

MEDICAL LAB SCIENCES (MLSC)

MLSC 2110 Genetics & Molecular Diag. Lab

This laboratory provides the basic skills necessary for performing and applying molecular diagnostics. The course will focus on the specific applications of molecular techniques within a variety of disciplines encountered in the clinical laboratory.

Corequisites: MLSC 2310

MLSC 2152 Pathophysiology Lab

This course introduces the fields of hematology and urinalysis, and aligns the theory of disease processes learned in Pathophysiology lecture with the laboratory skills necessary for interpretation of disease states. Students will perform both manual and automated diagnostic tests using blood and urine to assist in the diagnosis of human disease and disorders.

Corequisites: MLSC 2352

MLSC 2301 Intro to Medical Lab Sci-WIN

Introduction to the clinical laboratory including careers available, the healthcare system, and laboratory testing. Tours of hospital/reference labs, guest speakers, and other opportunities may be arranged to support learning. The laboratory associated with this course is designed to introduce students to foundational skills and concepts basic to a career in medical laboratory science. This course is required of all Medical Laboratory Science majors and is opened to those having an interest in the program or career. Must be taken concurrently with MLSC 2001.

Prerequisites: BIOL 2302 and 2102 with a grade of "C" or better and CHEM 1412 with a grade of "C" or better, or department approval.

MLSC 2310 Genetics and Molecular Diagn

This course introduces students to the principles of human genetics through the lens of clinical diagnostic methods and applications. Genetics, including the rules of inheritance, transmission genetics, genes in populations, the molecular basis of gene structure, function, expression, evolution, and their diagnostic applications in the clinical laboratory will be discussed.

Prerequisites: MLSC 2301 with a grade of "C" or better or department approval.
Corequisites: MLSC 2110

MLSC 2352 Pathophysiology

Introduces fundamental mechanisms of disease and diagnostic processes pertinent to medical laboratory science. Students will explore pathophysiological principles including cell injury, hemostatic mechanisms, inflammation, immune responses, and hemodynamic disorders. Emphasis is placed on linking clinical laboratory data with disease states, understanding the etiology and progression of disease, and interpreting laboratory findings.

Prerequisites: MLSC 2301 with a grade of "C" or better or department approval.
Corequisites: MLSC 2152

MLSC 3151 Immunobiology Lab

This course will introduce students to the field of immunology. Students will explore fundamental concepts of immunology as applied to the field of serology and molecular biology with hands on learning experiences. The laboratory section of this course provides hands-on experience in the practical aspects of immunologic and serologic testing used for disease diagnosis. Students will develop proficiency in core laboratory techniques, interpret test results, and implement standard operating procedures for manual and automated immunological assays. Topics include immunoassay preparation, serologic detection of disease markers, troubleshooting, application of quality control, and adoption of laboratory safety practices.

Corequisites: MLSC 3351

MLSC 3154 Clinical Chemistry I Lab

This laboratory provides the basic skills necessary for performing clinical chemistry analyses on blood and body fluids using manual and automated methods. Several fundamental techniques and methods are utilized to help students grasp pre-analytical, analytical, and post analytical components as they pertain to the laboratory methods discussed in the accompanying lecture. Students will also practice laboratory math, quality control, and quality assurance procedures.

Corequisites: MLSC 3354

MLSC 3156 Hematology Lab

This course provides skills for the evaluation of erythrocytes, leukocytes, platelets, and hematologic diseases. Practical skills and the theoretical information on bone marrow morphology, peripheral blood morphology, and cytochemical testing protocols are discussed and practiced.

Corequisites: MLSC 3356

MLSC 3162 Clinical Chemistry II Lab

In this course, learners will connect biochemical principles learned in the accompanying lecture to diagnostic testing and patient care in clinical laboratory settings. This course addresses laboratory applications in chemical analysis of blood and body fluids with emphasis on spectrophotometric, electrophoresis, and immunoassay methods. Students will perform quality control testing, sample measurements, troubleshooting, maintenance, and correlation of data with possible disease states or analytical issues.

Corequisites: MLSC 3362

MLSC 3168 Immunohematology Lab

This laboratory course is designed to connect theory and skills for understanding and performing laboratory techniques in the blood bank, including testing methodologies. Laboratory procedures for screening and identification of blood group antigens and antibodies, compatibility testing, processing and selecting blood products, and quality assurance as it relates to clinical immunohematology will be explored.

Corequisites: MLSC 3268

MLSC 3257 Medical Bacteriology Lab

This laboratory courses develops and hones the basic skills and techniques necessary for the isolation, cultivation, identification, and antimicrobial susceptibility testing of medically important bacteria. Clinical examples will be used to illustrate concepts presented in class, allowing for correlation of pathogens and human disease.

Corequisites: MLSC 3357

MLSC 3266 Infectious Diseases Lab

This course provides an in-depth exploration of medically important fungi, parasites, and viruses, emphasizing laboratory methods for specimen collection, preservation, and analysis. Students will identify and differentiate microorganisms using contemporary microscopic, culture-based, and and/or molecular techniques. Through the integration of patient data and clinical findings, students will develop skills in diagnosing fungal, parasitic, and viral diseases, perform accurate specimen processing, and apply quality control in the microbiology laboratory.

Corequisites: MLSC 3366

MLSC 3268 Immunohematology

This course in an introduction the theoretical aspects of the immune response and its relationship to clinical immunohematology. Includes theory and practical applications of blood-group systems, antibody screen and identification, compatibility testing, hemolytic disease of the fetus and newborn, autoimmune hemolytic anemia, introduction to donor testing.

Prerequisites: MLSC 3351 and MLSC 3151 each with a grade of “C” or better, or department approval.

Corequisites: MLSC 3168

MLSC 3351 Immunobiology- WIN

This course introduces students to fundamental principles of immunology and its clinical applications. The course covers theoretical aspects of immune system physiology, hypersensitivity, autoimmunity, immunodeficiencies, tumor immunology, transplant medicine, and immunotherapy. Emphasis is placed on the use of immunologic, serologic, and molecular technologies for disease diagnosis, and on emerging concepts in immunobiology. Students will gain insights into both normal and dysfunctional immune responses, including current practices for diagnosing, monitoring, and treating immune-related diseases, with a focus on integrating immunology concepts across medical laboratory science disciplines.

Prerequisites: Admission into the Medical Laboratory Science Program or department approval.

Corequisites: MLSC 3151

MLSC 3354 Clinical Chemistry I

This course introduces the principles and practices of quality assurance and laboratory regulation, and pre-analytical, analytical, and post analytical components of clinical chemistry. Basic concepts, principles, and applications of laboratory mathematics, photometry, immunoassays, electrochemistry, and separation techniques are discussed.

Prerequisites: Admission into the Medical Laboratory Science program or department approval.

Corequisites: MLSC 3154

MLSC 3356 Hematology

This course is a basic study of the process of blood formation and function. It includes morphological and biochemical relationships of blood cells and examines erythropoiesis, leukopoiesis, thrombopoiesis, and hemoglobin metabolism in both healthy and. disease states. The pathophysiology of anemias, leukocyte dyscrasias and disorders, and platelet disorders including bone marrow activity, cell energetics, current testing and technology, and treatments will be introduced.

Prerequisites: MLSC 3351 and MLSC 3151 each with a grade of “C” or better or department approval.

Corequisites: MLSC 3156

MLSC 3357 Medical Bacteriology

This course covers the pathogenesis and epidemiology of pathogenic bacteria and provides a basic understanding of medical bacteriology including microbial physiology, genetics, metabolism, biochemical profiles, isolation and cultivation, identification, and antimicrobial susceptibility testing.

Prerequisites: Admission into the Medical Laboratory Science program or department approval.

Corequisites: MLSC 3257

MLSC 3362 Clinical Chemistry II

This clinical chemistry course explores the metabolism of proteins, carbohydrates, and lipids, with emphasis on the intersection of metabolic pathways and mechanisms of energy production and utilization. Students will study the structure, function, and clinical relevance of proteins, enzymes, amino acids, carbohydrates, lipids, non-protein nitrogen bases, electrolytes, and hormones, and examine how alterations in these biomolecules relate to disease states.

Prerequisites: MLSC 3354 and MLSC 3154 each with a grade of “C” or better, or department approval.

Corequisites: MLSC 3162

MLSC 3366 Infectious Diseases

This course covers the pathogenesis and the epidemiology of medically important fungi, parasites, and viruses. Principles and practices of mycology, parasitology, and virology will be explored including individual microorganism and their characteristics. Student will learn about host environments, pathogenesis, isolation, cultivation, identification, and treatment of medically important organisms.

Prerequisites: MLSC 3357 and MLSC 3257 each with a grade of “C” or better, or department approval.

Corequisites: MLSC 3266

MLSC 4271 Clinical Microbiology II

Practicum Course. Instruction and application of techniques in the clinical laboratory setting to develop entry-level competencies for the medical laboratory scientists. This course includes the principles and practices of quality control, pre- analytical, analytical, and post-analytical components of laboratory testing, safety, testing and interpretation of human samples in clinical microbiology and serology.

Prerequisites: Department approval.

MLSC 4272 Clinical Hematology II

Practicum Course. Instruction and application of techniques in the clinical laboratory setting to develop entry-level competencies for the medical laboratory scientists. This course includes the principles and practices of quality control, pre- analytical, analytical, and post-analytical components of laboratory testing, safety, testing and interpretation of human samples in clinical hematology and hemostasis.

Prerequisites: Department approval.

MLSC 4273 Clinical Biochemistry II

Practicum Course. Instruction and application of techniques in the clinical laboratory setting to develop entry-level competencies for the medical laboratory scientists. This course includes the principles and practices of quality control, pre- analytical, analytical, and post-analytical components of laboratory testing, safety, testing and interpretation of human samples in clinical chemistry.

Prerequisites: Department approval

MLSC 4274 Transfusion Medicine II

Practicum Course. Instruction and application of techniques in the clinical laboratory setting to develop entry-level competencies for the medical laboratory scientists. This course includes the principles and practices of quality control, pre-analytical, analytical, and post-analytical components of laboratory testing, safety, testing and interpretation of human samples in clinical immunohematology.

Prerequisites: Department approval.

MLSC 4275 Clinical Lab Mgmt & Operations

Introductory course in the principles and techniques used in the management and operation of the clinical laboratory. The course includes human resource management and interviewing, laboratory regulation and accreditation, federal and state agencies, financial management, laboratory quality improvement programs, education and professional development, research investigation, and ethical concerns.

Prerequisites: Department approval

MLSC 4280 MLS Seminar- WIN

The Senior Seminar represents a culminating course integrating the on-campus study of selected scientific disciplines with learning experiences during the clinical practicum in an affiliated healthcare facility. The seminar focuses on an interdisciplinary medical case study capstone project, the theory and practice of phlebotomy in a healthcare setting, clinical laboratory review topics, and mock certification exams.

Prerequisites: Department approval

MLSC 4460 Transfusion Medicine I

This lecture and laboratory will cover comprehensive theory and practical applications of blood bank test methods to provide compatible blood components for transfusion. These include the collection, processing, storage, and transfusion of blood and blood components, blood group systems, blood group immunology, physiology and pathophysiology, serology and molecular testing, and transfusion practice. The course will also introduce donor services for the procurement of blood and other blood components. Must be taken concurrently with MLSC 4060.

Prerequisites: MLSC 3268 and MLSC 3168 with a grade of "C" or better and department approval.

MLSC 4461 Clinical Microbiology I

This lecture and laboratory course strengthens the understanding and application of the diagnostic implications of clinical microbiology. Emphasis on the clinical correlation of medically important microorganisms, isolation, identification and antibiotic sensitivity testing, where appropriate, pathogenesis and pathophysiology of infectious disease, and epidemiology and quality assurance. Must be taken concurrently with MLSC 4061.

Prerequisites: MLSC 3366 and MLSC 3266 with a grade of "C" or better and department approval.

MLSC 4462 Clinical Biochemistry I

This lecture and laboratory course serves to provide students with comprehensive theoretical biochemistry information as applied to disease and entry-level practical skills expected in the planning, execution, delivery, problem solving, managing, quality assurance, and test interpretation associated with clinical chemistry testing found in major healthcare facilities. Emphasis on previous clinical chemistry learning as well as introduction to blood gases, toxicology, trace elements and vitamins, therapeutic drugs, misused drugs, and overall organ assessment for patient management. Must be taken concurrently with MLSC 4062.

Prerequisites: MLSC 3362 and MLSC 3162 with a grade of "C" or better and department approval.

MLSC 4463 Clinical Hematology I

This lecture and laboratory will cover comprehensive concepts in clinical hematology, including study of the production, function, and physiology of red and white blood cells, platelets, and bone marrow. Disorders of red and white blood cells, along with platelets will be explored. Students will use manual and automated hematological test methods to correlate laboratory results with hematology and clinical laboratory disciplines and apply quality control and assurance practices to understand patient care and disease management. Must be taken concurrently with MLSC 4063.

Prerequisites: MLSC 3356 and MLSC 3156 with a grade of C or better and department approval.