

CLINICAL LABORATORY SCIENCES – COURSE DESCRIPTIONS

The CLS major requires the completion of 55 credits of Clinical Laboratory Science courses. The CLS Program requires the completion of 124 credits for the baccalaureate degree. All coursework must be completed with a grade of "C" or better as defined by the academic progression policy.

CLS 352 Seminar in Clinical Laboratory Sciences Practice

Introduction to the role of clinical laboratory scientist in health care delivery systems. Laboratory safety issues with emphasis on the practice of CDC universal precaution guidelines. Application of basic educational methods for laboratory personnel. Prerequisite: Admission to the CLS program. 1 credit.

CLS 353 Laboratory Operations I

Examination and correlation of laboratory data through multi-disciplinary case study approach to patient care. Includes issues of patient confidentiality, professional ethics, and fundamental laboratory calculations. Prerequisite: CLS 352. 1 credit.

CLS 402 Principles of Laboratory Specimen Collection & Processing

Specimen collection and processing for medical diagnoses including: hospital and laboratory organizational structures; safety; infection control; patient rights; professionalism; medical terminology; cardiovascular system; POCT, CLIA waived testing: glucose, coag, Hct, slide prep, UA, ESR, Troponin, Preg. & Occ Bld. Emphasis on patient care, interpretation and problem solving. Includes laboratory. Prerequisite: BIOL 196. 2 credits

CLS 403 Specimen Collection Clinical Practicum

Supervised clinical practicum experience to develop competencies in laboratory equipment, specimen collection, processing and direct testing. Including: blood (arterial, venipuncture, capillary), non-blood, timed, chain-of-custody samples; POCT and CLIA waived testing (glucose, Coag, Hct, slide prep, UA, ESR, Troponin, Pregs, Occ Bld). Emphasis on patient management and problem solving. Corequisite CLS 402. 1 credit

CLS 412 Clinical Immunology

Principles of immunology and the immune response as applied to states of health and disease, immune function and pathology. Topics include antibodies and other antigen receptors, antigens, cell-cell communications, major histocompatibility complex interactions, effector mechanisms, immune regulation, hypersensitivity reactions, immunoproliferative and immunodeficiency disease, transplantation immunology, and cancer mechanisms. Prerequisites: BIOL 300, CHEM 474. 3 credits

CLS 413 Clinical Immunology Laboratory

Immunologic and molecular techniques used to analyze antigen-antibody reactions in the diagnosis of health or disease. Including liquid and gel precipitation; direct agglutination, passive agglutination, and hemagglutination; secondary indicator systems (RIA, ELISA, FA); bacterial and viral serology, Western Blot, DNA fingerprinting, PCR, nucleic acid probes, flow cytometry and cellular analyses. Corequisite: CLS 412. 1 credit

CLS 414 Transfusion Medicine-Immunohematology

Transfusion medicine stresses practical and theoretic aspects of blood group serology. Emphasis on major blood group systems, their antigens and antibodies. Transfusion and compatibility testing, adverse reactions to transfusion, hemolytic disease of the newborn, hemotherapy apheresis, immunomodulation, stem cell transplantation and immunology of tissue antigens. Prerequisites: CHEM 474, CLS 412. 3 credits.

CLS 415 Transfusion Medicine Immunoematology Laboratory

Simulated clinical immunoematology laboratory designed to expose the student to the clinical practice of modern blood bank service. Applied experiences in basic and advanced clinical testing related to common blood group antigens and their associated antibodies, compatibility testing, alloantibody identification, adsorptions/elutions, transfusion reactions and pre/postnatal studies. Corequisite: CLS 414. 1 credits

CLS 422 Clinical Hematology I

Basic and diagnostic hematology with an emphasis on pathophysiology. Hematopoiesis, anemias, and homeostasis presented through lectures, case studies and morphologic review of peripheral blood and bone marrow smears. Differential diagnosis of these disorders through specified diagnostic laboratory tests. Prerequisites: BIOL 224 or 208 or 300, CHEM 474. 3 credits

CLS 423 Clinical Hematology I Laboratory

Basic and diagnostic hematology with an emphasis on the laboratory tests used to differentially diagnose various hematologic disorders. Major emphasis on the various anemias and primary hemostatic bleeding disorders. Laboratory unknowns and peripheral/bone marrow microscopic slides used to correlate clinical tests and theoretical principles. Corequisite: CLS 422. 2 credits.

CLS 424 Clinical Hematology II

Diagnostic hematology and body fluid analysis with emphasis on pathophysiology. Myeloproliferative, lymphoproliferative, myelodysplastic, acute and chronic leukemias and advanced topics in hemostasis presented through lectures, case studies and morphologic review of peripheral blood and bone marrow slides. Differential diagnosis of these disorders through specified laboratory tests. Prerequisites: CLS 412, CLS 422. 3 credits.

CLS 425 Clinical Hematology Laboratory II

Diagnostic hematology and body fluid analysis with an emphasis on the laboratory tests, cytochemical stains, and molecular markers used to differentially diagnose the various hematologic malignancies and hemostasis disorders. Laboratory unknowns and peripheral/bone marrow microscopic slides used to correlate clinical tests and theoretic principles. Corequisite: CLS 424. 2 credits

CLS 432 Clinical Microbiology I

Introduction to medically significant microbial diseases of man. Microbial physiology and pathogenic interactions between man and microorganism. Epidemiology, triage, and diagnosis of microorganisms causing human diseases. Emphasis is on aerobic and anaerobic bacterial diseases, mycobacteria, vibrios, Legionella, Mycoplasma, spirochetes, Rickettsia and Chlamydia. Includes discussion of antimicrobial therapy and resistance mechanisms. Prerequisites: BIOL 300, CHEM 474, CLS 412. 3 credits.

CLS 433 Clinical Microbiology Laboratory I

Introduction to isolation, diagnostic and identification techniques for microbial diseases of humans. Emphasis is on aerobic and anaerobic bacteria, mycobacteria, vibrios, Legionella, Mycoplasma, spirochetes, Rickettsia and Chlamydia. Includes conventional microscopic, culture, molecular and immunological techniques as well as susceptibility testing methods. Corerequisite: CLS 432. 2 credits

CLS 434 Clinical Microbiology II

Advanced medical microbiology. Microbial physiology and pathogenic interactions between man and microorganism. Epidemiology, prevention, diagnosis and treatment of microorganisms causing human diseases. Emphasis is on fungal, parasitic and viral diseases as well as miscellaneous bacteria from various body sites. Includes discussion of antimicrobial therapy and resistance mechanisms. Prerequisites: CLS 432, CLS 433. 3 credits

CLS 435 Clinical Microbiology Laboratory II

Advanced practical applications in the recovery, isolation and identification of microorganisms causing human disease. Emphasis is on methods for mycology, parasitology, and virology as well as miscellaneous bacteria from different body sites. Includes conventional microscopic, culture, molecular and immunological techniques as well as susceptibility testing methods. Corequisite: CLS 434. 2 credits.

CLS 442 Clinical Chemistry I

Chemical analysis indicative of human health and disease. Theory and utilization of biochemical instrumentation including photometry, electrochemical, and electrophoresis. Emphasis placed on method application to analysis of carbohydrates, proteins, electrolytes, liver and pancreatic function. Prerequisites: BIOL 300, CHEM 474, CLS 412. 3 credits.

CLS 443 Clinical Chemistry Laboratory I

Manual and automated chemical methods used to measure normal and abnormal constituents, such as glucose, electrolytes, and proteins, in blood and body fluids. Use of spectrophotometric techniques, recognition of technical problems and selected abnormalities discussed. Corequisite: CLS 442. 1 credit.

CLS 444 Clinical Chemistry II

Advanced study of chemical analysis of blood, urine and other body fluids in normal and abnormal physiological conditions. Emphasizes interdependency, physiological conditions affecting test results and clinical significance. Topics such as endocrinology, toxicology, and radioimmunoassay included. Prerequisites: CLS 442. 3 credits

CLS 445 Clinical Chemistry Laboratory II

Advanced laboratory applications in chemical analysis of blood, urine and other body fluids in normal and abnormal physiological conditions. Emphasizes interdependency, physiological conditions affecting test results and clinical significance. Topics such as endocrinology, toxicology and radioimmunoassay included. Corequisite: CLS 444. 1 credit.

CLS 452 Laboratory Operations II

Theory and practice of fiscal/personnel management of laboratory practitioners. Introduction to basic research skills in CLS as well as test development and implementation. Includes laboratory information systems, legal aspects of test reporting, and government regulatory and accreditation policies. Prerequisite: CLS 353. 1 credit.

CLS 453 Seminar in Clinical Laboratory Sciences

Discussion of topics in current clinical laboratory pathology. Individual and group projects used to reinforce concepts for interpretation and correlation of laboratory data to patient care. Includes student presentation or oral and written papers. Prerequisites: CLS 452. 2 credits

CLS 481 Clinical Practicum in Hematology/Body Fluids

Clinical practice module that allows the student to gain applied experiences and technical competencies in the area of hematology and body fluids. Clinical practicum in affiliated

laboratories designed to develop entry-level competencies and to assist the student in making the transition to clinical practitioner. Supervision by clinical/university faculty
Prerequisites: CLS 424, CLS 425. 1-3 credits.

CLS 482 Clinical Practicum in Chemistry/Immunology/Urinalysis

Clinical practice module that allows the student to gain applied experiences and technical competencies in the areas of chemistry, immunology, and urinalysis. Clinical practicum in affiliated laboratories designed to develop entry-level competencies and to assist the student in making the transition to clinical practitioner. Supervision by clinical/university faculty. Prerequisites: CLS 412, CLS 413, CLS 444, CLS 445. 1-3 credits.

CLS 483 Clinical Practicum in Immunohematology

Clinical practice module that allows the student to gain applied experiences and technical competencies in the area of Immunohematology. Clinical practicum in affiliated laboratories designed to develop entry-level competencies and to assist the student in making the transition to clinical practitioner. Supervision by clinical/university faculty. Prerequisites: CLS 414, CLS 415. 1-3 credits.

CLS 484 Clinical Practicum in Microbiology

Clinical practice module that allows the student to gain applied experiences and technical competencies in the area of clinical microbiology, parasitology, and mycology. Clinical practicum in affiliated laboratories designed to develop entry-level competencies and to assist the student in making the transition to clinical practitioner. Supervision by clinical/university faculty. Prerequisites: CLS 434, CLS 435. 1-3 credits.