

MEDICAL LABORATORY SCIENCES (MLSC)

Courses

MLSC 3010. Body Fluids. 3 Credit Hours.

This is a study of selected body fluids including urine, amniotic fluid, cerebrospinal fluid, pleural fluid, peritoneal fluid, pericardial fluid, and synovial fluid. Renal physiology and the physical and chemical properties of urine and cellular elements of the urine in healthy and diseased states are studied. The formation and function of cerebrospinal fluid and amniotic fluid will be discussed. The anatomy and physiology of pleural, peritoneal, and pericardial cavities will be presented. Attention is given to the cellular and formed elements found in these body fluids. In addition, this course includes the performance of various laboratory procedures utilized in the analysis of each of these fluids. Case studies will be used to emphasize the changes in laboratory results associated with various disease states. Principles and applications of quality control procedures are practiced.

MLSC 3011. Quality Assurance in the Clinical Laboratory. 1 Credit Hour.

This course presents the principles, statistics, and applications of quality assurance as it pertains to the clinical laboratory. The course will emphasize the statistics that are needed to evaluate a quality control system, the rules that are necessary for interpreting the quality control results, and the role of quality control in a quality assurance program. The impact of federal and state regulatory agencies on the clinical laboratory and its quality assurance program will be discussed. This course uses online learning format with most instructional components delivered online and some material may be delivered in person.

MLSC 3033. Medical Microbiology. 3 Credit Hours.

This is a comprehensive study of medically important microorganisms including their composition, morphology, and growth requirements. Methods for identification including biochemical reactions of significant pathogens and their role in infectious disease will be stressed.

MLSC 3034. Medical Microbiology Lab. 2 Credit Hours.

This is a laboratory course emphasizing diagnostic clinical microbiology. Examination of samples from different body sites provides students the opportunity to recognize and identify organisms that comprise the normal flora and those that are potential pathogens. This course includes conventional and rapid biochemical methods for detection and identification of significant organisms. Principles and application of quality control procedures are practiced. Corequisites: MLSC 3033.

MLSC 3040. Special Topics in Microbiology. 3 Credit Hours.

This lecture and laboratory course will focus on the transmission, pathophysiology, clinical sites of infection, clinical presentation, life cycles, and identification of infrequently isolated bacterial pathogens, anaerobes, mycobacteria, viruses, parasites and fungal agents. Specimen collection techniques and methods of processing specimens for each group of organisms will be included. Laboratory sessions will focus on microscopic identification as well as classic and rapid methods of detection and identification of these etiologic agents. Prerequisites: MLSC 3033 and MLSC 3034.

MLSC 3051. Hematology. 3 Credit Hours.

This course is a study of the normal production, maturation, and function of erythrocytes, leukocytes, and platelets. Common disorders involving such cells will be discussed with emphasis on the pathogenic mechanisms. Hematologic laboratory tests and their correlations with disease states will also be examined. Normal hemostasis will be considered including pertinent laboratory tests used in diagnosis of coagulation problems.

MLSC 3052. Hematology Laboratory. 2 Credit Hours.

This is a clinical laboratory course emphasizing manual and semi-automated cell counting techniques and other basic hematologic tests. Time is devoted to the examination of normal and abnormal blood smears with emphasis on identification of cells and their relationships to various disease processes. An introduction to quality control methods in the hematology laboratory will also be included. Corequisites: MLSC 3051.

MLSC 3060. Immunohematology. 3 Credit Hours.

This is a study of the major blood groups of humans including the red cell antigen systems, alloantibodies, and non-immune stimulated antibodies. The relationship of blood group systems to compatibility testing, transfusion reactions, and hemolytic disease of the newborn will be discussed.

MLSC 3064. Immunohematology Laboratory. 2 Credit Hours.

This is a laboratory course emphasizing basic bloodbanking techniques including blood typing, identification of alloantibodies, and resolution of typing discrepancies. Techniques used in resolution of compatibility testing, investigation of transfusion reactions, and hemolytic disease of the newborn are practiced. Principles and applications of quality control are introduced. Corequisites: MLSC 3060.

MLSC 3065. Clinical Immunology. 3 Credit Hours.

This course will discuss the principles of innate and acquired immunity. Emphasis will be placed on the cell-mediated immune response and humoral immune response to immunogens. The cells of either response, their development, and their role in the specific immune response will be discussed. Soluble mediators of the immune response will be covered including immunoglobulins, cytokines, and complement. Finally, disorders of impaired immune function and infectious diseases will be discussed including autoimmunity, hypersensitivity, transplantation and tumor immunology, immunodeficiency, syphilis, infectious mononucleosis, etc. Laboratory testing for these disorders will be described.

MLSC 3071. Diagnostic Immunology Laboratory. 1 Credit Hour.

This laboratory course introduces students to basic laboratory concepts and skills. Safety regulations and procedures will be covered. Specimen collection, handling and storage are discussed in relation to the reliability of a laboratory test result. Students will perform immunologic procedures commonly used in the diagnosis of infectious and autoimmune diseases. Principles and applications of quality control procedures are integrated throughout. Corequisites: MLSC 3065.

MLSC 3081. Clinical Chemistry. 3 Credit Hours.

The study of carbohydrates, enzymes, proteins and other chemicals routinely analyzed in clinical chemistry laboratories. Emphasis is placed upon principles of testing, methods of analysis, data interpretation, and clinical significance of results. Laboratory mathematics, quality control, safety, and instrumentation also are topics covered.

MLSC 3082. Clinical Chemistry Laboratory. 2 Credit Hours.

This is a laboratory course emphasizing biochemical analysis of body fluids utilizing manual procedures and semi-automated instrumentation. Students are given the opportunity to develop motor skills and organizational techniques in biochemical procedures. Principles and applications of quality control procedures are practiced. Corequisites: MLSC 3081.

MLSC 3085. Principles of Biochemistry. 3 Credit Hours.

This course is a discussion of the basic biomedical processes that occur in the human body. Topics that will be covered include the molecular basis of life, molecular structure, bioenergetics, enzymes, and metabolism.

MLSC 4006. Professional Issues. 1 Credit Hour.

This interdisciplinary course will provide an overview of professional and ethical issues facing allied health professionals. Topics to be discussed include responsibilities of the health care practitioner, life and death decisions, patient confidentiality, substance abuse, whistle blowing, and informed consent. Ethics in research and other critical issues related to health care problems will also be addressed. Collaborative activities and simulated cases will be used to enhance discussion among students.

MLSC 4033. Advanced Medical Microbiology. 2 Credit Hours.

This course will discuss etiology of infectious diseases in different body sites. Laboratory identification of suspected etiologic agents, using conventional methods, will be emphasized. Recent developments in microbiology and new rapid methods in the identification of bacterial agents of infectious disease will also be presented. Prerequisites: MLSC 3033, MLSC 3034.

MLSC 4037. Clinical Practicum I. 4 Credit Hours.

The clinical practicum courses are a series of clinical experiences in microbiology, hematology, clinical chemistry, and immunohematology. The student will be assigned to one of the four clinical areas. The student will be given the opportunity to demonstrate: 1) the ability to apply knowledge, attitudes, and skills to clinical laboratory practices and procedures; 2) the ability to integrate previous knowledge and skills with more sophisticated instrumentation and advanced methodology; 3) an attitude of cooperation and concern in interpersonal relationships with patients and health care workers; and 4) an appreciation of the ethical foundations of the medical laboratory sciences profession.

MLSC 4053. Advanced Hematology. 2 Credit Hours.

Using problem-based learning approach, this advanced course presents the pathogenic mechanisms of disorders involving erythrocytes, leukocytes, platelets, and coagulation factors. The methodology for detection of diseases of the blood and blood forming organs is examined. The peripheral blood and bone marrow findings in relation to various hematopoietic disease processes will be emphasized. Abnormalities of hemostatic mechanisms and their correlation with laboratory tests will be presented.

MLSC 4054. Advanced Hematology/Web-Based. 2 Credit Hours.

This advanced course in hematology/hemostasis presents the pathogenic mechanisms of disorders involving erythrocytes, leukocytes, platelets, and coagulation factors. The methodology for detection of diseases of the blood and blood forming organs is examined with emphasis on the interpretation of the findings and determination of appropriate reflex testing. Morphologic changes in the peripheral blood and bone marrow will be emphasized. This is a Web-based course. Enrollment is open to clinical laboratory technicians/medical laboratory technicians or military-trained laboratory personnel who have been accepted into the CLS program or by special permission from the course director.

MLSC 4055. Advanced Immunohematology. 2 Credit Hours.

This is a lecture course which uses case studies to emphasize theory and principles and develop problem solving skills. Major areas of focus include collection, processing and therapeutic use of blood components; investigation of autoantibodies and alloantibodies as detected in hemolytic disease of newborns, transfusion reactions, and autoimmune hemolytic anemias. The HLA system and applications in transplantation and paternity testing will also be discussed. Prerequisites: MLSC 3060, MLSC 3064.

MLSC 4057. Clinical Practicum II. 4 Credit Hours.

The clinical practicum courses are a series of clinical experiences in microbiology, hematology, clinical chemistry and immunohematology. The student will be assigned to one of the four clinical areas. The student will be given the opportunity to demonstrate: 1) the ability to apply knowledge, attitudes, and skills to clinical laboratory practices and procedures; 2) the ability to integrate previous knowledge and skills with more sophisticated instrumentation and advanced methodology; 3) an attitude of cooperation and concern in interpersonal relationships with patients and health care workers; and 4) an appreciation of the ethical foundations of the medical laboratory sciences profession.

MLSC 4067. Clinical Practicum III. 4 Credit Hours.

The clinical practicum courses are a series of clinical experiences in microbiology, hematology, clinical chemistry, and immunohematology. The student will be assigned to one of the four clinical areas. The student will be given the opportunity to demonstrate: 1) the ability to apply knowledge, attitudes, and skills to clinical laboratory practices and procedures; 2) the ability to integrate previous knowledge and skills with more sophisticated instrumentation and advanced methodology; 3) an attitude of cooperation and concern in interpersonal relationships with patients and health care workers; and 4) an appreciation of the ethical foundations of the medical laboratory sciences profession.

MLSC 4080. Introduction to Scientific Writing. 2 Credit Hours.

This course provides students with the opportunity to acquire the knowledge and skills for effective communication in medical and scientific writing and presentations. It allows students to accomplish the following: 1) review basic writing skills, including grammar, word usage, punctuation, and sentence structure; 2) examine the scientific literature and peer-reviewed journals; 3) identify the steps involved in production of a scientific review paper; and 4) apply writing skills to the development of a scientific review paper that is suitable for publication in a peer-reviewed journal. The capstone project for the 2-course Research series - Evidence-based Literature Review in Medical Laboratory Sciences and Introduction to Scientific Writing will be a literature review paper.

MLSC 4083. Advanced Clinical Chemistry. 2 Credit Hours.

This is an advanced clinical lecture course emphasizing abnormalities in liver, cardiac, renal, and endocrine systems and their effect on chemical blood constituents. The theories and use of complex biochemical methodologies including immunochemical assays, chromatography, and electrophoresis will also be discussed. Prerequisites: MLSC 3081, MLSC 3082.

MLSC 4087. Clinical Practicum IV. 4 Credit Hours.

The clinical practicum courses are a series of clinical experiences in microbiology, hematology, clinical chemistry, and immunohematology. The student will be assigned to one of the four clinical areas. The student will be given the opportunity to demonstrate: 1) the ability to apply knowledge, attitudes, and skills to clinical laboratory practices and procedures; 2) the ability to integrate previous knowledge and skills with more sophisticated instrumentation and advanced methodology; 3) an attitude of cooperation and concern in interpersonal relationships with patients and health care workers; and 4) an appreciation of the ethical foundations of the medical laboratory sciences profession.

MLSC 4090. Special Topics Practicum. 1 Credit Hour.

Under the supervision and direction of a clinical instructor in a clinical laboratory setting, the student will gain additional experience in a select area of clinical laboratory practice. Examples include immunophenotyping by flow cytometry for diagnosis of certain hematologic neoplasms, fungal identification and in vitro susceptibility testing of antifungal drugs, and molecular diagnostic testing for diagnosis of hematologic neoplasms.

MLSC 4091. Independent Study. 1-12 Credit Hours.

A plan of study is determined by the supervising faculty. The participating student and supervising faculty develop the course requirements and forms of evaluation. Credit hours are determined by the scope of the project.

MLSC 4095. Management. 2 Credit Hours.

This course is designed to present the principle of group dynamics, human resources management, and financial analysis to students in laboratory medicine. Topics include leadership style, staffing, and laboratory information systems (data management, analysis, selection). Writing resumes and laboratory procedures and developing job performance criteria are included. Interviewing techniques and performance evaluations are practiced. Current issues in managed care including outcomes assessment, evidence-based medicine, infection control, CLIA regulations, point of care testing, onsite surveys of the laboratory and medical necessity are discussed.

MLSC 4098. Molecular. 3 Credit Hours.

This course is an introduction to molecular diagnostics in the clinical laboratory. The focus of this course will be to provide fundamental principles of molecular biology and its application in the clinical laboratory. Students will perform molecular techniques, as a laboratory component to this course, to facilitate the understanding of clinical molecular diagnostics.

MLSC 4101. Honors CLS Course. 2.5-5 Credit Hours.

This is an elective course for students who want to study a CLS discipline in more depth or breadth, participate in a research project, study a professional issue, or work on a laboratory-related problem. This course is open only to students who have the permission of the Department Chair, are in good standing in the CLS Program, have a minimum GPA of 2.5, and a letter of recommendation from a CLS faculty member. The student is responsible for selecting an area of interest and securing the approval of a faculty mentor who will supervise the student's work.

MLSC 4102. Honors CLS Practicum. 1-5 Credit Hours.

This elective course is for students who are interested in completing clinical practicums in specialized areas not included in the required clinical practicums. This may include laboratory management, molecular diagnostics, virology, etc. Certified clinical laboratory technicians who have extensive experience in the laboratory and who have completed the objectives of required practicums may choose to enroll in this practicum. A special clinical experience in the South Texas Environmental Education and Research (STEER) Program may be available to select students. This program is open to sophomores and juniors as well as seniors. The STEER Program is five weeks long and takes place in Laredo, Texas. Housing is provided. To enroll in this course, students must have the permission of the Department Chair, a minimum 2.5 GPA, and letters of recommendation from two faculty members. The student must be in good standing in all coursework. In addition, to enroll in the STEER Program, students must apply, be accepted, and complete a one-page statement of interest.

MLSC 4189. CLS Senior Seminar. 1 Credit Hour.

Integrated study of selected topics in clinical laboratory science.

MLSC 4190. Research. 2 Credit Hours.

This course is an introduction to the components of medical research, the different types of clinical research trials, the purpose of the institutional review board and the informed consent procedure. Characteristics of the ethical researcher will be described. An overview of appropriate research design and data collection, sample size determination, and statistical evaluation of the results will be discussed. Students will have the opportunity to develop group research projects, write a proposal, develop a PowerPoint presentation, and present the proposal to faculty and students.

MLSC 5000. Immunodiagnostics. 3 Credit Hours.

This course focuses on principles of innate and acquired immunity. Emphasis will be placed on the cell-mediated immune response and antibody-mediated immune responses to immunogens. The cells of either response, their development, and their role in the specific immune response will be discussed. Soluble mediators of the immune response will be covered including immunoglobulins, cytokines, and complement. Finally disorders of impaired immune function and infectious diseases will be discussed including autoimmunity, hypersensitivity, transplantation and tumor immunology, immunodeficiency, syphilis, infectious mononucleosis, etc.. Laboratory testing for these disorders including the most current recommendations for tests will be described. Students will be expected to integrate the role of specific immune responses, current research findings, and the laboratory testing used in diagnosis and treatment of the specific condition. Open for Cross Enrollment on Space Available Basis.

MLSC 5001. Immunodiagnostics Laboratory. 1 Credit Hour.

This laboratory course introduces students to basic laboratory concepts and skills. Safety regulations and procedures will be covered. Specimen collection, handling and storage are discussed in relation to the reliability of a laboratory test result. Students will perform immunologic procedures commonly used in the diagnosis of infectious and autoimmune diseases. Principles and applications of quality control procedures are integrated throughout. Students are expected to troubleshoot and resolve testing discrepancies and suggest reflex testing based on initial test results. Corequisite: MLSC 5000.

MLSC 5002. Clinical Applications of Quality Assessment. 1 Credit Hour.

This course presents the CLIA requirements for quality assessment that apply to the clinical laboratory. The principles, statistics, and applications of quality assessment will be discussed. A major emphasis of the course is the internal quality control system including the statistics that are needed to evaluate a quality control system, the rules that are necessary for interpreting the quality control results, and the role of quality control in a quality assessment program. The impact of federal and state regulatory agencies on the clinical laboratory related to its quality assessment program will be discussed. This course uses online learning format with most instructional components delivered online and some material may be delivered in person.

MLSC 5003. Diagnostic Hematology. 3 Credit Hours.

This course is a study of the normal production, maturation, and function of erythrocytes, leukocytes, and platelets. Common disorders involving such cells will be discussed with emphasis on the pathogenic mechanisms. Hematologic laboratory tests and their correlations with disease states will also be examined. Normal hemostasis will be considered including pertinent laboratory tests used in diagnosis of coagulation problems. Using case studies, students will be expected to analyze the laboratory data to determine differential diagnosis and suggest appropriate reflex testing to confirm diagnosis. Open for Cross Enrollment on Space Available Basis.

MLSC 5004. Diagnostic Hematology Laboratory. 2 Credit Hours.

This is a clinical laboratory course emphasizing automated cell counting techniques and basic hematologic tests. Test results are critically evaluated to determine their reportability. Normal and abnormal blood smears are examined with emphasis on identification of cells and their relationships to various disease processes. Recognition of maturing hematopoietic cells will be studied using normal bone marrow smears. Students will apply quality control methods throughout the hematology laboratory experience. Corequisite: MLSC 5003.

MLSC 5005. Diagnostic Immunohematology. 3 Credit Hours.

This is a study of the major blood groups of humans including the red cell antigen systems, alloantibodies, and non-immune stimulated antibodies. The relationship of blood group systems to compatibility testing, transfusion reactions, and hemolytic disease of the fetus and newborn will be discussed. Students will be expected to analyze and resolve complex cases and prepare a report on specific blood group systems. Open for Cross Enrollment on Space Available Basis.

MLSC 5006. Diagnostic Immunohematology Laboratory. 2 Credit Hours.

This laboratory course emphasizes basic blood banking techniques including blood typing, identification of alloantibodies, and resolution of typing discrepancies. Techniques used in resolution of compatibility testing, investigation of transfusion reaction, and hemolytic disease of the newborn are practiced. Principles and applications of quality control are introduced. Students are expected to be able to resolve cases involving multiple alloantibodies and complex patient histories. Corequisite: MLSC 5005.

MLSC 5007. Diagnostic Chemistry. 3 Credit Hours.

The study of carbohydrates, enzymes, proteins, electrolytes and other chemicals routinely analyzed in clinical chemistry laboratories. Emphasis is placed upon principles of testing, methods of analysis, data interpretation, and clinical significance of results. Through case study analysis, students will be expected to correlate the laboratory results with pertinent disease states and explain how the laboratory results support the diagnosis. Aspects of the laboratory's quality assessment program will be discussed including method evaluation, determination of reference intervals, and selection of new methods. Open for Cross Enrollment on Space Available Basis.

MLSC 5008. Diagnostic Chemistry Laboratory. 2 Credit Hours.

This is a laboratory course emphasizing biochemical analysis of body fluids using automated instrumentation and manual procedures. Assessment of test results by applying quality control methods and review of patient result protocol is stressed. Students are expected to correlate test results with pertinent disease states and suggest appropriate reflex testing to confirm diagnosis. Method evaluation studies are performed and evaluated. Corequisite: MLSC 5007.

MLSC 5009. Laboratory Analysis of Body Fluids. 3 Credit Hours.

This course focuses on the analysis and findings of selected body fluids including urine, amniotic fluid, cerebrospinal fluid, pleural fluid, peritoneal fluid, pericardial fluid and synovial fluid in health and disease states. Anatomy and physiology of the kidney, pleural, pericardial and peritoneal cavities are studied. Topics include: physical and chemical properties as well as cellular elements of urine; formation and function of cerebrospinal fluid and amniotic fluid as well as cellular and formed elements. In addition this course includes the performance of various laboratory procedures utilized in the analysis of each fluid. Case studies and literature review will be used to emphasize correlation of the changes in laboratory results with various disease states. Principles and applications of quality control procedures are practiced.

MLSC 5010. Diagnostic Microbiology. 3 Credit Hours.

This is a comprehensive study of medically important microorganisms including their microscopic and colony morphology, and growth requirements. Methods of detection, identification and susceptibility pathogens and their role in infectious disease will be stressed. Antimicrobials, their mechanisms of action and resistance mechanisms will be included. Open for Cross Enrollment on Space Available Basis.

MLSC 5011. Diagnostic Microbiology Laboratory. 2 Credit Hours.

This is a laboratory course emphasizing diagnostic microbiology. Examination of specimens from different body sites provides students the opportunity to recognize and identify organisms that comprise the normal flora and those that are potential pathogens. This course includes conventional and rapid methods for detection, identification, and susceptibility testing of significant organisms. Principles of quality control procedures are practiced. Rarely encountered and fastidious microorganisms are additional challenges of this course. Corequisite: MLSC 5010.

MLSC 5012. Advanced Special Topics in Microbiology. 3 Credit Hours.

This lecture and laboratory course will focus on the transmission, pathophysiology, clinical sites of infection, clinical presentation, life cycles, and identification of anaerobes, mycobacteria, parasites and fungi. Specimen collection techniques and methods of processing specimens for each group of organisms will be included. Laboratory sessions will focus microscopic identification as well as classic and rapid methods of detection and identification. Prerequisites: MLSC 5010 and MLSC 5011.

MLSC 5013. Medical Toxicology/Therapeutic Drug Monitoring. 3 Credit Hours.

This course provides the student with the knowledge of the major classes of drugs and bioactive compounds, their mode of action and the concept of toxidromes. This course will concentrate on the role of the laboratory in personalized medicine (effect of individual genetics on the response to drugs and the production of toxicity in pain management and drug addiction) and the parts genomic testing and therapeutic drug monitoring should play.

MLSC 5014. Biostatistics. 3 Credit Hours.

This course provides the student with the opportunity to demonstrate the ability to: 1) select and utilize the appropriate techniques for determining basic probability, sensitivity and specificity, Bayes Rule, population measures, Gaussian distributions, point estimation, confidence intervals, classical and practical hypothesis testing, simple analysis of variance and mean separation tests, nonparametric procedures for one- and two-way classifications, least squares regression and correlation, including lack of fit tests, simple categorical data analysis including goodness of fit, and homogeneity of proportions; and 2) appropriately assess the findings of the tests utilized above; and 3) based on the finding assess the statistical significance of the assay to which the testing was applied.

MLSC 5085. Organ System Biochemistry. 3 Credit Hours.

This course provides an advanced understanding of the biochemical processes that drive proper functioning of the major organs in the body, including the gastrointestinal tract, the liver and biliary system, cardiovascular, pulmonary, respiratory, renal, pancreas and endocrine systems. The course also provides the biochemistry of micronutrients, including vitamins, and the three macronutrients- carbohydrates, lipids, and proteins. The metabolic processes that integrate these systems are stressed.

MLSC 6000. Advanced Diagnostic Microbiology. 2 Credit Hours.

This course will discuss etiology of infectious diseases in different patient populations, different body sites and organ systems in a case-based approach. Appropriate specimens and laboratory tests based on patient signs and symptoms will be emphasized. Recent developments in microbiology and new methods in the identification of bacterial agents of infectious disease will also be presented. The course will explore the public health and infection control aspects of infectious diseases.

MLSC 6001. Advanced Diagnostic Hematology. 2 Credit Hours.

This lecture course uses a case-based approach to study the pathogenic mechanisms of disorders involving erythrocytes, leukocytes, platelets, and coagulation factors. The peripheral blood and bone marrow findings in relation to various hematopoietic disease processes will be emphasized. Abnormalities of hemostatic mechanisms and their correlation with laboratory tests will be presented. Using case studies, students will analyze laboratory results and discuss relevant and irrelevant results.

MLSC 6002. Principles of Laboratory Management. 3 Credit Hours.

This course focuses on general management and laboratory-specific management topics. The areas of human resource management, organizational behavior, financial analysis, as well as compliance and regulatory issues will be incorporated into the course. Reimbursement issues and CPT coding, principles and development of reflex testing and critical pathways will be covered. Job specific skills such as resume writing and interviewing will be addressed. Assignments and projects will allow students to integrate these principles and topics in laboratory related scenarios.

MLSC 6003. Evidence-based Medicine in Medical Laboratory Science. 3 Credit Hours.

This course introduces the principles of, rationale for use of, and the process employed in evidence-based medicine in laboratory medicine. Topics include: basic principles of evidence based medicine, development of focused questions, identification and use of the hierarchy of information, critical appraisal of literature, and application to laboratory practice scenarios. Students will write a Critically Appraised Topic on a medical laboratory science problem or clinical question and give an oral presentation to faculty and students.

MLSC 6004. Clinical Practicum I. 4 Credit Hours.

The clinical practicum courses are a series of clinical experiences in microbiology, hematology, clinical chemistry, and immunohematology. The student will be assigned to one of the four clinical areas. The student will be given the opportunity to demonstrate: 1) the ability to apply knowledge, attitudes, and skills to clinical laboratory practices and procedures; 2) the ability to integrate previous knowledge and skills with more sophisticated instrumentation and advanced methodology; 3) an attitude of cooperation and concern in interpersonal relationships with patients and health care workers; and 4) an appreciation of the ethical foundations of the medical laboratory sciences profession.

MLSC 6005. Advanced Diagnostic Immunohematology. 2 Credit Hours.

Advanced study in specific applications of clinical immunohematology including: collection, processing and therapeutic use of blood components, investigation of autoantibodies and alloantibodies as detected in hemolytic disease of newborns, transfusion reactions, and autoimmune hemolytic anemias. Molecular testing and HLA system applications in transplantation and paternity testing will also be discussed. This course utilizes complex and unusual case studies as a means to integrate theory and principles and develop problem solving and critical thinking skills.

MLSC 6006. Advanced Diagnostic Chemistry. 2 Credit Hours.

This course prepares the student with advanced clinical chemistry knowledge underlying the rapidly growing laboratory tests. The course emphasizes the test abnormalities associated with routine tests such as the comprehensive metabolic panel, as well as emerging tests in the areas of tumor markers, care of the infertile couple, pregnant woman and newborn screening tests, clinical toxicology and therapeutic drug monitoring. This is a problem-solving course that is heavily driven by case studies. Open for Cross Enrollment on Space Available Basis.

MLSC 6007. Seminar in Laboratory Medicine. 3 Credit Hours.

This course discusses the value of conducting medical research, the historical events leading to the development of the Nuremberg code and the Belmont Report, benefits of including all races, both genders and all ages in medical research (and the disadvantages of excluding some). This course also exposes the student to different styles of scientific writing and publication, and guides the students on how to interpret and critique scientific publications and case reports. Each student will be required to critique/discuss about ten scientific publications in front of peers.

MLSC 6008. Professional Issues in Healthcare. 1 Credit Hour.

This interdisciplinary course will provide an overview of professional and ethical issues facing allied health professionals. Topics to be discussed include responsibilities of the health care practitioner, life and death decisions, patient confidentiality, substance abuse, whistle blowing, and informed consent. Ethics in research and other critical issues related to health care problems will be also be addressed. Collaborative activities and simulated cases will be used to enhance discussion among students.

MLSC 6009. Clinical Practicum II. 4 Credit Hours.

The clinical practicum courses are a series of clinical experiences in microbiology, hematology, clinical chemistry, and immunohematology. The student will be assigned to one of the four clinical areas. The student will be given the opportunity to demonstrate: 1) the ability to apply knowledge, attitudes, and skills to clinical laboratory practices and procedures; 2) the ability to integrate previous knowledge and skills with more sophisticated instrumentation and advanced methodology; 3) an attitude of cooperation and concern in interpersonal relationships with patients and health care workers; and 4) an appreciation of the ethical foundations of the medical laboratory sciences profession.

MLSC 6010. Clinical Practicum III. 4 Credit Hours.

The clinical practicum courses are a series of clinical experiences in microbiology, hematology, clinical chemistry, and immunohematology. The student will be assigned to one of the four clinical areas. The student will be given the opportunity to demonstrate: 1) the ability to apply knowledge, attitudes, and skills to clinical laboratory practices and procedures; 2) the ability to integrate previous knowledge and skills with more sophisticated instrumentation and advanced methodology; 3) an attitude of cooperation and concern in interpersonal relationships with patients and health care workers; and 4) an appreciation of the ethical foundations of the medical laboratory sciences profession.

MLSC 6011. Diagnostic Immunology Practicum. 2 Credit Hours.

The student will perform routine and reflex testing for specific disease states that are primarily diagnosed by serologic techniques. In addition they will have the opportunity to practice flow cytometry techniques and evaluate results characteristic of specific hematologic disorders.

MLSC 6012. Independent Study. 1-12 Credit Hours.

A plan of study is determined by the supervising faculty. The participating student and supervising faculty develop the course requirements and forms of evaluation. Credit hours are determined by the scope of the project.

MLSC 6013. Clinical Practicum IV. 4 Credit Hours.

The student is introduced to the role of the clinical chemistry laboratory in patient care. Students have the opportunity to gain experience with laboratory automation including general chemistry instruments, immunochemical instruments, and urinalysis instruments. Emphasis will be placed on troubleshooting instrumentation problems and patient sample issues. The student will also perform urinalysis, special chemistry procedures, therapeutic drug monitoring, and toxicology procedures. In addition students will perform routine and reflex testing for specific disease states that are primarily diagnosed by serologic tests using immunoassay-based techniques. Internal and external quality control methods will be practiced and external quality control results (i.e., proficiency testing reports) will be analyzed to determine if corrective action is required.

MLSC 6014. Scientific Writing in Medical Laboratory Sciences. 2 Credit Hours.

This course provides students with the opportunity to develop the knowledge and skills for effective communication in medical and scientific writing and presentations. It allows students to accomplish the following: 1) review basic writing skills, including grammar, word usage, punctuation, and sentence structure; 2) examine the scientific literature and peer-reviewed journals; 3) identify the steps involved in production of a scientific review paper; and 4) apply writing skills to the development of a scientific review paper that is suitable for publication in a peer-reviewed journal. The student will prepare a literature review paper that represents a portion of the capstone project for the 3-course Research series-Evidence-based Medicine in Medical Laboratory Sciences, Scientific Writing for Medical Laboratory Sciences and Advanced Research Concepts.

MLSC 6016. Research Concepts. 3 Credit Hours.

This course provides discussion of research methods used in medical laboratory sciences, with an emphasis on types of research study designs. It includes a thorough study of the research process including development of research question, design, data collection, sample size, statistical evaluation of results and institutional review board application. The student will write a research protocol for submission to the Institutional Review Board, develop a research proposal PowerPoint presentation, and give an oral presentation to faculty and students.

MLSC 6018. Advanced Research Concepts. 3 Credit Hours.

This course provides discussion of research methods used in medical laboratory sciences, with an emphasis on types of research study designs. It includes a thorough study of the research process including development of research question, design, data collection, sample size, statistical evaluation of results and institutional review board application. The student will write an abstract, develop a PowerPoint presentation for the literature review paper created in the Scientific Writing course and give an oral presentation to faculty and students. Submission of abstract for poster presentation at professional meeting or publication in peer-reviewed journal is encouraged.

MLSC 6090. Select Topic Practicum. 1 Credit Hour.

Under the supervision and direction of a clinical instructor in a clinical laboratory setting, the student will gain advanced experience in an emerging area of clinical laboratory practice. Examples include molecular diagnostic testing for diagnosis of hematologic malignancies and select genetic and infectious diseases; flow cytometric techniques for diagnosis of leukemias and lymphomas; fungal identification, in vitro susceptibility testing of antifungal drugs, and evaluation of antifungal properties of new antifungal drugs. Experience will include quality assessment issues such as use of quality control methods, pre-examination sources of error and evaluation of results for accuracy.

MLSC 6091. Independent Study. 1-12 Credit Hours.

A plan of study is determined by the supervising faculty. The participating student and supervising faculty develop the course requirements and forms of evaluation. Credit hours are determined by the scope of the project.

MLSC 6098. Molecular Diagnostics. 3 Credit Hours.

This course is an introduction to molecular diagnostics in the clinical laboratory. The focus of this course will be to provide fundamental principles of molecular biology and its application in the clinical laboratory. Students will perform molecular techniques, as a laboratory component to this course, to facilitate the understanding of clinical molecular diagnostics.

MLSC 7091. Selected Topics in Medical Laboratory Sciences. 1-9 Credit Hours.

This course comprises selected topics in one of the four major disciplines: microbiology, clinical chemistry & toxicology, hematology and immunohematology. This will be conducted under the supervision of a faculty advisor.

MLSC 7097. Research in Medical Laboratory Sciences. 3-6 Credit Hours.

This course comprises independent and original research in one of the four major disciplines: microbiology, clinical chemistry & toxicology, hematology and immunohematology. This will be conducted under the supervision of a faculty advisor.