CLINICAL MEDICAL LABORATORY SCIENCES (CMLS)

CMLS 2201 Introduction to Medical Laboratory Science 2 Credits
Department: Nursing and Health Professions
This course introduces the field of medical laboratory science, emphasizing the roles of laboratory professionals and the fundamentals of testing in hematology, chemistry, microbiology, immunology, molecular diagnostics, and immunohematology. It also outlines key career pathways in the profession.

CMLS 3401 Fundamentals of Clinical Chemistry 4 Credits
Department: Nursing and Health Professions
The course introduces foundational principles and practices of clinical chemistry analysis, covering specimen collection, processing, testing, and statistical analysis. Students will develop a foundation in correlating laboratory results with specific disease states. The course also introduces quality control procedures, the basic metabolic panel, and an overview of urinalysis.
Prerequisite(s): CHEM 1312 and CHEM 1112

CMLS 3404 Introduction to Hematology and Hemostasis 4 Credits
Department: Nursing and Health Professions
This course introduces hematopoiesis, hemostasis, red blood cells, white blood cells, and platelet disorders, hemoglobinopathies, myeloproliferative neoplasms, acute leukemias, lymphomas, and body fluid analysis. The laboratory component provides hands-on experience in phlebotomy, blood smear preparation and staining, microscopic evaluation, WBC differentials, coagulation testing, and quality control procedures.
Prerequisite(s): BIOL 2402 or BIOL 1407

CMLS 3407 Clinical Immunology and Serology 4 Credits
Department: Nursing and Health Professions
This course is an overview of the immune system, focusing on the characteristics and interactions of antigens, antibodies, and major immune mechanisms. Students examine innate and adaptive immunity, cytokines, complement pathways, hypersensitivities, autoimmune and immunodeficiency disorders, and transplantation immunology, with emphasis on clinical correlations. The course also covers the principles and interpretation of clinical serology assays, laboratory safety, and quality assurance.
Prerequisite(s): BIOL 2421 or BIOL 4303

CMLS 4101 Board of Certification Review Course 1 Credit
Department: Nursing and Health Professions
This review course prepares senior Medical Laboratory Science students for national certification by integrating all major MLS disciplines, including hematology, hemostasis, clinical chemistry, microbiology, immunology, immunohematology, molecular diagnostics, and urinalysis/body fluids. Students engage in case-based learning and simulated examinations, with an emphasis on clinical correlation, result interpretation, quality assurance, regulatory standards, and overall certification readiness.

CMLS 4310 Management (Lab Operations and Supervision) 3 Credits
Department: Nursing and Health Professions
This course provides a foundation in the principles and practices of clinical laboratory operations and management. It emphasizes professionalism, leadership, quality management systems, regulatory compliance, workforce administration, financial oversight, and the integration of laboratory information systems. Applied learning is reinforced through case studies, project-based assignments, and operational problem-solving activities.

CMLS 4401 Clinical Chemistry Rotation (practicum) 4 Credits
Department: Nursing and Health Professions
This course provides supervised practical experience in the clinical chemistry and urinalysis sections of an affiliated hospital laboratory. Students perform analytical testing, operate and maintain instrumentation, apply quality control procedures, and adhere to regulatory and safety standards. Emphasis is placed on accurate result reporting, correlation of laboratory findings with clinical conditions, troubleshooting, and professional behavior.
Restriction(s):
Students with a class of Freshman, Junior or Sophomore may **not** enroll.

CMLS 4404 Diagnostic Microbiology I 4 Credits
Department: Nursing and Health Professions
This course covers medically significant fungi, parasites, and viruses, emphasizing their morphology, classification, transmission, pathogenesis, and clinical significance in human disease. Students examine host–pathogen interactions, immune responses, epidemiology, and principles of prevention and control. Laboratory instruction focuses on proper specimen collection, processing, and the application of diagnostic techniques used to identify these organisms and interpret laboratory findings.
Prerequisite(s): BIOL 2421 or BIOL 4303

CMLS 4407 Clinical Analysis I Urinalysis & Bodily Fluids 4 Credits
Department: Nursing and Health Professions
This course provides instruction and hands-on experience in the chemical, physical, and microscopic analysis of urine and selected body fluids. Emphasis is placed on renal physiology, urine formation, renal and metabolic disorders, and the correlation of laboratory findings with systemic disease. The course integrates analytical techniques, spectrophotometric instrumentation, method evaluation/ validation, reference intervals, laboratory mathematics, quality control, application of the Westgard rules, and automation.

CMLS 4413 Diagnostic Microbiology II 4 Credits
Department: Nursing and Health Professions
This course covers clinically significant bacteria associated with human diseases. Emphasis is placed on the collection, processing, and proper handling of clinical specimens, as well as the principles and methodologies used for the isolation, identification, and characterization of pathogenic bacteria. The course integrates both theoretical concepts and laboratory applications in diagnostic testing, antimicrobial susceptibility testing, quality control, result interpretation, and correlation of laboratory findings with disease processes.
Prerequisite(s): CMLS 4404

CMLS 4416 Hematology/Hemostasis 4 Credits
Department: Nursing and Health Professions
This course covers hematopoiesis, hemostasis, red blood cell disorders, white blood cell disorders, platelet disorders, anemias, hemoglobinopathies, myeloproliferative neoplasms, myelodysplastic syndromes, acute leukemias, lymphomas, and body fluid analysis. The laboratory component provides hands-on experience in phlebotomy, blood smear preparation and staining, microscopic evaluation, WBC differentials, manual cell counts, reticulocyte counts, microhematocrit, erythrocyte sedimentation rate, and coagulation testing. Emphasis is placed on pathophysiology, laboratory evaluation, and clinical correlation.

CMLS 4419 Chemistry: Clincal Analysis II 4 Credits
Department: Nursing and Health Professions
This course covers significant chemical analytes involved in human health and disease. Major topics include carbohydrates and diabetes mellitus, lipids and lipoproteins, proteins and nonprotein nitrogen compounds, enzymes, electrolytes and acid–base balance, hemoglobin and bilirubin metabolism, endocrinology, tumor markers, toxicology, therapeutic drug monitoring, immunochemical techniques, and molecular diagnostics. Emphasis is placed on analytical principles and methodologies used to measure these analytes, accurate performance and evaluation of laboratory testing, and interpretation of results and correlating laboratory findings with normal physiology and pathological conditions.
Prerequisite(s): CMLS 4407

CMLS 4422 Immunohematology 4 Credits
Department: Nursing and Health Professions
This course integrates theory with hands-on laboratory experience. Topics include blood group systems, donor selection, specimen collection and processing, component preparation, compatibility testing, transfusion practices, HLA systems, transfusion reactions, and data management. Students develop competency with emphasis on accurate interpretation of serologic results, adherence to quality control procedures, and compliance with established standards.

CMLS 4425 Clinical Immunohematology 4 Credits
Department: Nursing and Health Professions
This practicum provides structured, supervised training in routine and advanced serologic testing, component preparation, and transfusion support within an affiliated hospital laboratory. Students progress from observation to supervised practice and independent performance while adhering to established standard operating procedures, quality control requirements, and regulatory guidelines. The course emphasizes accurate interpretation of serologic results, resolution of discrepancies, and integration of laboratory results to ensure safe and effective transfusion practices.

CMLS 4428 Clinical Microbiology 4 Credits
Department: Nursing and Health Professions
This course provides supervised practical experience in the isolation, identification, and characterization of clinically significant bacteria, fungi, and parasites within an affiliated hospital laboratory. Students develop skills in specimen collection, culture methods, staining, microscopic examination, biochemical testing, and antimicrobial susceptibility testing. Instruction emphasizes proper pre-analytic, analytic, and post-analytic procedures, aseptic technique, quality control, error troubleshooting, and accurate result reporting with appropriate clinical correlation.

CMLS 4431 Clinical Hematology 4 Credits
Department: Nursing and Health Professions
The hematology clinical rotation provides students with structured, hands-on supervised experience in both routine and specialized hematology and hemostasis procedures. Throughout the rotation, students advance from guided observation to independent performance while adhering to established standard operating procedures, competently operating manual and automated laboratory instruments, and maintaining the professional standards expected within an affiliated clinical laboratory.