

MEDICAL LABORATORY SCIENCE (MLS)

Explanation of Course Numbers

- Courses in the 1000s are primarily introductory undergraduate courses
- Those in the 2000s to 4000s are upper-level undergraduate courses that also may be taken for graduate credit with permission and additional work assigned
- Those in the 6000s and 8000s are for master's, doctoral, and professional-level students
- The 6000s are open to advanced undergraduate students with approval of the instructor and the dean or advising office

MLS 0190. Blood Banking Exam Review. 0 Credits.

Review of professional knowledge in all areas of blood banking.

MLS 1101. Introduction to Laboratory Medicine I. 4 Credits.

The first in a two-course sequence. Introduction to laboratory medicine, including quality assurance and quality control, laboratory safety, specimen collection, laboratory math, basic hematology, urinalysis, and clinical chemistry. Restricted to Students in SMHS. Prerequisites: HSCI 1101, HSCI 1102 and HSCI 1103.

MLS 1102. Introduction to Laboratory Medicine II. 4 Credits.

The second in a two-course sequence. Introduction to the clinical laboratory; immunology, basic microbiology and infectious disease testing, blood banking and transfusion services, molecular diagnostics, and professionalism in the clinical laboratory. Restricted to Students in SMHS. Prerequisite: MLS 1101.

MLS 2000. Biology for Health Sciences. 3 Credits.

This course covers key concepts in biology with an emphasis on the similarities and differences between organisms and how they interact with their environment and with each other.

MLS 2001. Chemistry for Health Sciences. 3 Credits.

An introduction to basic concepts in general, organic and biological chemistry, including the nature of matter, chemical reactions, stoichiometry, solutions, and the chemistry of biomolecules.

MLS 2005. Plagues, Pandemics, and Epidemics. 3 Credits.

The biological, historical, ethical, and social implications of various diseases that have caused plagues, pandemics, and epidemics.

MLS 2007W. Microbes and Society. 3 Credits.

The ways in which microorganisms shape human society, with special emphasis on the role of microbes in food production, agriculture, biotechnology, and disease. Includes a significant engagement in writing as a form of critical inquiry and scholarly expression to satisfy the WID requirement.

MLS 3000. Clinical Laboratory Mathematics. 3 Credits.

Basic mathematical techniques used in the clinical laboratory, including exponential and logarithms, measurement systems, solutions and concentrations, proportionality, graphing, statistics and quality control, and method evaluation; practical applications of data analysis. An equivalent college-level mathematics course or permission of the program director may be substituted for the prerequisite. Restricted to students in the medical laboratory science program. Prerequisite: HSCI 2117.

MLS 3001. Professional Ethics for Medical Laboratory Scientists. 3 Credits.

Ethical and professional conduct of and dilemmas encountered by medical laboratory professionals. Restricted to students in the medical laboratory science program.

MLS 3001W. Professional Ethics for Medical Laboratory Scientists. 3 Credits.

Ethical and professional conduct of and dilemmas encountered by medical laboratory professionals. Restricted to students in the medical laboratory science programs. Includes a significant engagement in writing as a form of critical inquiry and scholarly expression to satisfy the WID requirement.

MLS 3003. Biochemistry for Laboratory Science. 3 Credits.

Concepts and principles of biochemistry applicable to laboratory science; structure and function of biological molecules, cellular energetics, and cellular metabolism in relation to human physiology and health. Prerequisites: BISC 1111, CHEM 1111, and CHEM 1112.

MLS 4106. Urogenital System Cytology. 2 Credits.

MLS 4116. Clinical Bacteriology I. 3 Credits.

Principles of clinical microbiology with emphasis on pathogenic characteristics, isolation, and identification of bacteria related to human disease; theoretical approach to the current diagnostic techniques and identification systems used in clinical practice. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1111.

MLS 4117. Clinical Bacteriology II. 2 Credits.

The etiology of infectious diseases in different body sites with an emphasis on the epidemiology, pathogenic mechanisms, and laboratory identification of suspected etiologic agents; specimen collection and handling, diagnosis and treatment of medically significant bacteria. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1111.

MLS 4119. Parasitology, Mycology, and Virology. 2 Credits.

Principles and procedures involved in the diagnosis of parasitic, fungal, and viral infections; disease causation, specimen collection and handling, laboratory identification and treatment of medically significant fungi, parasites, and viruses. Proctor fee. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1112; or BISC 1116 and BISC 1126.

MLS 4121. Applied Microbiology. 4 Credits.

Physiology, metabolism and pathogenesis of medically important bacteria with an emphasis on their isolation and identification in the clinical microbiology laboratory. Restricted to students enrolled in the undergraduate certificate in clinical microbiology program or with the permission of the instructor. Prerequisites: BISC 1116 and BISC 1126.

MLS 4123. Clinical Microbiology I. 3 Credits.

Principles of clinical microbiology with emphasis on pathogenic characteristics, isolation, and identification of bacteria and viruses related to human disease; theoretical approach to the current diagnostic techniques and identification systems used in clinical practice; disease causation, specimen collection and handling, laboratory identification, and treatment of medically significant bacteria and viruses. For prerequisites BISC 1115/BISC 1125 an equivalent biology course and for HSCI 3106 an equivalent general microbiology course may be substituted at the instructor's discretion. Proctor fee. Recommended background: BISC 1111 and HSCI 3106.

MLS 4124. Clinical Microbiology II. 2 Credits.**MLS 4130. Hematology I. 3 Credits.**

Study of the blood and blood-forming tissues with emphasis on hematologic techniques and cell identification; anemias and non-malignant leukocyte disorders. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1111.

MLS 4131. Hematology II. 3 Credits.

Study of the blood and blood-forming tissues with emphasis on white blood cell disorders; introduction to the hemostatic system and associated coagulation disorders. Restricted to students in the medical laboratory science program. Prerequisites: MLS 4130.

MLS 4136. Clinical Experience I. 2 Credits.

Supervised clinical experience in clinical chemistry. Proctor fee.

MLS 4137. Clinical Experience II. 2 Credits.

Supervised clinical experience in microbiology. Proctor fee.

MLS 4138. Clinical Experience III. 2 Credits.

Supervised clinical experience in hematology, coagulation and urinalysis. Proctor fee.

MLS 4139. Clinical Experience IV. 2 Credits.

Supervised clinical experience in transfusion medicine and serology. Proctor fee.

MLS 4141. Immunology and Serology. 3 Credits.

Principles of the immune system's components, functions, interactions with microorganisms, and the clinical applications of immunologic assays to human health and disease.

MLS 4145. Clinical Biochemistry I. 3 Credits.

This course studies the methodologies employed in the chemical analysis of human blood and body fluids. This includes an examination of the fundamentals of measurement and the principles of instrumentation as they relate to the assay of each analyte studied. In addition, the laboratory results are correlated with the clinical significance and pathophysiology which may generate changes in the analyte. Throughout the course, the quality assurance measures required to ensure reliability and validity of the laboratory results are also emphasized. [add to end of description: Proctor fee.]

MLS 4146. Clinical Biochemistry II. 3 Credits.

This second course in clinical biochemistry continues the study of the measurement and interpretation of chemical constituents in human blood and body fluids. The laboratory results of each analyte are correlated with the clinical significance and pathophysiology which may generate changes in the analyte. Throughout the course, the quality assurance measures required to ensure reliability and validity of the laboratory results are also emphasized.

MLS 4150. Immunohematology. 3 Credits.

The major blood group systems that affect the practice of transfusion medicine and examines the processing and distribution of blood products supplied by transfusion services. Proctor fee.

MLS 4151. Molecular Diagnostics. 3 Credits.

Introduction to the molecular techniques used to diagnose human disease; technology, theory, and methodology of specific molecular protocols that can be used within a clinical laboratory setting to aid in disease diagnostics including those of genetic, oncogenic, and infections origin. Proctor fee.

MLS 4158. Laboratory Management and Operations. 3 Credits.

Introduction to critical concepts of lab management, including leadership theory, management principles, human resource management, financial management, quality management, and laboratory operations. Proctor fee.

MLS 4159. Capstone Seminar. 1 Credit.

Comprehensive review of medical laboratory science, which prepares students to sit for the board of certification examination. Integration of knowledge gained in didactic and practicum courses within the various laboratory disciplines, including hematology, microbiology, chemistry, and immunohematology. Proctor fee.

MLS 4160. Blood Bank Practicum. 4 Credits.

Clinical practicum in which students apply medical knowledge and clinical skills gained in MLS 4150. Prerequisites: MLS 4150.

MLS 4161. Clinical Biochemistry Practicum. 4 Credits.

Application of the medical knowledge and clinical skills gained in the didactic clinical biochemistry I and clinical biochemistry II courses. Proctor fee.

MLS 4162. Hematology Practicum. 2 Credits.

Analyses and laboratory testing of human blood specimens.

MLS 4163. Immunology and Serology Practicum. 1 Credit.

Supplemental, hands-on clinical experience applying medical knowledge and clinical skills gained in the didactic Immunology and serology course. For students who need to meet additional requirements for state licensure as a medical laboratory professional. Restricted to students in the medical laboratory science program.

MLS 4164. Clinical Microbiology Practicum. 4 Credits.

Students apply medical knowledge and clinical skills gained in MLS 4123 (Clinical Microbiology I), MLS 4124 (Clinical Microbiology II), and MLS 4151 (Molecular Diagnostics). Proctor fee.

MLS 4165. Urinalysis Practicum. 1 Credit.

Active engagement in applying medical knowledge and clinical skills in the analysis of urine and body fluids.

MLS 4166. Coagulation Practicum. 1 Credit.

One-week required rotation for students in the Bachelor of Science in Health Science in Medical Laboratory Science (MLS), Post-baccalaureate MLS, or Post-baccalaureated in Hematology for MLS certificate programs. Focus on analyses and laboratory testing of human blood specimens.

MLS 4170. Introduction to Molecular Biology. 3 Credits.

Foundational course in molecular biology; DNA replication, DNA repair, transcription, translation and gene regulation. Prerequisites: BISC 1111.

MLS 4171. Human Genetics. 3 Credits.

Hereditary and molecular genetics as it applies to humans. Prerequisites: BISC 1111.

MLS 4172. Molecular Diagnostics Capstone. 3 Credits.

Culmination course for the BSHS in molecular diagnostic sciences program. Provides an overview of molecular diagnostics using a case-based approach. Students must have earned a minimum grade of C in all prerequisite courses in order to enroll in this course. Program director approval may be substituted for prerequisite courses. Proctor fee. Prerequisites: MLS 4170, MLS 4171, MLS 4217 and MLS 4242.

MLS 4179. Microbiology Laboratory Operations. 3 Credits.

Quality assurance, quality control, and regulatory requirements in a clinical microbiology laboratory, with particular emphasis on laboratory operations and management. Restricted to students enrolled in the undergraduate certificate in clinical microbiology program or with the permission of the instructor. Prerequisites: BISC 1116 and BISC 1126.

MLS 4216. Clinical Bacteriology Laboratory. 1 Credit.

Hands-on experience in current diagnostic techniques and identification systems used in clinical practice; principles, procedures, techniques and data interpretation for the isolation and identification of clinically significant bacteria. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1111. Corequisites: MLS 4116.

MLS 4217. Molecular Techniques. 3 Credits.

Theory and processes of current molecular techniques used to diagnose human disease. Prerequisites: BISC 1111.

MLS 4219. Parasitology, Mycology, and Virology Laboratory. 1 Credit.

Principles and procedures involved in the diagnosis of parasitic, fungal, and viral infections; disease causation, specimen collection and handling, laboratory identification and treatment of medically significant fungi, parasites and viruses. Laboratory fee. Corequisite MLS 4119. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1112; or BISC 1116 and BISC 1126.

MLS 4230. Hematology Laboratory. 1 Credit.

Diagnostic analyses used to evaluate disease states associated with human blood cells; quality assurance in the hematology lab and on the evaluation of stained blood smears and microscopic differentiation of blood cells. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1111. Corequisites: MLS 4130.

MLS 4242. Applications of Molecular Testing. 3 Credits.

Application of molecular testing to diagnose various human diseases and disorders. Prerequisites: BISC 1111; or BISC 1115 and BISC 1125.

MLS 4246. Clinical Biochemistry Laboratory. 1 Credit.

Practical laboratory course covering the principles and procedures of various diagnostic testing procedures performed in the clinical biochemistry laboratory; measurement and interpretation of chemical constituents in human blood and body fluids. Laboratory fee. Corequisite: MLS 4145. Prerequisites: CHEM 1111 and CHEM 1112. Recommended background: students in the medical laboratory science program.

MLS 4250. Immunohematology Laboratory. 1 Credit.

Performance of routine blood banking procedures, including blood group and Rh typing, antibody screens, antibody identification, cross matching, and elution and absorption techniques. Restricted to students in the medical laboratory science program.

MLS 4251. Molecular Diagnostics Laboratory. 1 Credit.

An introduction to the theory of and laboratory techniques in molecular biology with an emphasis on molecular and serological techniques, including DNA extraction and quantitation, restriction enzyme digestion, polymerase chain reaction, agarose gel electrophoresis, flow cytometry, and ELISA. Restricted to students in the medical laboratory science program.

MLS 4252. Applications of Molecular Testing Laboratory. 2 Credits.

Molecular-based testing to determine human disease causation. Prerequisites: BISC 1111.

MLS 4266. Molecular Diagnostics Practicum. 6 Credits.

Application of molecular techniques in a clinical setting to facilitate the diagnosis of human diseases. Students must have earned a minimum grade of C in all prerequisite courses. Instructor permission may be substituted for prerequisites. Prerequisites: MLS 4170, MLS 4171, MLS 4217 and MLS 4242.

MLS 4995. Independent Research in Biomedical Laboratory Science. 1-3 Credits.

Opportunity to complete an independent research project under the direction of a faculty mentor. Approval by both the faculty mentor and the program director is required.

MLS 4997. Independent Study in Biomedical Laboratory Science. 1-3 Credits.

Opportunity to gain or enhance biomedical laboratory science knowledge and explore a specific area of interest. Permission of program director is required prior to enrollment.

MLS 5099. Variable Topics. 1-99 Credits.

MLS 6114. Advanced Clinical Microbiology I. 2 Credits.

Pathogenic characteristics, isolation techniques, specimen collection and handling, laboratory identification, and treatment of medically significant bacteria and viruses with emphasis on current diagnostic techniques used in clinical practice.

MLS 6116. Advanced Clinical Bacteriology I. 3 Credits.

Principles of clinical microbiology with emphasis on pathogenic characteristics, isolation, and identification of medically significant bacteria. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1111.

MLS 6117. Advanced Clinical Bacteriology II. 2 Credits.

Etiology of infectious diseases in different body sites using a case study#based approach; epidemiology, pathogenic mechanisms, and laboratory identification of suspected etiologic agents; commonly encountered clinical bacterial species. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1111 and MLS 6116.

MLS 6119. Advanced Parasitology, Mycology, and Virology. 2 Credits.

Provides a systematic approach to the biology and epidemiology of human parasitic, fungal, and viral diseases. Proctor fee. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1112; or BISC 1116 and BISC 1126.

MLS 6123. Advanced Clinical Microbiology I. 3 Credits.

Pathogenic characteristics, isolation techniques, specimen collection and handling, laboratory identification, and treatment of medically significant bacteria and viruses; current diagnostic techniques used in clinical practice. Prerequisites: BISC 1111 and HSCI 3106 or equivalents.

MLS 6124. Advanced Clinical Microbiology II. 2 Credits.

The etiology of human infectious diseases using an organ system approach.

MLS 6130. Advanced Hematology I. 3 Credits.

Blood and blood-forming tissues with emphasis on hematologic techniques and cell identification; anemias and non-malignant leukocyte disorders. Proctor fee. Restricted to students in the medical laboratory science program. Recommended background: BISC 1111.

MLS 6131. Advanced Hematology II. 3 Credits.

Hematopoiesis and hemostatic disorders. Proctor fee. Restricted to students in the medical laboratory science program. Prerequisite: MLS 6130.

MLS 6132. Molecular Epidemiology. 3 Credits.

The range of molecular and genetic techniques used and their applications in epidemiological investigations.

MLS 6141. Advanced Immunology and Serology. 3 Credits.

The immune system, various immune-related diseases, and the clinical applications of immunology related to the diagnosis and monitoring of human diseases.

MLS 6145. Advanced Clinical Biochemistry I. 3 Credits.

Methodologies employed in the chemical analysis of human blood and body fluids and the associated pathophysiology of each analyte measured; measurement of carbohydrates, proteins, lipids, and clinically significant enzymes. Proctor fee. Restricted to students in the medical laboratory science program. Prerequisites: CHEM 1111 and CHEM 1112.

MLS 6146. Advanced Clinical Biochemistry II. 3 Credits.

Methodologies used in the chemical analysis of human blood and body fluids and the associated pathophysiology of each analyte measured; measurement of hormones, urinalysis and body fluids, biomarkers, and toxins. Proctor fee. Restricted to students in the medical laboratory science program. Prerequisites: CHEM 1111, CHEM 1112 and MLS 6145.

MLS 6150. Advanced Immunohematology. 3 Credits.

Blood group systems that impact the practice of transfusion medicine; processing and distribution of blood products supplied by blood donor centers and transfusion services. Proctor fee. Restricted to students in the medical laboratory science program. Prerequisites: BISC 1111.

MLS 6151. Advanced Molecular Diagnostics. 3 Credits.

Overview of molecular biology and genetic concepts as well as molecular techniques used to diagnose human diseases. The technology, theory, and methodology of molecular protocols used within a clinical and research laboratory setting.

MLS 6158. Advanced Laboratory Management and Operations. 3 Credits.

An introduction to critical concepts of lab management, including leadership theory, management principles, human resource management, financial management, quality management, and laboratory operations. Prerequisites: HSCI 2100 and HSCI 2117; for HSCI 2100 an equivalent English course and for HSCI 2117 an equivalent college-level math course may be substituted at the instructor's discretion.

MLS 6159. Leadership in Laboratory Medicine. 3 Credits.

Leadership characteristics and styles and assessment of their strengths and weaknesses. Applying effective leadership strategies and decision making in the laboratory medicine setting.

MLS 6160. Data Analytics and Research Methods in Laboratory Medicine. 3 Credits.

Basic methods and practices for conducting valid and ethical research in the clinical laboratory. Literature review, research populations and designs, research ethics, data management and analytics, and research publication. Prerequisites: HSCI 6263.

MLS 6166. Molecular Diagnostics Practicum. 3 Credits.

During this practicum course, the student is actively engaged in applying molecular techniques to diagnose various human diseases.

MLS 6203. Clinical Immunohematology I. 5 Credits.

MLS 6204. Clinical Immunohematology II. 5 Credits.

MLS 6207. Clinical Practicum: Blood Banking I. 5 Credits.

MLS 6208. Clinical Practicum: Blood Banking II. 5 Credits.

MLS 6209. Clinical Practicum: Blood Banking III. 5 Credits.

MLS 6210. Clinical Immunology: Principles & Lab Diagnosis. 4 Credits.

MLS 6211. Hematopoiesis & Blood Pathophysiology. 2 Credits.

MLS 6212. Organization and Management of Blood Banks. 3 Credits.

MLS 6213. Seminar in Immunohematology. 2 Credits.

MLS 6214. Specialized Practicum. 4 Credits.

MLS 6215. Research Project. 3 Credits.

MLS 6216. Microbial Pathogenesis. 3 Credits.

A comprehensive overview of the molecular basis of diseases caused by microbial pathogens with a focus on model microbial systems to illustrate mechanisms of the human infectious disease process.

MLS 6217. Medical Biotechnology. 3 Credits.

Comprehensive overview of current molecular technologies and how they are used in modern medicine.

MLS 6218. Genetics. 3 Credits.

This course covers hereditary and molecular genetics, with an emphasis on genomics and human diseases.

MLS 6219. Molecular Biology. 3 Credits.

This course emphasizes the molecular mechanisms of DNA replication, repair, transcription, translation and gene regulation in prokaryotic and eukaryotic cells.

MLS 6242. Molecular Pathology. 3 Credits.

This course investigates human disease processes with an emphasis on the molecular and genetic mechanisms of disease. The goal of this class is to advance students' understanding of how molecular, cellular and genetic approaches are used to investigate human diseases. Current knowledge of the molecular and cellular events which lead to various human diseases is covered, including cardiovascular, neurological and musculoskeletal abnormalities, autoimmunity, endocrine defects, infectious disease and cancer. Through lectures, assigned readings and discussions, current applications and limitations of modern diagnostic medicine and the importance of basic and applied research to further the understanding of human disease are addressed.

MLS 6243. Education and Assessment in MLS. 3 Credits.

This course studies the process of instructional design and applied to the education and training of MLS professionals. Topics include a fundamental review of instructional strategies, needs assessment, task analysis, analysis of subject-matter content, the development of goals and objectives, lesson design, and the assessment of instructional outcomes. This is a project-oriented course in which students design, develop, and evaluate a set of MLS instructional materials and assessment tools. In addition, current trends in instructional design as applied to the MLS field are also explored.

MLS 6244. Research Ethics and Integrity. 3 Credits.

This course addresses traditional and modern topics in research ethics and scientific integrity. The purpose of this course is to emphasize ethical theory and principles of bioethics while planning and conducting scientific studies. Through lectures, reading assignments, case studies and discussion sessions, the following topics are covered: ethical theory and principles, scientific and academic integrity, informed consent in research; Institutional Review Boards and the use of human subjects in research; IACUC and the use of animals in research, Institutional Biosafety Committees and the use of recombinant DNA in research; conflicts of interest and commitment; authorship and publication; the peer-review process; collaboration and mentoring; methodology, data reporting and data management; ownership of data and intellectual property; whistleblowing and dispute resolution; and privacy and confidentiality. Students learn to conduct unbiased peer-review, conduct research and report on an independent examination of a case of research misconduct or other ethical issue, and participate in oral scientific and ethical discussions.

MLS 6245. Current Topics in Medical Laboratory Science. 3 Credits.

Novel findings within each area of the medical laboratory science field, including hematology and hemostasis, immunology and serology, clinical microbiology, immunohematology, clinical chemistry, molecular diagnostics, and laboratory operations and management. The course is designed to enhance critical thinking and problem solving skills. Current topics are integrated into the development of a project proposal for the capstone research project that the student completes the following semester.

MLS 6246. Capstone Project. 3 Credits.

This course allows students to apply the knowledge gained throughout the program through the completion of an independent, mentored project. A proposal for the capstone project is developed by the student as a component of the Current Topics course of the previous semester.

MLS 6247. Advanced Clinical Biochemistry Practicum. 2 Credits.

Practical application of the medical knowledge and clinical skills gained in MLS 6145 and MLS 6146. Restricted to students in the medical laboratory science program. Prerequisites: MLS 6145 and MLS 6146.

MLS 6248. Advanced Blood Bank Practicum. 2 Credits.

Application of the medical knowledge and clinical skills gained in the prerequisite courses. Restricted to students in the medical laboratory science program. Prerequisites: MLS 6141 and MLS 6150.

MLS 6249. Advanced Coagulation Practicum. 1 Credit.

Practical application of the medical knowledge and clinical skills gained in MLS 6130 and MLS 6131. Restricted to students in the medical laboratory science program. Prerequisites: MLS 6130, MLS 6131 and MLS 6141.

MLS 6250. Advanced Hematology Practicum. 1 Credit.

Practical application of the medical knowledge and clinical skills gained in the prerequisite courses. Restricted to students in the medical laboratory science program. Prerequisites: MLS 6130 and MLS 6131.

MLS 6251. Advanced Clinical Microbiology Practicum. 2 Credits.

Practical application of the medical knowledge and clinical skills gained in ML 6116, MLS 6117, and MLS 6119. Restricted to students in the medical laboratory science program. Prerequisites: MLS 6116, MLS 6117, MLS 6119 and MLS 6141.

MLS 6252. Advanced Urinalysis Practicum. 1 Credit.

Practical application of the medical knowledge and clinical skills gained in MLS 6145 and MLS 6146. Restricted to students in the medical laboratory science program. Prerequisites: MLS 6141, MLS 6145 and MLS 6146.

MLS 6995. Advanced Independent Research in Biomedical Laboratory Science. 1-3 Credits.

Opportunity to complete an independent research project under the direction of a faculty mentor. Approval by both the faculty mentor and the program director is required.

MLS 6997. Advanced Independent Study in Biomedical Laboratory Science. 3 Credits.

Opportunity to gain or enhance biomedical laboratory science knowledge and explore a specific area of interest. Permission of program director is required prior to enrollment.

MLS 8001. Clinical Laboratory Systems Management. 3 Credits.

Managerial skills required to direct clinical laboratory systems including safety and emergency management, facilities management, method comparison, process validation, strategic planning, project management, and communication strategies.

MLS 8002. Personnel Management in the Clinical Laboratory. 3 Credits.

Theories of human behavior as applied to managing a clinical laboratory, including human needs, emotional intelligence, workplace motivation, onboarding and separation, performance compliance, training, compensations, and succession planning.

MLS 8003. Lab Quality Systems and Regulatory Compliance. 3 Credits.

Practices needed to maintain a quality management system (QMS) and ensure reliability of patient lab results. Includes protocol and outcome assessments and corrective actions to ensure staff and patient safety and compliance at all levels.

MLS 8004. Finance for Clinical Laboratory Managers. 3 Credits.

Essential skills in financial management specific to the clinical lab, including general financial tasks (budgets, income statements, and cash flow analysis), market structure analysis, profitability, and revenue generation.