COURSE DESCRIPTIONS

MLAB401 – Clinical Laboratory Skills: The course includes principles and applications of ethical practice and professionalism, analytical techniques, laboratory mathematics and data handling. Principles of laboratory instrumentation and methodologies, safety regulations, quality control, quality assurance and quality improvement including pre-analytical, analytical, and post-analytical factors are also covered. Students work with statistical and non-statistical quality control within systems of continuous performance improvement. Students review analytical skills and concepts necessary for accurate laboratory analysis through lectures, self-instructional modules and competency assessment exercises.

MLAB402 – Clinical Practice: The clinical practicum in Clinical Practice addresses the pre-analytical phase of specimen collection and processing. Students also participate in a rotation experience in molecular diagnostics and complete a series of activities regarding current molecular diagnostic techniques.

MLAB403 – Chemistry: Lecture categories include analytical and physiological chemistry of renal function, water balance, electrolytes and acid-base balance; endocrinology; liver and cardiac function; lipid metabolism; protein analysis and electrophoresis; therapeutic drug monitoring and drugs of abuse and chemistry automation. Normal and abnormal physiology, test interpretation, statistical quality control and interpretation, principles of methodologies, test development and performance of assays are included. Laboratory sections address performance of assays, test result interpretation, problem-solving, troubleshooting, and mechanisms for continuous assessment of laboratory performance.

MLAB404 - Pre-analytical Techniques: Lecture sessions include theoretical aspects of phlebotomy and specimen processing including the anatomy and physiology of the vascular system and practical techniques for the collection of blood and other laboratory specimens; emphasis is on aspects of collection and processing of analytical specimens and their impact on pre-analytical variability. Laboratory experiences provides the opportunity to perform phlebotomy and apply pre-analytical techniques to laboratory case situations within a quality framework.

MLAB405 – Clinical Chemistry: The clinical practicum provides intensive study of test procedures and practical application of lecture topics. Areas of instruction and student participation include manual chemistry, automated spectrophotometry, electrophoresis, single and multichannel discrete analysis systems, blood gas analysis, drug monitoring, hormone assessment and computer controlled instrumentation. This clinical practicum includes colorimetric, kinetic and enzymatic analysis, the use of immunoassay and molecular techniques.

MLAB406 – Microbiology I: An introduction to clinical microbiology, including theoretical and technical skills that are related to human normal flora and pathological organisms found in the clinical setting as well as sample preparation, sample evaluation, rapid testing and basic techniques in body site interpretation. Methods for antibiotic susceptibility testing, sterilization, proper collection and transport of specimens, and gram stain testing and interpretation.

MLAB407 – Microbiology II: This course emphasizes pathogenic or potentially pathogenic bacteria in humans as well as principles of testing methodologies, techniques for isolation, identification, and clinical relevance by body site. Laboratory techniques focus on the identification of pathogens in routine cultures by body site including associated problem solving of discrepant culture results and troubleshooting of unexpected assay performance. Students learn about advanced antimicrobial susceptibility testing and molecular methods for the detection of pathogenic organisms.
MLAB408 – Clinical Microbiology: This clinical practicum involves in-depth study of techniques and methods used for the isolation and identification of bacteria, fungi and parasites considered to be of human pathogenic significance. Testing for antibiotic susceptibility of bacteria, preparation of culture media, quality control, performance improvement, and the safety procedures used in the lab to inhibit the spread of infection are emphasized.

MLAB409 – Parasitology: Lecture sessions cover the major groups of medically important parasites, including amoebae, helminths and blood protozoa. Emphasis is placed on morphologic identification of pathogenic organisms and the ability to distinguish these from non-pathogenic genera.

MLAB410 – Mycology: Lecture sessions cover the medically important fungi including yeast, dermatophytes, opportunistic and dimorphic fungi. Emphasis is placed on morphologic identification, both macroscopically and microscopically, of pathogenic organisms as well as the saprophytes which are more commonly encountered in clinical specimens.

MLAB411 – Parasitology and Mycology Laboratory: Laboratory sessions are focused on laboratory techniques used in the identification of parasites and fungus. Students learn laboratory related identification procedures through the assignment and work-up of unknowns.

MLAB413 – Hematology: This course is an in depth study of the formation of blood cells and the pathogenesis and mechanisms of hematologic disorders. Topics include: hematopoiesis, proliferative disorders, normal and abnormal hemoglobins, anemias and leukemias. Analytical methodologies, as well as the correlation of tests with disease state, hematopoiesis and identification of the maturation sequence as seen in peripheral blood and bone marrow, maintenance and quality control of instrumentation as well as back up manual methods are all part of this course sequence. Emphasis is placed on the performance of routine assays as well as the problem-solving of discrepant results and troubleshooting of methodologies.

MLAB414 – Clinical Hematology: During this clinical practicum, emphasis is placed on instrument maintenance, quality control, and result interpretation. Practice with routine and emergency testing procedures and workflow, specimen processing, reading of differential morphology and data interpretation are performed during this course. This practicum also includes the analysis of body fluid.

MLAB415 – Coagulation: This course is an in depth study of the hemostatic mechanism, including study of coagulation in the intrinsic and extrinsic systems, as well as platelet and vessel function, and hypercoagulability. Analytical methodologies for the detection of abnormalities are studied for all systems.

MLAB416 – Immunology, Serology, & Molecular Diagnostics: This course includes basic immunology, the theory of immunodiagnostics and immunopathology, and the theory of molecular diagnostics and its practical applications. Principles of methodologies in relationship to clinical diagnosis and correlation with human disease are stressed. Assays are performed as they relate to the diagnosis of various clinical processes. Problem solving of discrepant results and troubleshooting of assay performance is stressed through case simulations.

MLAB417 – Immunohematology I: Introductory theoretical and technical course work is covered in the following areas: blood group serology, human blood groups and their significance, transfusion, donor selection and blood components, antibody detection and identification, quality control, current transfusion practices and recent advances in immunohematology.

MLAB418 – Immunohematology II: Advanced theoretical and technical course work is covered in the following areas: blood group serology, human blood groups and their significance, transfusion, donor selection and blood components, antibody detection and identification, quality control, current transfusion practices, recent advances in immunohematology, complex problem solving, donor screening, blood collection, donor care, processing and storage of blood.
MLAB419 – Clinical Immunohematology: This clinical practicum addresses routine testing in a hospital/blood center setting: the proper care and use of equipment and materials, performance of blood group determinations, compatibility testing, antibody identification, pre and post-natal testing of newborns and mothers. Students also learn appropriate follow up of transfusion reactions, result interpretation, problem solving and troubleshooting as it relates to patient test results.

MLAB421 – Urinalysis: Renal anatomy and physiology relating to the formation and content of urine in health and disease is covered. Laboratory experience includes the microscopic and chemical analysis of urine, correlations with normal and abnormal physiology, maintenance and use of instrumentation, and disease correlation.

MLAB423 – Body Fluids: This course covers anatomy and physiology of body sites from which come fluids for analysis (cell counts and differentials, chemical and microbiological). Topics include cerebrospinal fluid, serous fluids, synovial fluid and semen. Laboratory experience includes hematologic analysis of a variety of body fluids, including operation of instrumentation and disease correlation.

MLAB424 – Research – Capstone Project: Activities in this course introduce the student to basic techniques in laboratory research including the formulation of research questions and the process of research design and practices. A series of group activities assist students in becoming informed consumers of research. This capstone project requires that students formulate a research question, perform a literature search using appropriate reference materials, and pursue of a pilot project that could serve as the basis for a larger research study. The research process culminates in a research poster presented in a formal venue for peers in the clinical laboratory community.

MLAB425 – Management – Capstone Project: Students learn basic management theory and the principles and practices of supervision. Topics covered include basic management and health care theory including those aspects of healthcare delivery that most impact laboratory services, basic human resource management, the role and responsibilities of supervision, interpersonal and interdisciplinary communication skills, team building, technical writing, laboratory scheduling and workflow, and financial management. This course culminates in a team directed capstone project in which small groups of students must apply management principles to problems in a simulated lab setting. Student management groups present their findings to a team of managers drawn from the laboratory community.

MLAB426 – Education – Capstone Project: The basics of education for the laboratory professional who may be instructing other lab employees and students, or doing inservice presentations are presented in this course. Students learn to set goals, write objectives, determine content and delivery, write and perform assessments and evaluate instruction. For the capstone project in education, each student must present an educational in-service while demonstrating sound educational principles and design of instruction.

MLAB430 – Body of Knowledge: This course serves as a review of clinical laboratory science for the individual preparing for national certification examinations. The major categories of laboratory medicine are addressed and students review major concepts through mini-reviews, case studies and final comprehensive exams.