

MEDICAL LABORATORY SCIENCES

MLS 501 — Introduction to Lab Methods

Introduces terms, concepts, procedures, and equipment used in a professional laboratory. Topics of professional ethics and regulatory agencies; basic lab safety, lab equipment, and techniques; phlebotomy and specimen processing; quality control concepts; laboratory math; required documentation and retention policies; point of care testing, basic instrumentation, automation, and computerization in the laboratory. Lab experience in phlebotomy will be provided in the campus laboratory and the clinical setting.

3 credits

Hybrid

MLS 502 — Urinalysis & Bodily Fluids

This course will focus selected body fluids including urine, amniotic fluid, cerebrospinal fluid, pleural fluid, peritoneal fluid, pericardial fluid, and synovial fluid. Renal pathophysiology and the physical and chemical properties of urine and cellular elements of the urine in healthy and diseased states are studied. The formation, function, and analysis of cerebrospinal fluid and amniotic fluid will be presented and analyzed. The pathophysiology of pleural, peritoneal, and pericardial cavities will be presented. Focus is provided to the cellular and formed elements found in these body fluids. This course includes the performance of various laboratory procedures utilized in the analysis of each of these fluids. Case studies will be analyzed to incorporate synthesis of the content and ability to assess the laboratory results associated with various disease states. Laboratory applications of patient samples and quality control procedures are required.

3 credits

Hybrid

MLS 503 — Parasitology, Mycology and Virology

The disease mechanisms of blood, tissue and intestinal parasites will be studied with emphasis on general characteristics of parasitic infections, test methods, and treatments. The study of mycology, characteristics of medically important molds and fungi, as well as test methods are detailed. Virology, medically important viruses, transmission routes, and methods of testing will be addressed.

3 credits

OnLine

MLS 504 — Hematology & Coagulation I

This course is a study of the normal production, maturation, and function of erythrocytes, leukocytes, and platelets. Lectures on hematologic disorders involving red/white cells will be discussed with emphasis on the pathogenic mechanisms. Laboratory tests, along with correlation to common disease states will also be examined and performed. Normal hemostasis will be considered including pertinent laboratory tests used in diagnosis of coagulation problems. Students will be expected to analyze case studies, evaluate laboratory data, and compose written evaluation of the differential diagnosis through comparing or contrasting similar conditions, and suggest appropriate reflex testing to confirm diagnosis.

4 credits

Hybrid

MLS 505 — Clinical Chemistry I

Provides students with an opportunity for in-depth application and reinforcement of chemistry principles and techniques in a medical laboratory setting. Topics include carbohydrates, electrolytes and acid-base balance, nitrogenous compounds, enzymes and endocrinology, liver functions, lipids, therapeutic drugs and toxicology, automated chemistry routine, immunoassay, special chemistry tests, molecular diagnostics, recording accuracy, safety, and quality control. Students will review case studies, evaluate data, and compose written evaluations of the differential diagnosis by comparing and contrasting similar conditions. Laboratory experiences will be required to demonstrate competency and comprehension of techniques applicable to the study.

4 credits

Hybrid

MLS 506 — Immunohematology I

This course will provide the study of the major blood groups of humans including the red cell antigen systems, alloantibodies, and non-immune stimulated antibodies. Topics of focus will cover blood group systems, compatibility testing, transfusion reactions, and hemolytic disease of the fetus and newborn will be discussed. Learners will analyze and resolve complex case study scenarios, compile research data, and prepare and discuss presentations on specific blood group systems. Laboratory experiences will focus on type & screens, antibody panels, and resolving multiple antibody related panels.

4 credits

Hybrid

MLS 507 — Immunology, Serology, and Molecular Diagnostics I

This course discusses immunity, cell-mediated immune response, and antibody-mediated immune responses to immunogens. The cells, development, and role in human immune response will be discussed. Immunoglobulins, cytokines, and complement will be analyzed for role in immune responses. Common disorders of impaired immune function and infectious diseases will be discussed including autoimmunity, hypersensitivity, transplantation and tumor immunology, immunodeficiency, syphilis, infectious mononucleosis, COVID, and hepatitis. Laboratory exercises for disorders will be performed, analyzed, and compared to conditions for synthesis. Learners are expected to integrate the role of specific immune responses, current research findings, and the laboratory testing used in diagnosis and treatment of the specific condition.

4 credits

Hybrid

MLS 508 — Clinical Microbiology I

Lectures and laboratory experiences emphasize current medical laboratory procedures for the safe collection, culture, staining, identification, and control of microorganisms routinely encountered in a medical setting. This course includes a survey of gram positive and gram-negative organisms encountered in medical microbiology labs and includes laboratory exercises focusing on plate characteristics and biochemical identification of organisms.

4 credits

Hybrid

MLS 600 – Laboratory Management

Learners focus on general management and laboratory-specific management topics to include human resource management, organizational behavior, financial analysis, and compliance and regulatory issues. Reimbursement related issues, CPT coding, and analysis of financial decision-making regarding cost per test will be evaluated. Job specific skillsets, professional attributes of management, and interviewing will be assessed. Assignments and projects will show comprehension, synthesis, and application of the learner's ability to integrate these principles and topics in laboratory related scenarios.

3 credits
OnLine

MLS 601 – Research Methods

The purpose of this course is to introduce students to basic research methods in the medical Laboratory Science field, including familiarization with both quantitative and qualitative methods. Students will be introduced to topics on how to write a research proposal, and how to analyze quantitative and qualitative results.

2 credits
OnLine

MLS 603 – Trends & Topics in the News

Learners will explore trends, topics, managerial decision making and factors affecting the current lab scene. Case studies, articles, and collaborative projects are explored with encouragement to find alternative solutions.

4 credits
OnLine

MLS 604 – Advanced Hematology II

This online course will provide understanding, application principles and didactic reinforcement of hematology/coagulation principles and techniques. Evaluation of case studies involved in laboratory principles and procedures at a medical technologist level will require learners to critically think and employ troubleshooting methods to solve difficult cases. Topics include complete blood counts and differentials, routine and special blood tests, evaluation of data for leukemias, anemias, and sample acceptability; calibration and instrument to instrument comparisons; coagulation to disease states and critical levels; recording and evaluating accuracy, safety, and quality control, and management issues.

4 credits
OnLine

MLS 605 – Advanced Clinical Chemistry II

This online course provides an analysis and synthesis of chemistry related case studies as a reinforcement of chemistry principles and techniques in a medical laboratory job setting. The cases will require learners to apply concepts and techniques, coupled with previously learned theory to diagnose, troubleshoot, and correlate results to pathophysiologic disease states. Learners will evaluate data, apply knowledge, and compose and defend both orally and written cases through presentations and reports. Topics include carbohydrates, electrolytes and acid-base balance, nitrogenous compounds, enzymes and endocrinology, liver functions, lipids, therapeutic drugs and toxicology, automated chemistry routine and stat, immunoassay, special chemistry tests, molecular diagnostics, recording accuracy, safety, and quality control.

4 credits
OnLine

MLS 606 – Advanced Immunohematology II

This online course provides an analysis of difficult case studies through the application and reinforcement of immunohematology principles and techniques. Case study applications allow the learner to fully immerse them in topics of complicated transfusions, difficult antibody identifications using various biochemical methods to solve, transfusion related complications such as TRALI and TACO, inventory control, management of disease states, inventory control, records and reagent quality control, equipment and safety, and regulatory accrediting agency standards.

4 credits
OnLine

MLS 607 – Advanced Immunology/Molecular Diagnosis II

This online course emphasizes immunologic techniques in the serologic identification of antigens and antibodies. This course will employ a case study approach to solving difficult cases with emphasis is made on measurement of the immune product, reactions which can yield significant information in the clinical differential diagnosis and monitoring the progress of a disorder / disease through results presented. Learners will communicate understanding through presentations, written reports, and evaluation of the data to determine if additional testing is required to definitively identify the cause.

4 credits
OnLine

MLS 608 – Advanced Microbiology II

This online course provides a review of basic microbiology principles. Evaluation of case studies involved in laboratory principles and procedures at a medical technologist level will require learners to critically think and employ troubleshooting methods to solve difficult cases. The case study approaches enable learners to identify both physical and biochemical characteristics of bacterial samples, microbial physiology and the interactions between the host and pathogenic microorganisms, clinical and epidemiological consequences of these interactions, and molecular diagnostic testing are also covered.

4 credits
OnLine

MLS 609 – Education Design

Learners will explore topics related to teaching, taxonomy, evaluation, assessment, and accreditation as they explore roles as a trainer, preceptor, program director, faculty appt.

2 credits
OnLine

MLS 610 – Directed Research

Learners will perform the ten principals of research, conduct a small-scale research project as assigned by the clinical internship host on a topic within the scope of the medical internship, and present and defend the project.

2 credits
OnLine

MLS 612 – Advanced Education Design

Learners will explore topics related to teaching, taxonomy, evaluation, assessment, and accreditation as they explore roles as a trainer, preceptor, program director, faculty appt. Students will develop several of the components of a NAACLS self study and pilot an online course as the culminating project.

3 credits
OnLine

MLS 684 — Immunology/Serology Internship

Students will be assigned a clinical placement in a hospital laboratory, reference laboratory, or equivalent for intensive study in the discipline of immunology/serology for a minimum of 40 hours of clinical practice.

1 credits

Prerequisites: MLS 501, MLS 507

MLS 685 — Urinalysis & BF Internship

Students will be assigned a clinical placement in a hospital laboratory, reference laboratory, or equivalent for intensive study in the discipline of urinalysis & body fluids for 120 hours of clinical practice.

2 credits

Prerequisites: MLS 501, MLS 502

MLS 686 — Hematology/Coagulation Internship

Students will be assigned a clinical placement in a hospital laboratory, reference laboratory, or equivalent for intensive study in the discipline of hematology and coagulation/hemostasis for 160 hours of clinical practice.

2 credits

Prerequisites: MLS 501, MLS 504

MLS 687 — Clinical Microbiology Internship

Students will be assigned a clinical placement in a hospital laboratory, reference laboratory, or equivalent for intensive study in the discipline of microbiology for 160 hours of clinical practice.

2 credits

MLS 688 — Immunohematology Internship

Students will be assigned a clinical placement in a hospital laboratory, reference laboratory, or equivalent for intensive study in the discipline of immunohematology / bloodbank for 160 hours of clinical practice.

2 credits

Prerequisites: MLS 501, MLS 506, MLS 606

MLS 689 — Clinical Chemistry Internship

Students will be assigned a clinical placement in a hospital laboratory, reference laboratory, or equivalent for intensive study in the discipline of clinical chemistry for 160 hours of clinical practice.

2 credits

Prerequisites: MLS 505, MLS 605*

* Concurrent enrollment allowed.

MLS 699 — Grad Seminar

This course provides a detailed analysis of the disciplines that comprise medical lab science. The course is a preparatory course to aid graduates in preparation for the certification exam. Analysis of case studies from the spectrum of disciplines within the field, real life scenarios are presented that not only correlate with disease states, but also serve as problem-solving and critical thinking exercises. So as to better prepare for sitting for the national certification examinations required and for clinical practice, a mock registry national examination will serve as the final exam which requires a passing score of 70% for successful completion of the course.

1 credits

OnLine