

MLS Program Course Descriptions

Purpose	This section provides a description of the courses that are taken during the School of Medical Laboratory Science (MLS) Program	
Audience	MLS Students	
Policy	This section describes the courses for the MLS Program	
Principle	This section contains information about the MLS Program courses regarding the approximate length of time necessary to cover the appropriate material. The length of time may vary depending on class understanding of course material.	
Supplies	Not applicable	
Procedure	Steps	Actions
Orientation 40 hours	1.	As an introduction to the hospital and the medical laboratory, this course includes a general hospital orientation by the Human Resources department and a description of policies of the laboratory and School of Medical Laboratory Science. The student is introduced to basic concepts necessary to function in the hospital laboratory. These include laboratory biohazard and safety training, techniques of blood collection, laboratory mathematics, quality control and statistics, infection prevention, use of basic laboratory tools, the psychology of the hospitalized individual, interpersonal communications and professionalism in a hospital setting. An overview of Medical Laboratory Science is also discussed to include differentiation of pre-analytical, analytic, and post-analytic components of laboratory services.
Hematology I 8 hours	2.	The first phase of hematology begins with hematopoiesis, then emphasizes the erythrocytic aspects of hematology including hemoglobin synthesis and iron metabolism.
Hematology II 11 hours	3.	The second in the series cover continues to build from the first through discussion of abnormalities found the red cell or hemoglobin. Quantitative measurement of erythrocytes, hemoglobinopathies, polycythemia, thalassemias and other inherited abnormalities will be the main topics.
Hematology III 14 hours	4.	Hemolytic anemias and nutritional anemias, blood volume studies, and normal and abnormal erythrocyte morphology are covered in this section. The discussion will cover the causes and the body's response to the anemias. Tutorials augment the identification of blood dyscrasias.
Hematology IV 11 hours	5.	The course emphasizes the leukocytic aspects of hematology. A review of leukopoiesis is followed by discussions of normal leukocytes, leukemoid reactions, and Mononucleosis. Characteristics and differentiation of each cell series will be covered.
Hematology V 15 hours	6.	Leukemias, inherited leukocyte anomalies, lymphoproliferative disorders and Lymphomas are the main topics of discussion. Methods of classifying leukemias will be fully covered utilizing cytochemical, morphological, and antigen typing. Examination of the bone marrow, cytochemistry and special stains are also presented as well as Flow Cytometry basics. Pictures and powerpoints are presented to reinforce the lecture material.
Coagulation 14 hours	7.	This lecture series is a study of the body's hemostatic mechanisms, coagulopathies, and the testing principles and procedures involved in the diagnosis of abnormalities in hemostasis. Discussion will also cover the

		monitoring of therapeutic anticoagulants.
Immuno-hematology I 15 Hours	8.	Basic immunohematology lectures discuss the common blood group systems and principles and procedures utilized in the hospital blood bank. These procedures include blood typing, antibody screening and identification, crossmatch, as well as studies for hemolytic disease of the newborn.
Immuno-hematology II 15 Hours	9.	The second phase in this series includes more complex and special procedures such as paternity testing, HLA typing, investigation of transfusion reaction, quality control, prenatal testing and. Blood component therapy, autoimmune hemolytic anemia, and the physiology of transfusion reaction are also presented.
Immunology 9 Hours	10.	The student is assumed to have a basic knowledge of the immune system and immune globulin structure. This lecture is a discussion of the cellular and molecular aspects of the immune response. A brief review of the anatomy of the immune system will be followed with anergy and autoimmune diseases. These diseases will be correlated with T and B cell function or dysfunction.
Serology 9 Hours	11.	This lecture covers a practical continuation of immunology. Discussions will include different methods, including EMIT, ELISA, FPIA, MEIA, and RIA. Sensitivity, specificity, and relationship to the stages of diseases will also be discussed. Correlation to other laboratory testing will be included.
Molecular Diagnostics 9 Hours	12.	Basic Molecular Diagnostic procedures will be introduced to students. These will include PCR with its variations, Northern Blot, Southern Blot, and Western Blot. Along with these Tumor markers will be discussed. An enrichment opportunity is held at the MAWD Pathology Molecular Laboratory at Shawnee Mission Medical Center.
Urinalysis 16 Hours	13.	The course begins with a presentation of renal physiology and function and progresses to chemical and microscopic testing principles and procedures. A correlation is made between laboratory finding and renal disease states. Pictures and tutorials are used to facilitate identification of urinary sediments.
Body Fluids 9 Hours	14.	This section will emphasize cerebrospinal and synovial fluid physiology and analysis. Analysis of other body fluids, amniocentesis, and cytogenetics will be included.
Chemistry I 14 Hours	15.	This section will begin with a brief review of the basic food groups that are utilized by man - carbohydrates, lipids, and proteins. This will be further developed into a discussion of the metabolism and methodology of carbohydrates, non-protein nitrogen compounds, proteins, and lipids. Normal and pathological states that are associated with these groups will be included. Alternative methodologies will be introduced if not seen in this laboratory. General theory of spectrophotometry and its variations will be applied to methodologies.
Chemistry II 11 Hours	16.	The physiological and technical aspects of blood gases, pH, and water/electrolyte balance are discussed in this series. Discussion of the organ systems that are involved in maintaining this balance and abnormal states that lead to imbalance will complete this section. The theory of ion-specific electrodes will be discussed.
Chemistry III 12 Hours	17.	This phase of chemistry takes up both enzymology and hepatic function. In enzymology, both clinical correlation and methodology are stressed. The relationship of isoenzyme patterns to diseases, severity of diseases, and stage of diseases will be covered. Differentiation of hepatitis will be thoroughly covered in this series.
Endocrinology 14 Hours	18.	After a general introduction to the endocrine system, this lecture series presents the hormones of the hypothalamus, pituitary, adrenals, thyroid and gonads in terms of function, physiology and methodology.

Toxicology & Therapeutic Drug Monitoring 11 Hours	19.	Students will be introduced to basic concepts in toxicology. Analytical methods including HPLC, GLC, and GC-MS will be discussed. Both generic and proprietary nomenclature will be used to discuss Therapeutic Drug Monitoring. The pharmacodynamics and use of medications will be emphasized.
Microbiology I 11 Hours	20.	Basic concepts and techniques involving the collection and processing of bacteriological specimens is followed by a discussion of aerobic normal flora, pathogenic microorganisms of man, and man's response to pathogens. Antimicrobial agents and their activity are discussed and methods of antimicrobial susceptibility testing are presented. The schematic identification of human aerobic bacteria is presented by bacterial groups gram positive cocci and gram positive bacilli. Case history presentations augment this section.
Microbiology II 9 Hours	21.	The schematic identification of human aerobic bacteria is presented by bacterial groups the enterobacteriaceae, gram negative coccobacillary organisms, and nonfermentative gram negative bacilli. Case history presentations augment this section.
Microbiology III 8 Hours	22.	A discussion of the physiology of anaerobic bacteria is followed by a presentation of techniques for isolation and identifying the anaerobic bacteria. Gram negative cocci are also discussed in this section with case history presentations augmenting this section.
Microbiology IV 8 Hours	23.	Time will be spent in presenting the physiology, pathogenicity and identification techniques for mycobacteria, viruses, rickettsia, mycoplasma and spirochetes.
Parasitology 12 Hours	24.	An introduction to parasitology, which includes classification and terminology, is followed by detailed discussion of the groups of organisms which parasitize man. Both clinical manifestation of parasitic infection and identification of parasites are stressed. Tutorials and powerpoint will be used for clinical identification.
Mycology 9 Hours	25.	General classification and morphologic characteristics of the fungi is followed by a more detailed account of the yeast, superficial fungi, systemic fungi, actinomycetes and saprophytic fungi. Emphasis is on identification and clinical and epidemiologic considerations. Powerpoint presentations and tutorials will be used for clinical identification
Management and Education 42 Hours	26.	<p>A seminar format will be used to present the topics in management, laboratory operations, research, method evaluation, education, personnel management, computer systems, and legal/regulatory agencies.</p> <p>This is an introductory course that highlights various aspects of laboratory management including personnel, governmental agencies and regulation, cost accounting, ordering, and management theory. Students will be presented with personnel problems to present and solve. Role playing maybe used for demonstration. Students will learn to write a laboratory procedure and develop flow charts.</p> <p>Students will be introduced to basic concepts of the domains of learning. They will write basic objectives, test questions, and present a case study over their chosen topic.</p> <p>Laboratory Information Systems (LIS) will include selection of systems, basic operations, and personal computer operation. Students will be introduced to basic concepts in electronics. Students will learn to identify computer components, and troubleshoot basic problems.</p>

	<p>Students are expected to complete a number of professional activities throughout their clinical year. Professional activities are divided into 3 categories: Professional Development, Community Service, and Scholarly Activities.</p> <p>To practice the management topics learned in the seminars, students will assist in planning either the Laboratory Educational Fair or Laboratory Professionals Week activities. Students will also complete a one-week clinical rotation encompassing management topics. They may interview potential candidates, run statistical software, assist with instrument purchase and contracts, attend recruitment events, etc.</p>
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Related Documents	Not applicable
References	Not applicable
Appendices	Not applicable
Accrediting Agency	The National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)
Standard and/or Checklist Item	NAACLS Standard IV.A.g.