



Course Number and Title: MLT 221 Clinical Chemistry II

Campus Location:

Georgetown

Effective Date:

2019-51

Prerequisite:

MLT 220

Co-Requisites:

None

Course Credits and Hours:

4.00 credits

3.00 lecture hours/week

3.00 lab hours/week

Course Description:

This course covers the qualitative and quantitative measurement of biochemical constituents in body fluids and their significance to disease. Topics include the study of the liver and biliary system, enzymology, endocrinology, toxicology, and special testing. Laboratory exercises incorporate sample collection and preparation, safety, quality control, and instrumentation.

Required Text(s):

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

Additional Materials:

Lab coat, permanent marker and gloves

Schedule Type:

Classroom Course

Disclaimer:

None

Core Course Performance Objectives (CCPOs):

1. Explain how clinical chemistry analytes correlate with various diseases and conditions associated with various anatomy and physiology systems. (CCC 2, 5, 6; PGC 6)
2. Identify, describe, and collect the types of samples used in clinical chemistry, and identify the variables that can adversely affect laboratory results. (CCC 2, 5; PGC 1, 2, 6)
3. Perform testing of analytes using a variety of methods to include both manual and automated methods. (CCC 1, 2, 6; PGC 1, 2, 3, 4, 5)
4. Evaluate laboratory data using a multirule system for quality control (QC) after calculating statistics. (CCC 6; PGC 3)
5. Discuss the scientific principles, test methodologies, and proper use of instrumentation in the clinical chemistry laboratory. (CCC 2, 5; PGC 1, 2, 3, 4, 5, 6)
6. Determine proper safety measures to use for various situations in the clinical chemistry laboratory. (CCC 1, 2, 3; PGC 5)
7. Use medical terminology and abbreviations in the proper context. (CCC 1; PGC 7)
8. Calculate laboratory values and test results with various formulas using both patient and hypothetical data. (CCC 6; PGC 4)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

Measurable Performance Objectives (MPOs):

Upon completion of this course, the student will:

1. Explain how clinical chemistry analytes correlate with various diseases and conditions associated with various anatomy and physiology systems.
 1. Describe the clinical significance of laboratory tests such as cholesterol, lipids, lipoproteins, total protein, albumin, globulin, triglycerides, bilirubin, urobilinogen, and liver function tests, and correlate the findings with diseases and conditions that affect the liver and biliary system.
 2. Describe the clinical significance of laboratory tests such as amylase, lipase, ketones, sweat chloride, and glucose, and correlate the findings with diseases and conditions that affect the pancreas and intestines.

3. Describe the clinical significance of laboratory tests for thyroid and reproductive function, and correlate the findings with the diseases and conditions that affect the endocrine system.
 4. Describe the clinical significance of laboratory tests to include lactate dehydrogenase (LDH), creatine kinase (CK), creatine kinase myocardial band (CKMB), myoglobin, and troponins, and correlate the findings with the diseases and conditions that affect the cardiac system.
 5. Describe the clinical significance of laboratory tests such as urea nitrogen and creatinine, and correlate the findings with the diseases and conditions that affect the urinary system.
 6. Describe the clinical significance of arterial blood gas test results, and correlate the findings with diseases and conditions that affect the human body.
2. Identify, describe, and collect the types of samples used in clinical chemistry, and identify the variables that can adversely affect laboratory results.
 1. Explain the source, composition, and normal appearance of different specimens used in the clinical chemistry laboratory: serum, plasma, urine, cerebrospinal fluid (CSF), synovial fluid, amniotic fluid, pleural fluid, peritoneal fluid, pericardial fluid, and semen.
 2. Describe how specimen handling affects quality assurance.
 3. Describe the type of specimen needed to obtain optimal results when a specific procedure is requested, and determine when to refuse a specimen.
 4. Describe how specimen integrity can affect laboratory results.
 5. Identify the proper use of sample collection devices used in the laboratory.
 6. Perform specimen collection for both urine and blood samples.
 3. Perform testing of analytes using a variety of methods to include both manual and automated methods.
 1. Prepare the necessary reagents or instrumentation for the stated procedures.
 2. Describe the methodology of stated procedures, sources of error, and clinical applications of the procedure.
 3. State the normal values for the parameters measured in the stated procedures.
 4. Perform chemical analysis of liver function, cholesterol, pancreatic enzymes, intestinal enzymes, therapeutic drugs, cardiac enzymes, and proteins using automated methods within acceptable limits.
 5. Perform human chorionic gonadotropin (HCG) and ketone testing on both urine and serum.
 4. Evaluate laboratory data using a multirule system for quality control (QC) after calculating statistics.
 1. List and explain essential analytical and nonanalytical factors in quality control.
 2. Name the functions of a quality control program.
 3. Describe statistical terms and the use of quality control charts.
 4. Explain the types of changes that can be observed in quality control charts.
 5. Perform and document quality control for manual procedures.
 6. Perform and document quality control for automated procedures.
 7. Analyze data to determine if testing data is acceptable.
 5. Discuss the scientific principles, test methodologies, and proper use of instrumentation in the clinical chemistry laboratory.
 1. Describe the principles used for chemical testing for liver function.
 2. Describe the principles used for chemical testing of blood samples for pancreatic and intestinal function.
 3. Describe the principles used for chemical testing of blood samples for cardiac function.
 4. Describe the principles used for chemical testing of blood samples for thyroid and endocrine function.
 5. Describe the principles used in therapeutic drug monitoring.
 6. Describe the principles used in screening for drugs of abuse.
 7. Describe the basic principles used in operating a centrifuge and spectrophotometer.
 8. Describe basic principles in operating an automated chemistry analyzer.
 6. Determine proper safety measures to use for various situations in the clinical chemistry laboratory.
 1. Describe essential safety practices used in the clinical chemistry laboratory.
 2. Name the components of the personal protective equipment standard.
 3. Demonstrate proper use of personal protective equipment in the clinical chemistry laboratory.
 4. Use standard precautions in the clinical chemistry laboratory.
 5. Use a centrifuge properly.
 6. Use a spectrophotometer.
 7. Use an automated chemistry analyzer.
 7. Use medical terminology and abbreviations in the proper context.
 1. List the common terms encountered in clinical chemistry, and use them in proper context.
 2. Recognize common abbreviations associated with clinical chemistry, and tell what they represent.
 8. Calculate laboratory values and test results with various formulas using both patient and hypothetical data.
 1. Calculate albumin/globulin albumin/globulin (A/G) ratio for serum proteins.
 2. Calculate BUN/Creatinine (B/C) ratio for renal function.
 3. Calculate creatinine clearance.

Evaluation Criteria/Policies:

Students must demonstrate proficiency on all CCPOs at a minimal 75 percent level to successfully complete the course. The grade will be determined using the Delaware Tech grading system:

92	-	100	=	A
83	-	91	=	B
75	-	82	=	C
0	-	74	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

Final Course Grade:

Calculated using the following weighted average

Evaluation Measure	Percentage of final grade
Summative: Case studies – (15-25) (equally weighted)	6.5%
Summative - Tests – (7-10) (equally weighted)	45.5%
Formative: Homework Assignments/lecture quizzes – (equally weighted)	13%
Summative: Lab exercises	17.5%
Summative: Practical – (5-10) (equally weighted)	17.5%
TOTAL	100%

Core Curriculum Competencies (CCCs are the competencies every graduate will develop):

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):**AHTAASMLT**

1. Collect, process, and analyze biological specimens and other related substances.
2. Recognize factors that affect procedures and results, and take appropriate actions within predetermined limits when corrections are indicated.
3. Perform and monitor quality control within predetermined limits.
4. Apply basic scientific principles for application in medical laboratory procedures and methodologies.
5. Employ safety principles according to health and environmental regulations.
6. Correlate laboratory results with common disease processes and treatments for diagnosis.
7. Demonstrate professional conduct and interpersonal communication skills with patients, laboratory personnel, other healthcare personnel, and the public.

Disabilities Support Statement:

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.