

Clinical Laboratory Sciences (CL_L_S)

CL_L_S 1000: Orientation to Clinical Laboratory Science

The class is designed to give prospective Clinical Laboratory Science students clinical experience in the field of Clinical Laboratory Science. Graded on S/U basis only.

Credit Hour: 1

CL_L_S 3000: Introduction to Immunology for Medical Laboratory Science

This course offers an in-depth exploration of immunology tailored for students pursuing degrees in Clinical Laboratory Science/ Medical Laboratory Science. It covers essential principles, including innate and adaptive immunity, antigen recognition by T and B cells, lymphocyte development, antibody functions, and cell-mediated immune responses. The course also addresses immunological disorders such as autoimmunity and allergies, vaccination principles, and emerging immunotherapy approaches for cancer and autoimmune diseases. Designed to meet the specific needs of students preparing for careers in medical laboratory science, this course equips learners with a robust understanding of immunological concepts crucial for advanced studies and clinical practice. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: BIO_SC 1010 or BIO_SC 1030 or BIO_SC 1500 or BIO_SC 2300 or Instructor consent required

CL_L_S 4001: Topics in Medical Laboratory Science

Topical study in any area of medical laboratory science and/or development of new content area. Graded on A-F basis only.

Credit Hour: 1-6

CL_L_S 4407: Clinical Laboratory Operations

This course provides a basic introduction to the theory, practical application, technical performance and evaluation of laboratory skills specific to the practice of clinical laboratory science. Laboratory safety; microscopy; pipetting; general laboratory equipment; quality control; mathematics; phlebotomy; pre-analytic, analytic and post-analytic processes, including specimen collection, processing and transport to maintain test result integrity, will be addressed. Graded on A-F basis only.

Credit Hours: 2

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4408: Introduction to Clinical Hematology

This course introduces the theory, practical application, technical performance and evaluation of hematological and hemostasis

procedures. Correlation of laboratory data with the diagnosis of erythrocyte, leukocyte and bleeding/clotting disorders will be introduced. Graded on A-F basis only.

Credit Hours: 2

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4409: Introduction to Clinical Microbiology

This course introduces the theory, practical application, technical performance and evaluation of procedures for isolation, identification and susceptibility testing of infectious disease organisms in humans. The course primarily focuses on bacteriology, but will include introductory coverage of parasitology, mycology and virology. Graded on A-F basis only.

Credit Hours: 2

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4410: Introduction to Clinical Chemistry and Urinalysis

This course introduces the theory, practical application, technical performance and evaluation of basic laboratory skills and methods in clinical chemistry and urinalysis. The course focuses on the correlation of laboratory data with the diagnosis of renal conditions, but will include introductory coverage of carbohydrate, liver and protein conditions, as well as enzymes. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4411: Introduction to Clinical Immunohematology

This course introduces the theory, practical application, technical performance and evaluation of immunohematology procedures required to provide compatible blood components for transfusion. Methods for collection, processing, storage and transfusion of blood and blood components will be presented. Immunohematology procedures that assist in the diagnosis and management of hemolytic conditions will be introduced. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4412: Clinical Laboratory Science Theory, Application and Correlation

Application, evaluation and correlation of laboratory procedures used in the diagnosis and treatment of common disease states. Opportunities for building critical thinking, problem solving, and leadership skills are provided in small group clinical case discussions. Course may be repeated for credit. Graded on A-F basis only.

Credit Hours: 5

Prerequisites: departmental consent, accepted in into the Medical Technology Program

CL_L_S 4413: Clinical Endocrinology and Toxicology

This course introduces the theory, practical application, and evaluation of clinical chemistry laboratory procedures. Correlation of clinical laboratory data with the diagnosis and treatment of endocrine disorders, toxicology disturbances and therapeutic drug monitoring is emphasized. Graded on A-F basis only.

Credit Hour: 1**Prerequisites:** Restricted to Clinical Laboratory Students only**CL_L_S 4414: Clinical Chemistry and Urinalysis I**

This course expands on the theory, practical application, and evaluation of basic laboratory procedures introduced in CL_L_S 4407 Clinical Laboratory Operations and CL_L_S 4410 Introduction to Clinical Chemistry and Urinalysis, with an emphasis on common automated methodologies used in clinical chemistry and urinalysis laboratories. This course will focus on the interpretation, evaluation and correlation of clinical laboratory data with the diagnosis and treatment monitoring of carbohydrate, renal, hepatic, protein, cardiac, lipid/lipoprotein, major and minor electrolyte, enzyme, pancreatic-gastrointestinal and acid-base disorders. May be repeated for credit. Graded on A-F basis only.

Credit Hours: 2**Prerequisites:** Clinical Lab Sci (Medical Technology) Program students only**CL_L_S 4415: Clinical Chemistry and Urinalysis II**

This course expands on the theory, practical application, and evaluation of laboratory procedures introduced in CL_L_S 4414 Clinical Chemistry and Urinalysis I and CL_L_S 4444 Clinical Core Laboratory Practical I. Correlation of clinical laboratory data with the diagnosis and treatment monitoring of carbohydrate, renal, hepatic, cardiac, lipid/lipoprotein, protein, major and minor electrolyte, trace element, enzyme, pancreatic-gastrointestinal and acid-base disorders; tumor markers; and inborn errors of metabolism is emphasized. Graded on A-F basis only.

Credit Hours: 2**Prerequisites:** Clinical Lab Sci (Medical Technology) Program students only**CL_L_S 4416: Clinical Hematology I**

Introduction to the theory, practical application, technical performance and evaluation of hematological and coagulation procedures. Emphasis on correlations of clinical laboratory data with the diagnosis and treatment of anemia, leukemia, and bleeding/clotting disorders. May be repeated for credit. Graded on A-F basis only.

Credit Hours: 2**Prerequisites:** departmental consent, accepted into the Medical Technology Program**CL_L_S 4417: Clinical Hematology II**

This course expands on the theory, practical application, and evaluation of hematological and hemostasis procedures introduced in CL_L_S 4416 Clinical Hematology I and CL_L_S 4444 Clinical Core Laboratory Practicum I, and includes the analysis of cerebrospinal, synovial and serous fluids. Correlation of clinical laboratory data with the diagnosis and treatment of erythrocyte, leukocyte and bleeding/clotting disorders will be emphasized. Graded on A-F basis only.

Credit Hours: 2**Prerequisites:** Clinical Lab Sci (Medical Technology) Program students only**CL_L_S 4418: Clinical Microbiology I**

This course includes the theory, practical application, and evaluation of immunological components and infection disease serology. The principles and methodologies used in the assessment of immunologically related disorders, including hypersensitivity reactions, autoimmune, Immunoproliferative, immunodeficient disorders and infectious disease are included. The course emphasizes the correlation of clinical laboratory data with the patient's diagnosis and treatment. The theory and application of molecular diagnostic tools, such as polymerase chain reaction (PCR), nucleic acid probes, and microarrays are also addressed. Graded on A-F basis only.

Credit Hours: 2**Prerequisites:** Clinical Lab Sci (Medical Technology) Program students only**CL_L_S 4419: Clinical Microbiology II**

This course builds on the theory, practical application and evaluation of the procedures for isolation, identification and susceptibility testing of infectious disease organisms in humans introduced in CL_L_S 4418 Clinical Microbiology I and CL_L_S 4448 Clinical Microbiology Laboratory Practicum I. This course includes bacteriology, mycology, parasitology, and virology content, and will emphasize the correlation of clinical laboratory data with the patient's diagnosis and treatment. Graded on A-F basis only.

Credit Hours: 2**Prerequisites:** Clinical Lab Sci (Medical Technology) Program students only**CL_L_S 4420: Clinical Immunology and Molecular Diagnostics**

This course includes the theory, practical application, and evaluation of immunological components and infection disease serology. The principles and methodologies used in the assessment of immunologically related disorders, including hypersensitivity reactions, autoimmune, Immunoproliferative, immunodeficient disorders and infectious disease are included. The course emphasizes the correlation of clinical laboratory data with the patient's diagnosis and treatment. The theory and application of molecular diagnostic tools, such as polymerase chain

reaction (PCR), nucleic acid probes, and microarrays are also addressed. Graded on A-F basis only.

Credit Hours: 2

Prerequisites: Clinical Lab Sci (Medical Technology) Program students only

CL_L_S 4422: Immunohematology I

Introduction to the theory, practical application, technical performance and evaluation of blood bank procedures required for transfusion of blood and blood components and for handling and storage of blood and blood components. May be repeated for credit. Graded on A/F basis only.

Credit Hours: 2

Prerequisites: departmental approval, accepted into the Medical Terminology Program

CL_L_S 4423: Clinical Immunohematology II

This course expands on the theory, practical application, and evaluation of immunohematology procedures presented in CL_L_S 4422 Clinical Immunohematology I and CL_L_S 4442 Clinical Immunohematology Laboratory Practicum I. There is an emphasis on the application of immunohematology procedures used for the resolution of complex immunohematology problems. Proper selection of immunohematology procedures that assist in the diagnosis and management of hemolytic conditions will be discussed. Concepts in patient blood management and the adverse effects of transfusion will be presented. Quality management as it applies to transfusion medicine will be addressed. Graded on A-F basis only.

Credit Hours: 2

Prerequisites: Clinical Lab Sci (Medical Technology) Program students only

CL_L_S 4424: Phlebotomy

Theory, practical application, technical performance and evaluation of procedures used in collecting, handling and processing blood specimens. May be repeated for credit. Graded on S/U basis only.

Credit Hour: 1

Prerequisites: departmental approval, accepted into the Medical Technology Program

CL_L_S 4426: Body Fluid Analysis

Theory, practical application, technical performance and evaluation of procedures used in the analysis of urine and other body fluids, including cerebrospinal, synovial, serous, seminal, amniotic and feces. May be repeated for credit. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: departmental consent, accepted into the Medical Technology Program

CL_L_S 4442: Clinical Immunohematology Laboratory Practicum I

This course provides practical application in a clinical laboratory setting for the technical performance and evaluation of clinical immunohematology procedures and preparation of blood components. Course content will include new skills and procedures, in addition to the skills and procedures presented in CL_L_S 4407 Clinical Laboratory Operations and CL_L_S 4411 Introduction to Clinical Immunohematology. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4443: Clinical Immunohematology Laboratory Practicum II

This course provides practical application in a clinical laboratory setting for the technical performance and evaluation of clinical immunohematology procedures and preparation of blood components. Course content will include new skills procedures, in addition to the skills and procedures presented in CL_L_S 4442 Clinical Immunohematology Laboratory Practicum I. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4444: Clinical Core Laboratory Practicum I

This course provides practical application in a clinical laboratory setting for the technical performance and evaluation of clinical hematology/ hemostasis, chemistry and urinalysis procedures. Course content will include new skills and procedures and the application of automation and automatic verification techniques, building on the skills and procedures presented in CL_L_S 4407 Clinical Laboratory Operations, CL_L_S 4408 Introduction to Clinical Hematology and CL_L_S 4410 Introduction to Clinical Chemistry and Urinalysis. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4445: Clinical Core Laboratory Practicum II

This course provides practical application in a clinical laboratory setting for the technical performance and evaluation of clinical hematology/ hemostasis, chemistry and urinalysis procedures. Course content will include new skills and procedures, in addition to the skills and procedures presented in CL_L_S 4444 Clinical Core Laboratory Practicum. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4448: Clinical Microbiology Laboratory Practicum I

This course provides practical application in a clinical laboratory setting for the technical performance and evaluation of clinical microbiology

procedures. Course content will include new skills and procedures, in addition to the skills and procedures presented in CL_L_S 4407 Clinical Laboratory Operations and CL_L_S 4409 Introduction to Clinical Microbiology. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4449: Clinical Microbiology Laboratory Practicum II

This course provides practical application in a clinical laboratory setting for the technical performance and evaluation of clinical microbiology procedures. Course content will include new skills and procedures, in addition to the skills and procedures presented in CL_L_S 4448 Clinical Microbiology Laboratory Practicum I. Graded on A-F basis only.

Credit Hour: 1

Prerequisites: Restricted to Clinical Laboratory Students only

CL_L_S 4970: Clinical Laboratory Management I

This course introduces the theory, practical application and evaluation of laboratory management principles in healthcare, including safety, research, educational methodology, quality control, ethics, laboratory operations, point-of-care testing, scope of practice, and the job application process. Opportunities for building critical thinking, problem-solving, research, communication, professionalism, management and leadership skills are provided. Graded on A-F basis only. May be repeated for credit.

Credit Hours: 2

Prerequisites: Clinical Lab Sci (Medical Technology) Program students only

CL_L_S 4980: Clinical Lab Management II

Continuation of Clinical Lab Management I. Theory, practical application, and evaluation of laboratory management principles and associated models in compliance and regulatory issues, human resource management, method evaluation, professionalism and laboratory quality. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: CL_L_S 4970 or departmental consent

CL_L_S 4980W: Clinical Lab Management II - Writing Intensive

Continuation of Clinical Lab Management I. Theory, practical application, and evaluation of laboratory management principles and associated models in compliance and regulatory issues, human resource management, method evaluation, professionalism and laboratory quality. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: CL_L_S 4970 or departmental consent

CL_L_S 8000: Current Trends in Clinical Laboratory Sciences

This course is designed to explore, through selected themes assigned by the instructor, current trends in clinical laboratory sciences in psychosocial, professional, educational, and technical areas. The organized study of a specific CLS topic will be conducted in a holistic manner. Emphasis given to focus areas in laboratory management and operations, hematology, microbiology, immunohematology, clinical chemistry/urinalysis, and ethics. Graded on A-F basis only.

Credit Hours: 3

CL_L_S 8110: Advanced Clinical Microbiology

Students will journey through a series of case studies showcasing resistant or multi-drug-resistant organisms (MDROs), explore disease states of aforementioned organisms, and observe how the deployment of Antimicrobial Stewardship is pivotal in combating the rise of antibiotic resistance. This course welcomes a diverse audience of medical professionals but has been designed for individuals with previous clinical laboratory education and/or experience, specifically those with a practicing knowledge of clinical microbiology. Graded on A-F basis only.

Credit Hours: 3

CL_L_S 8120: Advanced Clinical Chemistry

This course applies advanced laboratory concepts to the field of clinical chemistry. The course will explore new and emerging clinical chemistry testing, with an emphasis on evidence-based practice and method evaluation and validation. Clinical chemistry literature, cases studies, and advanced laboratory practice issues in the field of clinical chemistry will be used to enhance knowledge and skills. Graded on A-F basis only.

Credit Hours: 3

CL_L_S 8130: Advanced Clinical Hematology

Clinical hematology encompasses conditions that affect normal hematopoiesis, blood components, and hemostasis. This course focuses on an in-depth investigation of the pathophysiology of different hematologic complications and their correlation with the various laboratory tests performed for diagnosing, monitoring, and treatment. Topics covered in this course include disorders in iron kinetics, DNA synthesis, hemolytic anemias, hemoglobinopathies, myeloproliferative disorders, myelodysplastic syndromes, and bleeding and clotting disorders. This course will analyze research studies and case studies to enhance the comprehension of these conditions and the different testing suggestions. This course will also possess several multi-week assessments, such as developing diagnostic flow charts for various hematological disorders, creating grading scales for erythrocyte morphologies, and devising pathology review criteria. At last, every student will choose a patient case to showcase to the class as a grand round presentation. These assignments are to help solidify concepts discussed throughout the course and build critical thinking skills. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: Course enrollment is restricted to students who have been admitted to the MHS CDS CLS emphasis area program
