### MLS - Medical Laboratory Science

#### MEDICAL LABORATORY SCIENCE Courses

**MLS 210. Orientation to Medical Laboratory Science. 1 Credit.**
An introduction to the profession of medical laboratory science (previously called medical technology). Professional, ethical and operational issues will be discussed.

**MLS 307. Clinical Methods in Microbiology. 2 Credits.**
Laboratory techniques in the diagnosis of clinically relevant microorganisms. Prerequisite: admission to the major or minor in medical laboratory science. Pre- or corequisite: MLS 308.

**MLS 308. Clinical Microbiology. 3 Credits.**
A fundamental course in microbiology that includes bacterial growth, synthesis, differentiation, microbial nutrition and metabolism. Prerequisites: BIOL 121N, BIOL 122N, BIOL 123N, and BIOL 124N; CHEM 211 is recommended or permission of the instructor.

**MLS 309. Medical Bacteriology. 3 Credits.**
A comprehensive survey of bacteria, including colonial morphology, cultural characteristics, biochemical identification, pathogenicity, epidemiology, and treatment. Prerequisites: MLS 307 and MLS 308.

**MLS 310. Urinalysis and Body Fluids. 1 Credit.**
A study of the chemical, physical and microscopic analysis of human urine and other body fluids, with abnormal results interpreted and correlated to disease processes and cancer cytology of the urinary tract. Prerequisites: BIOL 250 and BIOL 251 or permission of the instructor.

**MLS 311. Hematology. 3 Credits.**
The study of the principles of the formation and development of blood, including the interpretation of normal and abnormal blood morphology and diagnostic procedures in the investigation of hematological disorders. Prerequisites: BIOL 250 and BIOL 251 or permission of the instructor. Pre- or corequisite: MLS 312.

**MLS 312. Hematology Laboratory. 1 Credit.**
Laboratory methods utilizing microscopy and other analytical procedures in the diagnosis and investigation of hematological disorders. Prerequisite: admission to the major or minor in medical laboratory science. Pre- or corequisite: MLS 311.

**MLS 313. Diagnostic Methods in Urinalysis. 1 Credit.**
Laboratory experience in the chemical, physical, and microscopic examination of the urine and body fluids with emphasis on quality control, osmometry, and disease correlates. Prerequisite: BIOL 250 or equivalent. Pre- or corequisite: MLS 310.

**MLS 315. Clinical Laboratory Diagnosis. 3 Credits.**
An introduction to clinical diagnostic principles utilized in immunology, serology, and hemostasis. Prerequisite: students must be certified graduates of a medical laboratory associate-level training program (MLT).

**MLS 319. Medical Bacteriology Methods. 2 Credits.**
Laboratory methods emphasizing isolation, identification and media requirements for pathogenic microorganisms. Prerequisite: admission to the major or minor in medical laboratory science. Pre- or corequisite: MLS 309.

**MLS 320. Blood Collection Techniques. 2 Credits.**
Laboratory methods in the procurement of blood by capillary, venipuncture and arterial draws, analytical variables, special phlebotomy tests, isolation techniques, safety, forensic, molecular, legal and ethical implications, pediatric, geriatric, and compromised patient concerns. All students must submit to venipuncture by fellow students. Prerequisite: BIOL 250 or equivalent or permission of the instructor.

**MLS 322. Phlebotomy Internship. 2 Credits.**
A 120-hour clinical internship for those desiring to qualify for the ASCP certification exam in phlebotomy. Prerequisite: MLS 320.

**MLS 324. Clinical Instrumentation and Electronics. 3 Credits.**
A course covering the theory, operation, selection, maintenance and quality control of instruments in the clinical laboratory. Instruments discussed include spectrophotometers, flame photometry, atomic absorption, fluorometry, gas and liquid chromatography, mass spectroscopy, chemiluminescence, immunochemical and nephelometric methods, electrophoresis, radiation detection and dosimetry, osmometry, electrochemistry and applications to molecular diagnostic and forensic testing, and basic electronic applications. Statistical applications to data analysis of both instrument and method comparisons, trouble shooting and quality control in the clinical lab. Prerequisites: CHEM 211 or CHEM 321, MATH 102M or permission of the instructor. Pre- or corequisite: MLS 325.

**MLS 325. Clinical Instrumentation Methods. 1 Credit.**
A laboratory course designed for students entering the clinical laboratory field. The course includes the instrumental and data processing techniques required for the clinical analysis of body fluids as well as applied statistical techniques to the interpretation of laboratory data, and statistical comparison methods. Lab to include lab sessions in molecular diagnostic testing, comparison studies, quality control, calibration, maintenance, and trouble shooting of clinical chemistry analytics. Prerequisites: MATH 102M, CHEM 121N, CHEM 122N, CHEM 123N, CHEM 124N, and CHEM 211.

**MLS 326. Immunohematology. 3 Credits.**
The study of the identification of blood group antigens and antibodies, standard testing procedures, decision criteria for component selection, and regulations of blood banks and transfusion services. Prerequisites: MLS 311, MLS 312, MLS 330, MLS 331, BIOL 250, and BIOL 251 or permission of the instructor. Pre- or corequisite: MLS 336.

**MLS 327. Hemostasis. 1 Credit.**
The study of the fundamentals of hemostasis, emphasizing principles, evaluation techniques, and diagnostic applications. Class meets the first seven weeks of the semester. Prerequisites: MLS 311, MLS 312 or permission of the instructor.

**MLS 330. Clinical Immunology/Serology. 2 Credits.**
The study of the body's immune response, its cellular and non-cellular components, in-vitro manifestations, diagnostic techniques and interpretations related to the investigation and diagnosis of infectious and non-infectious disease states. Prerequisite: BIOL 121N, BIOL 122N, BIOL 250 and BIOL 251 or permission of the instructor. Pre- or corequisite: MLS 331.

**MLS 331. Clinical Immunology/Serology Laboratory. 1 Credit.**
Laboratory methods emphasizing in-vitro antigen and antibody reactions used to aid in the diagnosis of infectious and non-infectious disorders. Prerequisites: admission to the major or minor in medical laboratory science. Pre- or corequisite: MLS 330.

**MLS 336. Immunohematology Laboratory. 1 Credit.**
Laboratory methods emphasizing procedures that lead to the identification of blood group antigens and antibodies and the selection of therapeutic components necessary for making transfusion-related decisions. Prerequisite: admission to the major or minor in medical laboratory science. Pre- or corequisite: MLS 336.

**MLS 337. Advanced Hematology. 1 Credit.**
The microscopic study of blood cells in blood and body fluids, emphasizing morphologic identification and correlation of laboratory data in order to identify specific disease states. Class meets the second seven weeks of the semester. Prerequisites: MLS 311 and MLS 312 or permission of the instructor.

**MLS 339. Medical Parasitology and Mycology Laboratory. 1 Credit.**
Laboratory methods emphasizing the identification of medically relevant parasites and fungi. Prerequisite: admission to the major or minor in medical laboratory science. Pre- or corequisite: MLS 340.

**MLS 340. Medical Parasitology, Mycology, and Virology. 1 Credit.**
A study of the medically important parasites, fungi, and viruses, and their medical significance. Prerequisite: MLS 307, MLS 308 or permission of the instructor.
MLS 350. Urinalysis. 1 Credit.
A study of the chemical, physical and microscopic analysis of human urine and body fluids, anatomy and physiology, and pathophysiology, with abnormal results interpreted and correlated to disease processes. Restricted to distance education students. Prerequisites: BIOL 250 and BIOL 251 or permission of the instructor.

MLS 351. Clinical Biochemistry. 3 Credits.
An introduction to the applications of biochemistry and clinical testing in the diagnosis of human disease. Practice given in the interpretation of laboratory data in the areas of carbohydrate, protein, lipid, genetic disorders, liver, renal, pancreatic, G.I., enzymatic, and cardiac testing. Also enzyme kinetics, electrolytes, acid base physiology, tumor markers, endocrinology, pharmacokinetics, therapeutic drug monitoring, and molecular diagnostics. Special emphasis on specimen collecting, pre- and post-analytical variables, and case studies. Prerequisites: BIOL 250, BIOL 251, CHEM 211, and CHEM 212, or permission of the instructor.

MLS 401. General Pathology. 3 Credits.
This course is an overview of general disease processes and causes in the human. All body systems will be covered including respiratory, gastrointestinal, circulatory, nervous, reproductive, and urinary. Aging, dietary, and stress factors will be discussed in the disease process. Bacteria, fungi, and viruses will be discussed in general and for each body system. Neoplasms will be covered for each body site. This course will be of benefit to anyone interested in diseases of the human body or entering the medical field. (cross listed with CYTO 404) Prerequisite: junior standing. Pre- or corequisites: BIOL 250 and BIOL 251 or equivalent.

MLS 403W/S03. Management in the Clinical Setting. 3 Credits.
A course concerned with organization and management in the clinical setting including personnel supervision, planning, equipment justification, quality assurance, data processing, budgeting, fiscal techniques, marketing, regulatory agencies, educational methodologies, current issues, as well as legal and ethical considerations. This is a writing intensive course. Prerequisites: junior standing and a grade of C or better in ENGL 110C and ENGL 211C or ENGL 221C or ENGL 231C.

MLS 404. Clinical Hematology Practicum. 4 Credits.
Direct clinical experience offered in automated and manual hematology procedures used in distinguishing blood dyscrasias and coagulation abnormalities. (qualifies as a CAP experience) Prerequisites: MLS 311, MLS 312, MLS 327, MLS 337, and permission of the program director.

MLS 406. Clinical Microbiology Practicum. 5 Credits.
Direct clinical experience offered in isolating and identifying human pathogens such as bacteria, fungi, and parasites from various clinical specimens. Prerequisites: MLS 307, MLS 308, MLS 309, MLS 319 and permission of the program director.

MLS 440/540. Statistical Applications and Data Analysis in the Clinical Laboratory. 3 Credits.
Topics include review of basic statistics used in the laboratory; use of statistics for quality control, reference range determination, method comparisons, test utility assessment, techniques for searching the literature and assessing quality and applicability of published studies; and data organization and retrieval via queries. Students will perform projects, preferably using actual laboratory data, that relate to lecture topics. Prerequisites: STAT 130M and permission of the instructor.

MLS 444. Advanced Clinical Practicum. 3 Credits.
A project-based advanced clinical experience for laboratory practitioners emphasizing enhancement of basic procedures and techniques and development of management, research, computer and educational skills, resulting in a written paper and oral presentation. (qualifies as a CAP experience) Prerequisite: MLS 440 or approved research methods course; or permission of instructor.

MLS 452. Clinical Biochemistry Practicum. 5 Credits.
Direct clinical experience offered in automated and manual clinical chemistry determinations with emphasis on the principles, instrumentation, interpretation, and diagnostic significance. Prerequisites: MLS 324, MLS 325, MLS 351, and permission of the program director.

MLS 454. Clinical Blood Bank Practicum. 4 Credits.
Direct clinical experience offered in the theories and principles of blood banking with emphasis on the instruction of technical procedures used in an AABB approved blood bank. Prerequisites: MLS 311, MLS 312, MLS 326, MLS 336, and permission of the program director.

MLS 457. Medical Laboratory Science Seminar. 1 Credit.
In-depth review for Medical Laboratory Scientist (MLS) certification exam. Prerequisite: permission of the program director.

MLS 480. Clinical Elective Practicum. 1 Credit.
Directed internship in any clinical area of interest approved by the clinical instructor and program director. Prerequisite: permission of the program director.

MLS 495. Special Topics in Medical Laboratory Science. 1-3 Credits.
The advanced study of selected topics within the medical field. Prerequisite: permission of the program director.

MLS 497. Directed Study in Medical Laboratory Science. 1-3 Credits.
Supervised experience in medical laboratory science specialties, allowing students to pursue areas of interest under faculty direction. Prerequisite: permission of the program director.

MLS 498. Clinical Research Methods. 3 Credits.
An introduction to clinical research methods to include sampling techniques, data collection and analysis, inferential statistics, multivariate analysis, hypothesis testing and research design. The student will be expected to develop a research proposal based upon a critical review of the literature. Prerequisite: STAT 130M or permission of the instructor.

MLS 503. Management in the Clinical Setting. 3 Credits.
A course concerned with organization and management in the clinical setting including personnel supervision, planning, equipment justification, quality assurance, data processing, budgeting, fiscal techniques, marketing, regulatory agencies, educational methodologies, current issues, as well as legal and ethical considerations.

MLS 540. Statistical Applications and Data Analysis in the Clinical Laboratory. 3 Credits.
Topics include review of basic statistics used in the laboratory; use of statistics for quality control, reference range determination, method comparisons, test utility assessment, techniques for searching the literature and assessing quality and applicability of published studies; and data organization and retrieval via queries. Students will perform projects, preferably using actual laboratory data, that relate to lecture topics.