per predetermined criteria.

5. Demonstrate standard quality assurance practices to ensure quality patient outcomes.

Learning Objectives

Explain the basic concepts of total quality management, including quality assurance (QA) and quality control (QC).
Calculate, interpret, and graph quality control measurements.
Apply appropriate corrective measurements to quality control errors.
Identify and discuss statistical quality assurance errors.

6. Calculate mathematical problems related to testing methods/techniques found in the clinical chemistry laboratory.

Learning Objectives

Define mathematical terms selected by the instructor.
Calculate mathematical problems selected by the instructor.

7. Discuss the general characteristics, structure and properties, and clinical significance of amino acids and proteins.

Learning Objectives

Describe the structures and properties of amino acids and proteins.
Outline protein synthesis and catabolism.
Briefly discuss the function and clinical significance of the following proteins: prealbumin, albumin, alpha-1-antitrypsin, alpha-fetoprotein, haptoglobin, ceruloplasmin, transferrin, fibrinogen, C-reactive protein, immunoglobulins, and troponin.
Discuss at least five general causes of abnormal serum protein concentrations.
Briefly explain the principle and clinical usage of separation of proteins by: electrophoresis, high-resolution electrophoresis, and isoelectric focusing.
Discuss the general characteristics of the aminoacidopathies, including metabolic defect in each.

8. Discuss the general characteristics, structure and properties, and clinical significance of the major enzymes of the body.

Learning Objectives

Describe the structures and properties of enzymes.
Briefly discuss the function and clinical significance of the major enzymes of the body.
Classify the major enzymes according to the International Union of Biochemistry (IUB).
Discuss which enzymes are useful in the diagnosis of cardiac disorders, hepatic disorders, bone disorders, muscle disorders, malignancies, and acute pancreatitis.
Discuss the tissue sources, diagnostic significance, and assays, including sources of error, for the following enzymes: CK, LD, AST, ALT, ALP, ACP, GGT, Amylase, Lipase and G-6-PD.
Evaluate patient serum enzyme levels in relation to disease states. Explain why the measurement of serum enzyme levels is clinically useful.

- 9. Discuss the general role of carbohydrates within the body, their general description, classification, regulation, and laboratory measurement.**

Learning Objectives

Classify carbohydrates into their respective groups.
List the hormones involved in the regulation of glucose levels.
Discuss the different types of diabetes found and their major characteristics.
List the criteria for diagnosis of diabetes.
List methods of glucose measurement.

- 10. Discuss the general role of lipids/lipoproteins within the body, their general description, reference ranges, regulation, and types of abnormalities.**

Learning Objectives

Explain lipid/lipoprotein physiology and metabolism.
Define terminology related to lipids/lipoproteins.
Identify reference ranges for the major lipids/lipoproteins discussed.
Discuss the various types of lipid/lipoprotein abnormalities.
Relate the clinical significance of lipid and lipoprotein values in the assessment of abnormalities.

- 11. Discuss the basic anatomy and physiology of the renal system, including major disorders and the laboratory assessment and correlation of renal diseases.**

Learning Objectives

Define terminology related to the renal system.
Describe the anatomy of the renal system.
Discuss the basic physiologic functions of the renal system.
Discuss major disorders of the renal system.
Discuss and correlate basic laboratory assessment of the renal system.
Discuss common treatments of renal disorders.

- 12. Discuss the general role of non-protein nitrogens (NPN) within the body, their general biochemistry, and disease correlation.**

Learning Objectives

Define terminology related to non-protein nitrogens (NPN).
Identify reference ranges for the major NPN discussed.
Briefly discuss the function and clinical significance of the major NPN of the body.
Discuss the various types of NPN abnormalities.

- 13. Discuss the general role of the major electrolytes within the body, their clinical significance, reference ranges, regulation, and types of abnormalities associated with each.**

Learning Objectives

Define terminology related to the electrolytes.
Briefly discuss the role and clinical significance of the major electrolytes found within the body.
Discuss the various types of abnormalities associated with the major electrolytes found within the body.
Briefly discuss the function and clinical significance of the major electrolytes of the body.
Identify reference ranges for the major electrolytes discussed.

- 14. Discuss the general role of porphyrin and hemoglobin (hgb) within the body, their general structure, clinical significance and disease correlation.**

Learning Objectives

Define terminology related to the porphyrias and hemoglobin.
Briefly discuss the role and clinical significance of the porphyrias and hemoglobin found within the body.
Discuss the various types of hemoglobin abnormalities including the hemoglobinopathies and thalassemias.
Discuss synthesis and degradation of hemoglobin.
List the types of hemoglobin that comprise normal adult hemoglobin, include globin chain types and approximate percentages of each.
Explain the role of myoglobin in the body.

SCC Accessibility Statement

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: www.southcentral.edu/disability

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