

MLS - Medical Laboratory Science

MLS 210 Orientation to Medical Laboratory Science (1 Credit Hour)

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 (1 Credit Hour)

Laboratory techniques in the diagnosis of clinically relevant microorganisms.

Prerequisites: Admission to the major or minor in medical laboratory science

Pre- or corequisite: MLS 308

MLS 308 Clinical Microbiology (2 Credit Hours)

A fundamental course in microbiology that includes bacterial growth, synthesis, differentiation, microbial nutrition and metabolism.

Prerequisites: A grade of C or better in BIOL 121N, and BIOL 122N or permission of the instructor

Pre- or corequisite: MLS 307

MLS 309 Medical Bacteriology (3 Credit Hours)

A comprehensive survey of bacteria, including colonial morphology, cultural characteristics, biochemical identification, pathogenicity, epidemiology, and treatment.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor, or the Medical Laboratory Science Degree Completion major; must be fully declared in degree program

Pre- or corequisite: C or better in MLS 307 and MLS 308 or an approved equivalent

MLS 310 Urinalysis and Body Fluids (1 Credit Hour)

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: Restricted to students with a major or minor in Cytology, Medical Lab Science, Medical Lab Science Degree Completion, or Pre-Clinical Studies, or permission of the instructor; C or better in BIOL 250 and BIOL 251 or an approved equivalent (BIOL 240/241 respectively)

MLS 311 Hematology (3 Credit Hours)

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: Limited to students in the Medical Laboratory Science major or minor; must be fully declared into degree program; C or better in BIOL 250 and 251 or an approved equivalent (BIOL 240/241 respectively)

Pre- or corequisite: MLS 312

MLS 312 Hematology Laboratory (1 Credit Hour)

Laboratory methods utilizing microscopy and other analytical procedures in the diagnosis and investigation of hematological disorders.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor; must be fully declared into degree program; C or better in BIOL 250 and 251 or an approved equivalent (BIOL 240/241 respectively)

Pre- or corequisite: MLS 311

MLS 313 Diagnostic Methods in Urinalysis (1 Credit Hour)

Laboratory experience in the chemical, physical, and microscopic examination of the urine and body fluids with emphasis on quality control, osmometry, and disease correlates.

Prerequisites: Restricted to students with a major or minor in Medical Lab Science or Medical Lab Science Degree Completion, or permission of the instructor; C or better in BIOL 250 and BIOL 251 or an approved equivalent (BIOL 240/241 respectively)

Corequisites: MLS 310

MLS 319 Medical Bacteriology Methods (2 Credit Hours)

Laboratory methods emphasizing isolation, identification and media requirements for pathogenic microorganisms.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor; must be fully declared in degree program

Pre- or corequisite: MLS 309

MLS 324 Clinical Chemistry I (3 Credit Hours)

This course covers the theory of operation of instrumentation used in the clinical chemistry laboratory. Methodologies discussed include (but not limited to): atomic absorption spectrometry, automation, blood gas instrumentation, chromatography, electrochemistry, electrophoresis, fluorometry, immunochemistry, luminometry, mass spectrometry, nephelometry, osmometry, POCT, spectrophotometry, and turbidimetry. Clinical chemistry principles of proteins, enzymes, therapeutic drug monitoring, and electrolytes are discussed. Basic laboratory mathematics applicable to serial and compound dilutions, conversion between metric units, and determination of analyte concentration are presented. Statistical applications for quality control data analysis are introduced.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor, the Medical Laboratory Science Degree Completion major, or Biomedical Engineering minor; must be fully declared into degree program; C or better in CHEM 211 or CHEM 321 and C or better in MATH 102M, or permission of the instructor

Pre- or corequisite: MLS 325

MLS 325 Clinical Chemistry I Methods (1 Credit Hour)

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 statistical techniques applied to the interpretation of laboratory data, method comparison studies, quality control, calibration, maintenance, and troubleshooting of clinical chemistry analytics.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor, the Medical Laboratory Science Degree Completion major, or the Biomedical Engineering minor; must be fully declared in degree program; grades of C or better in MATH 102M, CHEM 121N, CHEM 122N, CHEM 123N, CHEM 124N, and CHEM 211

Pre- or corequisite: MLS 324

MLS 326 Immunohematology (3 Credit Hours)

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: Limited to Medical Laboratory Science majors or minors, or Medical Laboratory Science Degree Completion majors; must be declared in degree program; C or better in MLS 330 and MLS 331 or permission of the instructor

Pre- or corequisite: MLS 311, MLS 312, and MLS 336

MLS 328 Advanced Hematology and Hemostasis (2 Credit Hours)

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. Fundamentals of hemostasis, emphasizing principles, evaluation techniques, and diagnostic applications.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor, or the Medical Laboratory Science Degree Completion major; must be fully declared in degree program

Pre- or corequisite: MLS 311 and MLS 312

MLS 330 Clinical Immunology/Serology (2 Credit Hours)

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.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor, or the Medical Laboratory Science Degree Completion major; must be fully declared in degree program

Pre- or corequisite: MLS 331

MLS 331 Clinical Immunology/Serology Laboratory (1 Credit Hour)

Laboratory methods emphasizing in-vitro antigen and antibody reactions used to aid in the diagnosis of infectious and non-infectious disorders.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor; must be fully declared in a degree program

Pre- or corequisite: MLS 330

MLS 336 Immunohematology Laboratory (1 Credit Hour)

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.

Prerequisites: Admission to the major or minor in Medical Laboratory Science; must be fully declared in a degree program

Pre- or corequisite: MLS 326

MLS 339 Medical Parasitology and Mycology Laboratory (1 Credit Hour)

Laboratory methods emphasizing the identification of medically relevant parasites and fungi.

Prerequisites: Admission to the major or minor in Medical Laboratory Science (intended or declared)

Pre- or corequisite: MLS 340

MLS 340 Medical Parasitology, Mycology, and Virology (1 Credit Hour)

A study of the medically important parasites, fungi, and viruses, and their medical significance.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor, or the Medical Laboratory Science Degree Completion major (intended or declared)

Pre- or corequisite: MLS 307 and MLS 308

MLS 351 Clinical Chemistry II (3 Credit Hours)

An introduction to the applications of biochemistry and clinical testing in the diagnosis of human disease. Practice is given in the interpretation of laboratory data in the areas of carbohydrates, lipids, genetic disorders, liver, renal, pancreatic, G.I., cardiac testing, acid-base physiology, tumor markers, endocrinology, pharmacokinetics, and molecular diagnostics. Special emphasis on specimen collecting, pre- and post-analytical variables, and case studies.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor, or the Medical Laboratory Science Degree Completion major; must be fully declared in degree program; grades of C or better in BIOL 250, BIOL 251, CHEM 211, CHEM 212, and MLS 324 or permission of the instructor

Pre- or corequisite: MLS 325

MLS 401 General Pathology (3 Credit Hours)

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) Pre- or

Prerequisites: junior standing

Corequisites: BIOL 250 and BIOL 251 or equivalent

MLS 402 Survey of Clinical Molecular Techniques (2 Credit Hours)

A brief review of nucleic acid chemistry, followed by discussion of clinical applications of FDA approved assays used to detect pathogens for which testing algorithms include molecular based testing.

Prerequisites: Limited to Medical Laboratory Science Degree Completion majors (intended or declared)

MLS 403W/503 Management in the Clinical Setting (3 Credit Hours)

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 231C; Restricted to Cytology, Medical Lab Science, Medical Lab Science Degree Completion, and Pre-Clinical Studies majors, Administrative Leadership and Ethics for Professional Roles Interdisciplinary minor or permission of the instructor

MLS 404 Clinical Hematology Practicum (4 Credit Hours)

Direct clinical experience offered in automated and manual hematology procedures used in distinguishing blood dyscrasias and coagulation abnormalities. Qualifies as a CAP experience. MLS 311, MLS 312, and MLS 328, or permission of the program director.

Prerequisites: Limited to declared Medical Laboratory Science majors

MLS 406 Clinical Microbiology Practicum (5 Credit Hours)

Direct clinical experience offered in isolating and identifying human pathogens such as bacteria, fungi, and parasites from various clinical specimens.

Prerequisites: Limited to declared Medical Laboratory Science majors; grades of C or better in MLS 307, MLS 308, MLS 309, MLS 319, MLS 339, and MLS 340

MLS 420/520 Blood Collection Techniques (2 Credit Hours)

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.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor (must be fully declared into degree program); C or better in BIOL 250 and BIOL 251 or equivalent (BIOL 240 and 241) or permission of the instructor

MLS 440/540 Statistical Applications and Data Analysis in the Clinical Laboratory (3 Credit Hours)

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: Limited to Medical Laboratory Science or Medical Laboratory Science Degree Completion majors (may be intended or declared) or permission of instructor; C or better in STAT 130M

MLS 441 Clinical Hematology Competencies (1 Credit Hour)

Demonstration of stated clinical laboratory competencies within the discipline of hematology.

Prerequisites: Limited to declared Medical Laboratory Science Degree Completion majors

Pre- or corequisite: MLS 328

MLS 442 Clinical Microbiology Competencies (1 Credit Hour)

Demonstration of stated clinical laboratory competencies within the discipline of clinical microbiology.

Prerequisites: Limited to declared Medical Laboratory Science Degree Completion majors; grades of C or better in MLS 309 and MLS 340 or permission of the instructor

MLS 443 Clinical Chemistry Competencies (1 Credit Hour)

Demonstration of stated clinical laboratory competencies within the discipline of clinical chemistry.

Prerequisites: Limited to declared Medical Laboratory Science Degree Completion majors; grades of C or better in MLS 324 and MLS 351 or permission of the instructor

MLS 444 Clinical Blood Bank Competencies (1 Credit Hour)

Demonstration of stated clinical laboratory competencies in the discipline of blood banking.

Prerequisites: Limited to declared Medical Laboratory Science Degree Completion majors; grades of C or better in MLS 326 and MLS 330 or permission of the instructor

MLS 452 Clinical Biochemistry Practicum (5 Credit Hours)

Direct clinical experience offered in automated and manual clinical chemistry determinations with emphasis on the principles, instrumentation, interpretation, and diagnostic significance. MLS 324, MLS 325, and MLS 351, or permission of the program director.

Prerequisites: Limited to declared Medical Laboratory Science majors

MLS 454 Clinical Blood Bank Practicum (4 Credit Hours)

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. MLS 311, MLS 312, MLS 326, and MLS 336, or permission of the program director.

Prerequisites: Limited to declared Medical Laboratory Science majors

MLS 457 Medical Laboratory Science Seminar (1 Credit Hour)

In-depth review for Medical Laboratory Scientist (MLS) certification exam.

Prerequisites: Limited to declared Medical Laboratory Science or Medical Laboratory Science Degree Completion majors

MLS 468/568 Phlebotomy Internship (2 Credit Hours)

A 120-hour clinical internship for those desiring to qualify for the ASCP certification exam in phlebotomy.

Prerequisites: C or better in MLS 420

MLS 495/595 Special Topics in Medical Laboratory Science (1-3 Credit Hours)

The advanced study of selected topics within the medical field.

Prerequisites: Limited to Medical Laboratory Science or Medical Laboratory Science Degree Completion majors (intended or declared) or permission of the program director

MLS 497/597 Directed Study in Medical Laboratory Science (1-3 Credit Hours)

Supervised experience in medical laboratory science specialties, allowing students to pursue areas of interest under faculty direction.

Prerequisites: Limited to Medical Laboratory Science or Medical Laboratory Science Degree Completion majors (intended or declared) or permission of the program director

MLS 498 Directed Research in Medical Laboratory Science (1-6 Credit Hours)

Supervised research on a specific problem in Medical Laboratory Science. Regular meetings with faculty and a written/oral report are required.

Prerequisites: Limited to MLS or MLS degree completion majors or permission of the instructor or program director

MLS 503 Management in the Clinical Setting (3 Credit Hours)

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 520 Blood Collection Techniques (2 Credit Hours)

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.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor (must be fully declared into degree program); C or better in BIOL 250 and BIOL 251 or equivalent (BIOL 240 and 241) or permission of the instructor

MLS 540 Statistical Applications and Data Analysis in the Clinical Laboratory (3 Credit Hours)

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 or equivalent; Limited to graduate students with permission from the instructor and/or MLS Program Director

MLS 568 Phlebotomy Internship (2 Credit Hours)

A 120-hour clinical internship for those desiring to qualify for the ASCP certification exam in phlebotomy.

Prerequisites: C or better in MLS 520

MLS 595 Special Topics in Medical Laboratory Science (1-3 Credit Hours)

The advanced study of selected topics within the medical field.

Prerequisites: Limited to Medical Laboratory Science or Medical Laboratory Science Degree Completion majors (intended or declared) or permission of the instructor/program director

MLS 597 Directed Study in Medical Laboratory Science (1-3 Credit Hours)

Supervised experience in medical laboratory science specialties, allowing students to pursue areas of interest under faculty direction.

Prerequisites: Limited to Medical Laboratory Science or Medical Laboratory Science Degree Completion majors (intended or declared) or permission of the instructor/program director