

# MEDICAL LABORATORY SCIENCE (MLS)

## **MLS 302 INTRODUCTION TO HEMATOLOGY 3 Credit Hours**

This online course includes the theory and application of basic concepts in hematology and hemostasis. The theory and basic principles of procedures performed in the clinical hematology laboratory will be introduced as well as evaluation of test data to detect possible disease. Introduction to quality control measures will be addressed.

Prerequisite: General Biology, Physiology and/or Cell Biology or instructor permission.

Typically Offered: SPRING

## **MLS 404 IMMUNOLOGY 3 Credit Hours**

This online course includes the theory and application of basic concepts in immunology, immunopathology, and immunologic testing methods.

Topics of study include the cells, proteins and chemicals involved in the immune system. Immune disorders such as hypersensitivity, immunodeficiency, autoimmunity, and protein abnormalities are addressed, as well as transplant and tumor immunology, immunologic testing methods and flow cytometry.

Prerequisite: General Biology, Physiology and/or Cell Biology or permission of instructor.

Typically Offered: FALL/SPR

## **MLS 407 CLINICAL LABORATORY OPERATIONS 2 Credit Hours**

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.

Prerequisite: Enrollment in the MLS Program.

Typically Offered: FALL/SPR

## **MLS 408 INTRODUCTION TO CLINICAL HEMATOLOGY 2 Credit Hours**

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.

Prerequisite: Enrollment in MLS or MLS DAO Program.

Typically Offered: FALL/SPR

## **MLS 409 INTRODUCTION TO CLINICAL MICROBIOLOGY 2 Credit Hours**

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.

Prerequisite: Enrollment in MLS or MLS DAO Program.

Typically Offered: FALL/SPR

## **MLS 410 INTRODUCTION TO CLINICAL CHEMISTRY AND URINALYSIS 1 Credit Hour**

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.

Prerequisite: Enrollment in MLS or MLS DAO Program.

Typically Offered: FALL/SPR

## **MLS 411 INTRODUCTION TO CLINICAL IMMUNOHEMATOLOGY 1 Credit Hour**

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.

Prerequisite: Enrollment in MLS Program.

Typically Offered: FALL/SPR

## **MLS 412 CLINICAL LABORATORY SCIENCE THEORY, APPLICATION AND CORRELATION 5 Credit Hours**

This course includes the application, evaluation and correlation of laboratory procedures used in the diagnosis and treatment of common disease states. Opportunities for building critical thinking, problem solving, leadership, oral communication, professionalism, and team work skills are provided in small group clinical case discussions.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 413, MLS 414, MLS 416, MLS 418, MLS 420, MLS 422.

Typically Offered: FALL/SPR

## **MLS 413 CLINICAL ENDOCRINOLOGY AND TOXICOLOGY 1 Credit Hour**

This course introduces the theory, practical application, and evaluation of laboratory procedures related to clinical endocrinology, therapeutic drug monitoring and toxicology. Correlation of clinical laboratory data with the diagnosis and treatment of endocrine disorders, toxicology disturbances and therapeutic drug monitoring is emphasized.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 410.

Typically Offered: FALL/SPR

## **MLS 414 CLINICAL CHEMISTRY AND URINALYSIS I 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of basic laboratory procedures introduced in MLS 407 Clinical Laboratory Operations and MLS 410 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.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 407, MLS 410.

Typically Offered: FALL/SPR

## **MLS 415 CLINICAL CHEMISTRY AND URINALYSIS II 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of laboratory procedures introduced in MLS 414 Clinical Chemistry and Urinalysis I and MLS 444 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.

Prerequisite: Enrollment in the Medical Laboratory Science Program and satisfactory completion of MLS 414 Introduction to Clinical Chemistry and Urinalysis and MLS 444 Clinical Core Laboratory Practicum I

Typically Offered: FALL/SPR

**MLS 416 CLINICAL HEMATOLOGY I 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of hematological and hemostasis procedures introduced in MLS 408 Introduction to Clinical Hematology and of basic laboratory skills in MLS 407 Clinical Laboratory Operations. Correlation of clinical laboratory data with the diagnosis and treatment of erythrocyte, leukocyte and bleeding/clotting disorders will be emphasized.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 407, MLS 408.

Typically Offered: FALL/SPR

**MLS 417 CLINICAL HEMATOLOGY II 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of hematological and hemostasis procedures introduced in MLS 416 Clinical Hematology I and MLS 444 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.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 416, MLS 444.

Typically Offered: FALL/SPR

**MLS 418 CLINICAL MICROBIOLOGY I 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of procedures for isolation, identification and susceptibility testing of infectious disease organisms in humans introduced in MLS 409 Introduction to Clinical Microbiology and of basic laboratory skills in MLS 407 Clinical Laboratory Operations. The course primarily focuses on bacteriology, but will include coverage of parasitology, mycology and virology. Course content emphasizes the correlation of clinical laboratory data with the patients diagnosis and treatment.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 407, MLS 409.

Typically Offered: FALL/SPR

**MLS 419 CLINICAL MICROBIOLOGY II 2 Credit Hours**

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 MLS 418 Clinical Microbiology I and MLS 448 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 patients diagnosis and treatment.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 418, MLS 448.

Typically Offered: FALL/SPR

**MLS 420 CLINICAL IMMUNOLOGY, SEROLOGY AND MOLECULAR DIAGNOSTICS 2 Credit Hours**

This course includes the theory, practical application, and evaluation of immunological components and infectious 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.

Prerequisite: Enrollment in the MLS or MLS DAO Program.

Typically Offered: FALL/SPR

**MLS 422 CLINICAL IMMUNOHEMATOLOGY I 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of immunohematology procedures introduced in MLS 411 Introduction to Clinical Immunohematology and of basic laboratory skills in MLS 407 Clinical Laboratory Operations. The primary focus will be on processes required to provide compatible blood components for transfusion.

Processes for donor blood collection and blood component processing and storage will be discussed. Immunohematology procedures that assist in the diagnosis and management of hemolytic conditions will be addressed.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 407, MLS 411.

Typically Offered: FALL/SPR

**MLS 423 CLINICAL IMMUNOHEMATOLOGY II 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of immunohematology procedures presented in MLS 422 Clinical Immunohematology I and MLS 442 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.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 422, MLS 442.

Typically Offered: FALL/SPR

**MLS 430 CLINICAL LABORATORY MANAGEMENT I 2 Credit Hours**

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.

Prerequisite: Enrollment in the Medical Laboratory Science or MLS DAO Program and satisfactory completion of MLS 407 Clinical Laboratory Operations or with Instructor/Program Permission

Typically Offered: FALL/SPR

**MLS 431 CLINICAL LABORATORY MANAGEMENT II 3 Credit Hours**

This course builds on MLS 430 Clinical Laboratory Management I, and includes the theory, practical application and evaluation of laboratory management principles in compliance and regulatory issues, test utilization, human resource management, written and oral communication, method evaluation, educational methodology, professionalism, quality improvement and financial resource management. Opportunities for building critical thinking, problem-solving, team work, communication, professionalism, management and leadership skills are provided.

Prerequisite: Enrollment in the MLS or MLS DAO Program, MLS 430.

Typically Offered: SPRING

**MLS 442 CLINICAL IMMUNOHEMATOLOGY LABORATORY PRACTICUM I 1 Credit Hour**

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 MLS 407 Clinical Laboratory Operations and MLS 411 Introduction to Clinical Immunohematology. Prerequisite: Enrollment in the MLS Program, MLS 407, MLS 411 and concurrent enrollment or successful completion of MLS 422. Typically Offered: FALL/SPR

**MLS 443 CLINICAL IMMUNOHEMATOLOGY LABORATORY PRACTICUM II 1 Credit Hour**

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 MLS 442 Clinical Immunohematology Laboratory Practicum I. Prerequisite: Enrollment in the MLS Program, MLS 422, MLS 442, concurrent enrollment or successful completion of MLS 423. Typically Offered: FALL/SPR

**MLS 444 CLINICAL CORE LABORATORY PRACTICUM I 1 Credit Hour**

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 MLS 407 Clinical Laboratory Operations, MLS 408 Introduction to Clinical Hematology and MLS 410 Introduction to Clinical Chemistry and Urinalysis. Prerequisite: Enrollment in the MLS Program, MLS 407, MLS 408, MLS 410, and concurrent enrollment or successful completion of MLS 414 and MLS 416. Typically Offered: FALL/SPR

**MLS 445 CLINICAL CORE LABORATORY PRACTICUM II 1 Credit Hour**

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 MLS 444 Clinical Core Laboratory Practicum I. Prerequisite: Enrollment in the MLS Program, MLS 414, MLS 416, MLS 444, and concurrent enrollment or successful completion of MLS 415 and MLS 417. Typically Offered: FALL/SPR

**MLS 448 CLINICAL MICROBIOLOGY LABATORY PRACTICUM I 1 Credit Hour**

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 MLS 407 Clinical Laboratory Operations and MLS 409 Introduction to Clinical Microbiology. Prerequisite: Enrollment in the MLS Program, MLS 407, MLS 409, and concurrent enrollment or successful completion of MLS 418. Typically Offered: FALL/SPR

**MLS 449 CLINICAL MICROBIOLOGY LABORATORY PRACTICUM II 1 Credit Hour**

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 MLS 409 Introduction to Clinical Microbiology, MLS 418 Clinical Microbiology I, MLS 448 Clinical Microbiology Laboratory Practicum I, and MLS 419 Clinical Microbiology II. Prerequisite: Enrollment in the MLS Program, MLS 418, MLS 448, and concurrent enrollment or successful completion of MLS 419. Typically Offered: FALL/SPR

**MLS 500 APPLICATION AND INTERPRETATION OF CLINICAL LABORATORY DATA 2 Credit Hours**

This course will provide the physician assistant student with an overview of commonly utilized laboratory tests, the appropriate application of these tests in a clinical setting, and the interpretation of selected clinical laboratory data. The course will include basic laboratory techniques such as urinalysis, a brief overview of CLIA (Clinical Laboratory Improvement Amendments) regulations, and an explanation of the use of quality measures to ensure the accuracy of test results. Prerequisite: Enrollment in the Physician Assistant program. Typically Offered: SPRING

**MLS 552 APPLICATION OF CLINICAL MEDICAL MICROBIOLOGY AND IMMUNOLOGY 1 Credit Hour**

This course includes the application, evaluation and correlation of laboratory data used in the diagnosis and treatment of common infectious disease states. Opportunities for building problem solving and communication skills are provided in small and large group clinical case discussions. Prerequisite: Enrollment in Doctor of Pharmacy Program. Corequisite: PAMM 550 and PAMM 509. Typically Offered: SPRING

**MLS 615 CLINICAL CHEMISTRY AND URINALYSIS II 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of laboratory procedures introduced in MLS 414 Clinical Chemistry and Urinalysis I and MLS 444 Clinical Core Laboratory Practice 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-based disorders; tumor markers; and inborn errors of metabolism is emphasized. Prerequisite: Enrollment in MMLS Program and satisfactory undergraduate MLS 414 Clinical Chemistry and Urinalysis I, and MLS 444 Clinical Core Laboratory Practicum I. Typically Offered: SPRING

**MLS 617 CLINICAL HEMATOLOGY II 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of hematological and hemostasis procedures introduced in MLS 416 Clinical Hematology I and MLS 444 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 and bleeding/clotting disorders will be emphasized. Prerequisite: Enrollment in MMLS Program and satisfactory completion of MLS 416 Clinical Hematology I, and MLS 444 Clinical Core Laboratory Practicum I. Typically Offered: SPRING

**MLS 619 CLINICAL MICROBIOLOGY II 2 Credit Hours**

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 MLS 418 Clinical Microbiology I and MLS 448 Clinical Microbiology Laboratory Practicum I. This course include bacteriology, mycology, parasitology, and virology content, and will emphasize the correlation of clinical laboratory data with the patient's diagnosis and treatment.

Prerequisite: Enrollment in MMLS Program and satisfactory completion of MLS 418 Clinical Microbiology I, and MLS 448 Clinical Microbiology Laboratory Practicum I.

Typically Offered: SPRING

**MLS 620 CLINICAL IMMUNOLOGY, SEROLOGY AND MOLECULAR DIAGNOSTICS 2 Credit Hours**

This course includes the theory, practical application, and clinical diagnostic evaluation of immunological components and infectious 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 application, and evaluation of molecular diagnostic testing tools, such as polymerase chain reaction(PCR), nucleic acid probes, and microarrays are also addressed.

Prerequisite: Enrollment in MMLS Program or instructor permission.

Typically Offered: FALL

**MLS 623 CLIN IMMUNOHEMATOLOGY II 2 Credit Hours**

This course expands on the theory, practical application, and evaluation of immunohematology procedures in MLS 422 Clinical Immunohematology I and MLS 422 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.

Prerequisite: Enrollment in MMLS Program and satisfactory completion of MLS 422 Clinical Immunohematology I, and MLS 442 Clinical Immunohematology Laboratory Practicum I.

Typically Offered: SPRING

**MLS 630 CLINICAL LABORATORY MANAGEMENT I 2 Credit Hours**

This course introduces the theory, practical application and evaluation of laboratory management principles in healthcare, including 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.

Prerequisite: Enrollment in MMLS Program

Typically Offered: FALL

**MLS 631 CLIN LAB MANAGEMENT II 3 Credit Hours**

This course builds on MLS 430/630 Clinical Laboratory Management I, and includes the theory, practical application and evaluation of laboratory management principles in compliance and regulatory issues, test utilization, human resource management, written and oral communication, method evaluation, education methodology, professionalism, quality improvement and financial resource management. Opportunities for building critical thinking, problem-solving, team work, communication, professionalism, management and leadership skills are provided.

Prerequisite: Enrollment in MMLS Program and satisfactory completion of MLS 430/630 Clinical Laboratory Management I

Typically Offered: SPRING