



**WICHITA STATE
UNIVERSITY**

***COLLEGE OF
HEALTH PROFESSIONS***

*Department of Medical
Laboratory Sciences*

STUDENT HANDBOOK

**POLICIES
AND
PROCEDURES**

For Medical Laboratory Sciences Students
Entering the Professional Program
Spring 2019 Semester

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Welcome to the Medical Laboratory Sciences Program at Wichita State University!

This material is compiled to answer your questions concerning the general policies and procedures of the Wichita State University (WSU) Medical Laboratory Sciences (MLS) Program. It will serve as a reference and guide as you complete the requirements of the program. We hope that it will make life simpler, get you started in the right direction, and help you along the way. Problems and questions will arise, so as they do, call the MLS office at (316) 978-3146 and we will do our best to help.

Contact information for MLS is:

Mailing address:
Medical Laboratory Sciences Program
1845 Fairmount
Wichita, KS 67260-0043

Phone: (316) 978-3146
E-mail: mls@wichita.edu
Physical location: Ahlberg Hall, Room 107

The MLS Faculty and Staff are here to help you. Contact information for faculty and staff:

Laurie Alloway, MSES, MLS(ASCP)^{CM}, SC^{CM}, Associate Teaching Professor

Clinical Biochemistry, Clinical Chemistry and Laboratory Management

Office: Ahlberg Hall, Room 117

Phone: (316) 978-6819

email: laurie.alloway@wichita.edu

Diana L. Cochran-Black, Dr.PH, MLS(ASCP)^{CM}SH^{CM}, Chair and Associate Professor

Program Director

Hematology /Hemostasis

Office: Ahlberg Hall, Room 107A

Phone: (316) 978-5657

email: diana.cochran@wichita.edu

Reitha Deiter, MS, MT (ASCP), Teaching Professor

Immunohematology

Office: Ahlberg Hall, Room 111

Phone: (316) 978-5654

email: reitha.deiter@wichita.edu

Sarah Nickel, MS, MLS(ASCP)^{CM}, Assistant Professor

Microbiology, Immunology and Molecular Diagnostics

Office: Ahlberg Hall, Room 115

Phone: (316) 978-5888

email: sarah.nickel@wichita.edu

Noelle Steen, MLS(ASCP)^{CM} , Assistant Teaching Professor

Clinical Coordinator

Office: Ahlberg Hall, Room 119

Phone: (315) 978-5997

email: noelle.steen@wichita.edu

Susie Jacques, BS, Academic Program Specialist

Office: Ahlberg Hall, Room 107

Phone: (316) 978-3146

email: Susie.jacques@wichita.edu

Mission

The mission of the department of Medical Laboratory Sciences is to improve the health of the community by:

- Educating resourceful, adaptable, and well-prepared individuals to serve and lead the medical laboratory sciences profession,
- Contributing to the body of knowledge for Medical Laboratory Sciences, and
- Facilitating life-long learning for Medical Laboratory Scientists.

Educational Goals, Objectives and Outcome Measures of the Program

Goal: To prepare students as competent Medical Laboratory Scientists as defined by the program's local and regional community of interest and by National Board credentialing examination matrices.

Objective: Upon graduation, the student will demonstrate the ability to comprehend, apply and evaluate information relevant to the role of a medical laboratory scientist.

Outcome Measures: Outcome measures consist of the results of:

- Comprehensive written examinations given at the completion of the program (minimum grade of 70%)
- National Board Credentialing examination by the American Society for Clinical Pathology (program pass rate equal to or greater than the national pass rate)
- Indication of satisfaction with program graduates by employers. Employers are surveyed at two year intervals.

Objective: Upon graduation, students will demonstrate technical proficiency in all skills required to practice in the profession.

Outcome Measure: Outcome measures consist of the results of:

- Ratings at or above minimal performance levels on clinical rotation checklists completed by clinical instructors at the end of the rotation.
- Indication of satisfaction with program graduates by employers. Employers are surveyed at two year intervals.

Objective: Upon graduation, students will demonstrate the ability to effectively communicate and interact with patients, physicians and other health professionals, in a manner consistent with employer standards.

Outcome Measures: Outcome measures include the results of:

- Summative affective evaluations completed by clinical rotation instructors. Evaluations are conducted at the end of each clinical rotation.
- Indication of satisfaction with program graduates by employers. Employers are surveyed at two year intervals.

Competencies of the Medical Laboratory Scientist Graduate

As described by the certification agency for Medical Laboratory Sciences, American Society for Clinical Laboratory Sciences, the graduate must be competent in areas of Body Fluids, Blood Bank, Chemistry, Hematology, Immunology and Microbiology. The following competencies are assessed by the certification agency:

- Applied knowledge of theory and principles related to:
 - anatomy (Body Fluids)
 - biochemistry (Chemistry and Hematology)
 - education
 - genetics (Blood Bank and Molecular Diagnostics)
 - growth characteristics/diagnostic and infective forms (Microbiology)
 - immunology (Blood Bank and Immunology)
 - laboratory information systems
 - physiology (Body Fluids, Chemistry, Hematology, Immunology)
 - data security/patient confidentiality
 - fundamental biological characteristics related to laboratory testing
 - medical terminology
 - principles of performing basic/special laboratory procedures
 - sources of error in laboratory testing
 - standard operating procedures
 - theory and practice related to laboratory operations (management/safety/education/R&D)
- Selects appropriate:
 - controls for test performed
 - course of action
 - instruments for new laboratory procedures
 - instruments to perform requested test
 - quality control procedures
 - reagents/media/blood products
 - routine/special procedures to verify test results
 - type of sample and method for test requested
- Prepares and processes
 - controls
 - equipment and instruments
 - reagents/media/blood products
 - specimens
- Calculates results and assesses test results by correlating laboratory data with:
 - clinical or other laboratory data
 - physiologic processes to validate test results and procedures
 - quality control data
 - results obtained by alternate methodologies

- Evaluates:
 - appropriate actions and methods
 - corrective actions
 - patient-related requirements
 - possible sources of error or inconsistencies
 - quality control procedures
 - specimen-related requirements
- Evaluates laboratory data to:
 - assess test for procedural validity/accuracy
 - assure personnel safety
 - check for procedural/technical problems
 - make identifications
 - recognize and report abnormal test results and/or the need for additional testing
 - recognize and resolve possible inconsistent results/sources of error
 - recognize related disease states
 - take corrective action
 - verify test results for reporting

Professional Behavior

Students in the MLS program will strive to develop habits of reliability, accuracy, timeliness, safety and confidentiality in all professional practices by:

1. Arriving on time and ready to perform all activities
2. Taking given opportunities to prepare for professional practice
3. Providing accurate, timely laboratory results so that primary care providers/ faculty may make accurate, timely diagnoses/ assessments
4. Observing and practicing the safety rules of the institution
5. Ensuring that the confidentiality of every patient is protected

Student Leadership

Each class elects a liaison as a representative to interact with the chair of MLS Department, the dean of the College of Health Professions (CHP) and other members of university leadership. You will be asked to elect this representative after two or three weeks into the semester to allow you to get to know each other.



MEDICAL LABORATORY SCIENCES PROFESSIONAL PROGRAM

The professional curriculum in the WSU MLS program is designed to provide the student with a strong background in the principles and methodologies involved in the various areas of Medical Laboratory Sciences. The full time professional curriculum is four semesters in length; the part time program is six semesters in length. The professional curriculum consists of 52 credit hours in MLS courses. A reduced-credit-hour option is also available for graduates of associate degree medical laboratory technician programs; this 27 to 32 credit hour program offers activities which extend the medical laboratory skills and knowledge of the associate degree program. Upon satisfactory completion of any of these programs, the graduate will be eligible to sit for national certification exams. The Program is accredited by:

National Accrediting Agency for Clinical Laboratory
Sciences (NAACLS)
5600 N. River Rd. Suite 720
Rosemont, IL 60018-5119
Phone: (773) 714-8880
<http://www.naacls.org/>

Admissions Policies

Deadline for receipt by the MLS Office for all application materials, including references, is April 1 for summer and fall semester entry and November 1 for next spring semester entry. Students will be accepted for full-time and part-time enrollment. Students must be full-time during the Clinical Semester.

ACCEPTANCE is based on the following criteria:

- A. Grade Point Average (GPA):
Minimum GPA of 2.5 on a 0 - 4.0 scale. Points are assigned as follows: Overall GPA x 10 = points. (Example; GPA of 2.5: 2.5 x 10 = 25 points) Note: All courses, which are pre-requisites for the MLS program, must be completed with a grade of 2.0 or above on a 0 – 4.0 scale before entering the professional phase of the MLS Program.

- B. References (3): Maximum of 15 points to be determined as follows:
Statements/evaluations support high recommendation of candidate – 5 points each
Statements/evaluations support recommendation – 4 points each
Statements/evaluations support recommendation with reservation – 2 points each

- C. Application Form: Maximum of 18 points may be assigned. Points will be based upon activities, such as those listed:
 - 1. Evidence of knowledge of healthcare (up to 6 points), such as:
Work/volunteer in a medical laboratory—up to 6 points
Work/volunteer in healthcare or patient care, other than medical laboratory— up to 4 points

2. Evidence of ability to lead or participate in diverse teams (up to 6 points):
 - Leadership activities in a team (i.e. President, class officer) – up to 6 points
 - Team participation – up to 6 points

3. Evidence of knowledge of the profession and presentation of application (up to 6 points):
 - Rationale for entering the MLS profession – up to 6 points
 - Neatness and accuracy – up to 2 points

MINIMUM POINTS FOR CONSIDERATION OF ACCEPTANCE: 50 points. Deviation from the minimum number of points must be considered by the Department Admission/Exception Committee.

FILE REACTIVATION: If entry to the program was denied based upon GPA or grades, documentation of improvement or repeat course work must be submitted. Should the majority of the committee agree that a reference might be invalid, a new reference from another source will be requested. All new material submitted shall become part of the applicant's permanent file. MLS students are accepted into the professional program as full-time or half-time enrollment. All students must be full-time during the Clinical Semester.

In accordance with the directives of the Americans with Disabilities Act, students are required to inform program faculty within two weeks of acceptance of any special learning needs so that reasonable accommodations are in place to ensure these needs are met.

Essential Functions of a Medical Laboratory Scientist

Essential functions are the functions that every MLS needs to successfully participate in clinical activities. MLS students must demonstrate the following essential functions to participate fully in learning activities while not endangering the public, other students, patients and their test results.

1. *Vision* The student must be able to follow instructions, interpret charts, graphs, and test results, discriminate major colors, and use a microscope to observe and identify specimen characteristics.

2. *Communication Skills* The student must be able to communicate effectively, and to accurately receive and transmit information.

3. *Movement* The student must be able to move freely from one location to another in the clinical laboratory and patient's room.

4. *Fine Motor Functions* The student must possess the motor skills necessary to safely and accurately perform diagnostic laboratory procedures, manipulate and operate instruments and equipment, performs phlebotomy, and to lift and move objects.

5. *Emotional Stability* The student must be able to make full use of his/her intellectual ability at all times and be able to recognize and respond appropriately to emergency and other non-routine situations.

The Curriculum

The WSU, MLS program is a university-based program that culminates in a Bachelor of Science in MLS (BSMLS). The WSU, MLS program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). The curriculum of the WSU, MLS program is guided by the standards of NAACLS.

To earn the BSMLS at WSU, the student must successfully complete pre-professional coursework and the seventeen-month professional program. The professional program consists of twelve months of formal lectures and student laboratory sessions provided on-campus at WSU, followed by a full-time Clinical Semester in a medical facility. MLS students participate in over 100 hours of student laboratory practice on the WSU campus before they are eligible to enter the clinical phase of the program. Student laboratory sessions provide the student with opportunities to practice basic clinical procedures on prepared specimens in a controlled setting. Student laboratories afford the student “hands-on” practice before practicing on actual patients.

During the Clinical Semester, the student rotates through the specialized clinical laboratory departments at the medical facility. The clinical experience provides opportunity for students to apply their newly acquired skills, knowledge and attitudes as a member of the health care team. Graduates of the program are awarded a BS in MLS degree and are eligible to apply for national certification examinations.

Pre-Requisites of the Program

All students earning a baccalaureate degree at WSU must complete the general education requirements of the university.

Applicants to the MLS program must also complete or be in process of completing program pre-requisites. Some program pre-requisites may satisfy the university general education requirements. The program pre-requisites are:

- General Biology
- General Chemistry (at chemistry major level with lab), 2 semesters
- Biochemistry
- Human or Mammalian Anatomy/Physiology
- General or Introductory Microbiology
- Immunology or Immunobiology

Orientation

All newly admitted students must attend program orientation at the beginning of the program.

At the completion of orientation and before attending student laboratories, the student will, at minimum:

1. Recognize the Standard Precautions for safety in a medical laboratory.
2. Recognize requirements for patient confidentiality under HIPAA.
3. State the policies and procedures of the WSU, MLS program.
4. Perform a venipuncture on a simulation mannequin arm.
5. Perform CPR on a simulation mannequin.

Program Curriculum Requirements

In addition to courses listed on the Program Plan, the student must complete the following requirements prior to progression to the Clinical Semester:

1. Phlebotomy:
 - a. Completion of venipuncture and capillary puncture assessments
 - b. Successful evaluation of competency after completion of assessments
2. Community Service/Interprofessional Practice:
 - a. Activities which total at least 10 hours, demonstrating service to the community or practice with health professionals other than medical laboratory professionals
 - b. Participation in a post-activity discussion regarding the activity

Full-Time Program Plan

Students may begin the program in fall or spring semester. The full time professional program is four semesters in length. Three semesters are completed on-campus; the fourth and last semester, the clinical semester, is completed at a medical facility.

<i>Fall Courses</i>		Credit Hours
MLS 453	Clinical Chemistry w/Urinalysis	8
MLS 463	Clinical Hematology	8
<i>Total Hours</i>		<i>16</i>

<i>Spring Courses</i>		
MLS 473	Immunohematology	8
MLS 495	Clinical Microbiology	8
<i>Total Hours</i>		<i>16</i>

<i>Summer</i>		
MLS 400	Clinical Laboratory Management	3
MLS 482	Molecular Diagnostic Techniques	3
<i>Total Hours</i>		<i>6</i>

The Clinical Semester: These courses are taken in the last semester of study and are offered every semester.

MLS 479	Applied Immunohematology	3
MLS 488	Core Lab Practicum	8
MLS 498	Applied Clinical Microbiology	3
<i>Total Hours</i>		<i>15</i>

Total Program Hours **52**

Part Time Program Plan

Students may begin the part time program in fall or spring semester. The part time professional program is six semesters in duration. Five semesters are completed on-campus and one semester is completed at a medical facility. The part-time option is not available during the summer semester nor the clinical semester. Assigned semesters are scheduled to allow two part-time students to enroll in one full-time opening. **The program has only two, part-time student positions/semester. Applicants must apply as a part-time student if you wish to be considered as part-time in the program.** Students may individualize the program only upon permission of the program director.

Part time option:

First and Second Fall Semesters (as assigned)

MLS 453 Clinical Chemistry 8

OR

MLS 463 Clinical Hematology 8

First and Second Spring Semesters (as assigned)

MLS 495 Clinical Microbiology 8

OR

MLS 473 Immunohematology 8

Summer

MLS 482 Molecular Diagnostic Techniques 3

MLS 400 Clinical Laboratory Management/Education 3

The Clinical Semester: These courses are taken in the last semester of study and are offered every semester.

MLS 479 Applied Immunohematology 3

MLS 488 Core Lab Practicum 8

MLS 498 Applied Clinical Microbiology 3

Total Program Hours 52

MLT-to-MLS Program Plan

MLT students (students who have earned an associate degree as medical laboratory technicians) may begin the professional program in fall, spring or summer semester. Students may individualize the program only upon permission of the program director.

Fall Courses

Credit Hours

MLS 458 Clinical Chemistry 4

MLS 468 Clinical Hematology 4

HS 400 Pathophysiology 4

Spring Courses

MLS 478 Immunohematology 4

MLS 499 Clinical Microbiology 4

Summer Courses

MLS 400 Clinical Laboratory Management/Education 3

MLS 482 Molecular Diagnostics Techniques 3

The Clinical Semester: Applied Practice is completed in the last semester of study and is offered every semester. Number of required semester hours is dependent on extent of the MLT-to-MLS student's documented work experience.

MLS 411 Applied Clinical Practice 1-6

Total Program Hours 27-32

Instructional Facilities

The program has instructional facilities available to aid the student in their professional education. Computers are available for student use in the Independent Study Lab, Room 100, Ahlberg Hall, in the University library and in the MLS Student Laboratories. Supplemental tutorials are available in the offices of the MLS program.

Lecture rooms are assigned by either the College of Health Professions office or the University and are usually located in Ahlberg Hall. Student laboratories are scheduled by the department in rooms 113, 125 and 127 of Ahlberg Hall.

Facilities Note: The College of Health Professions supports students who choose to breastfeed their infants; a private area will be provided upon request. Contact the department for more information.

WSU Requirements for Graduation

To be eligible for graduation from Wichita State University, students must have credit for minimum of 120 acceptable semester hours toward their degree and a GPA in the major of 2.5 (in a scoring system of 0-4) and at least a "C" or CR (credit) in all required major and program pre-requisite courses. Students transferring from a two-year college must complete at least 60 credits in a four-year college/university. Students must have completed a minimum of 45 credit hours in upper division (300 level or greater) coursework in order to qualify for graduation.

Medical Laboratory Sciences Course Descriptions

MLS 400. Clinical Laboratory Management (3). A study of the principles and methodologies of laboratory management and supervision applicable to the clinical laboratory sciences. Prerequisite: program consent.

Content Outline

- Quality Assessment
 - Compliance
 - Regulation
- Safety
- Purchasing
 - Inventory Control
- Competency
- Education and Communication
- Laboratory Information Systems

MLS 453 Clinical Chemistry (8) 6R 6L. This course includes the study of the principles, concepts, and techniques used in the clinical chemistry laboratory for the analysis of serum, plasma, and other body fluids. Correlations of chemical substances in the body and the assessment of health and disease are emphasized. Applicable practice in procedures used for chemical analysis of body fluids is provided. Coursework will include the study of Clinical Laboratory Regulation, General Laboratory Operations and Safety, and Instrumentation Methodologies, as well as coursework in the following areas: Carbohydrates,

Proteins and other Non-Protein Nitrogen-Containing Compounds, Heme Synthesis and Derivatives, Enzymes, Electrolytes, Acid-Base Balance, Lipids and Lipoproteins, Hormones, Tumor Markers, Therapeutic Drug Monitoring, and Toxicology. Prerequisite: Admission into the MLS program.

Content Outline of Clinical Chemistry w/urinalysis

- Carbohydrates
 - Glucose
 - Glycosylated hemoglobin
 - Other carbohydrates (e.g. lactate)
- Acid Base
 - pH, pCO₂, pO₂
 - Osmolality, base excess
- Electrolytes
 - Sodium, potassium, chloride, bicarbonate, anion gap
 - Calcium, magnesium, phosphorus
- Protein and Other Nitrogen-Containing Compounds
 - Total protein, albumin
 - Globulins (alpha 1, alpha 2, beta, gamma)
 - Ferritin, transferrin
 - Iron and TIBC
 - Ammonia
 - Creatinine, BUN
 - Uric acid
 - Troponin
 - Other (e.g., BNP)
- Heme Derivatives
 - Hemoglobin (S, fetal, A2, plasma)
 - Bilirubin, urobilinogen
 - Other (e.g., myoglobin)
- Enzymes
 - Amylase, lipase
 - AST, ALT
 - CK, LD
 - ALP
 - GGT
 - Other
- Lipids and Lipoproteins
 - Cholesterol (total, HDL, LDL)
 - Triglycerides
 - Phospholipids (PG)
 - Other lipids and lipoproteins
- Endocrinology
 - T3, T4, TBG, TSH
 - hCG, FSH, LH, estriol, estradiol
 - Other hormones (e.g. cortisol)
- Tumor markers (alpha fetoprotein, CEA, hCG, PSA)
- TDM and Toxicology

- Therapeutic drug monitoring
- Drugs of abuse
- Other toxicology (e.g., lead)

Content Outline of Urinalysis

- Physiology of fluid production
- Urinalysis (microscopic and chemical analysis)
- Sweat analysis
- Amniotic and gastric fluid analysis
- Semen analysis
- Feces analysis
- Correlation of analysis with pathology

MLS 463 Clinical Hematology (8) 6R 6L. The course emphasizes the theory underlying basic and advanced procedures performed in the hematology laboratory and the relationship between these procedures and the diagnosis of hematological disorders. The clinical significance of laboratory data and its correlation with pathologic conditions are discussed, including in depth discussions of anemias, polycythemias, leukemias, lymphomas and hemostasis abnormalities. The laboratory component of the course includes performance of basic and advanced hematology procedures including manual and automated complete blood counts, normal and abnormal differentials, cytochemical stains, and routine hemostasis testing. Prerequisites: Admission into the MLS program.

Content Outline of Hematology/Hemostasis

- Red Blood Cells and Indices
 - RBC count
 - Hemoglobin, hematocrit and indices
- White Blood Cells
 - WBC count
 - Cytochemical stains
- CBC (includes count, morphology and/or differential)
- Reticulocyte Count and Other RBC Inclusions
- ESR
- Tests for Hemoglobin Defects
 - Sickle cell tests
 - Hemoglobin electrophoresis
- Morphology and Differentials
 - Red Blood Cell Morphology
 - White Blood Cell Morphology
 - Differential (Whole Blood and Bone Marrow)
 - Platelet Morphology
- Immunology procedures
 - Anti-Nuclear Antibodies (ANAs)
 - Infectious mono testing

- Analysis including cell identification and disease correlation of:
 - CSF, synovial, and serous fluid
- Platelets and Hemostasis
 - Platelet count
 - Bleeding time and platelet function
 - PT, aPTT, TT
 - Fibrinogen, FDP, D-dimer
 - Factor assays
 - Circulating inhibitors (Lupus, Factor VIII, etc.)
 - Factor V Leiden, ATIII, Plasminogen, Prothrombin gene mutation, MTHFR, etc.)
 - Mixing studies
 - Anticoagulant therapy

MLS 473 Immunoematology (8) 6R 6L. The practice and procedures in the transfusion service and donor center will be presented, including the application of genetics and immunology to blood group serology. Problem solving in transfusion medicine, including complex antibody identification techniques and resolution of serological incompatibilities encountered in blood typing, compatibility testing of blood products, hemotherapy, testing for Rh immunoglobulin, as well as problems resulting from hemolytic disease of the newborn and hemolytic anemia is explored. Practice is offered in the techniques relevant to the performance of blood bank testing by the medical laboratory scientist in both the donor center and transfusion center, including automated testing methods, collection, storage and processing of blood components for transfusion. Reagents, testing of blood products and quality principles in blood banking will be summarized. Pre-requisite: Admission into the MLS Program.

Content Outline of Immunoematology (Blood Bank)

- ABO
- Rh
- Antibody Screen
- Antibody Identification
 - Duffy
 - Ii
 - Kell
 - Kidd
 - Lewis
 - MNS
 - P
 - Rh
 - Multiple antibodies
- Crossmatch
- Special Tests
 - DAT
 - Phenotyping and genotyping
 - Elution/adsorption
 - Antibody titer
 - Pre-warm technique
 - Rosette and Kleihauer-Betke
- Blood Donation

- Donor requirements
- Donor testing
- Transfusion Therapy
 - RBC
 - PLT
 - FFP
 - Cryoprecipitated AHF
 - RhIG
- Transfusion Reactions
- HDFN

MLS 482 Molecular Diagnostics Techniques (3) An introduction to molecular diagnostic techniques performed in the clinical laboratory, including rationale of testing methodologies, comparison of test methods, performance of lab tests, interpretation of test results, and clinical correlations of testing to specific disease, as well as the molecular basis of various pathologic conditions. Prerequisites: Admission into the MLS Program.

Content Outline of Molecular Diagnostics Techniques

- Recall basic molecular concepts.
- Define molecular diagnostic terms.
- Perform/describe and/ or interpret the following molecular methods, utilizing safety practices and performing the appropriate quality control in the laboratory setting:
 - Extractions
 - Amplifications (PCR)
 - Restriction enzymes
 - DNA/RNA Electrophoresis (Gel)
 - Hybridization and Microarray
 - Sequencing
 - Multiplex PCR

MLS 495 Clinical Microbiology (8) 6R 6L. Basic theory and laboratory practice of a) procedures for specimen processing in the clinical laboratory; b) normal flora of human body sites; c) morphological, cultural and serologic characteristics of medically significant bacteria, fungi and parasites; and d) antimicrobial principles and susceptibility testing techniques. Pre-requisite: Admission into the MLS program.

Content Outline of Clinical Microbiology

- General Microbiology, Pre-Analytical and Susceptibility Testing
- Aerobic Gram-positive Cocci: *Staphylococcus*, *Streptococcus*, *Enterococcus*, other (e.g., *Gemella*, *Leuconostoc*, *Micrococcus*)
- *Enterobacteriaceae*: *Citrobacter*, *Escherichia*, *Enterobacter*, *Klebsiella*, *Morganella*, *Proteus*, *Providencia*, *Salmonella*, *Serratia*, *Shigella*, *Yersinia*
- Other Gram-negative Bacilli: *Acinetobacter*, *Aeromonas*, *Bordetella*, *Brucella*, *Campylobacter*, *Eikenella*, *Francisella*, *Haemophilus*, *Helicobacter*, *Legionella*, *Pasteurella*, *Plesiomonas*, *Pseudomonas*, *Burkholderia*, *Stenotrophomonas*, *Chryseobacterium*, *Vibrio*, *HACEK*, *Bartonella*, *Capnocytophaga*

- Aerobic Gram-negative Cocci (e.g., *Neisseria*, *Moraxella*)
- Aerobic or Facultative Gram-positive Bacilli: *Bacillus*, *Corynebacterium*, *Erysipelothrix*, *Gardnerella*, *Lactobacillus*, *Listeria*, *Nocardia*, *Streptomyces*
- Anaerobes
 - Gram-positive: *Bifidobacterium*, *Clostridium*, *Eubacterium*, *Actinomyces*, *Peptostreptococcus*, *Propionibacterium*
 - Gram-negative: *Bacteroides*, *Fusobacterium*, *Porphyromonas*, *Prevotella*, *Veillonella*
- Fungi
 - Yeast (e.g., *Candida*, *Cryptococcus*, *Geotrichum*, *Malassezia*)
 - Dimorphic fungi (e.g., *Blastomyces*, *Coccidioides*, *Histoplasma*, *Sporothrix*)
 - Dermatophytes (e.g., *Epidermophyton*, *Microsporum*, *Trichophyton*)
 - Zygomycetes (e.g., *Absidia*, *Mucor*, *Rhizopus*)
 - Opportunistic molds/septate hyaline molds (e.g., *Aspergillus*, *Penicillium*)
 - Dermatiaceous molds
- Mycobacteria
 - *Mycobacterium tuberculosis* complex (e.g., *M. tuberculosis*)
 - Other Mycobacteria (e.g., *M. avium*, *M. avium-intracellulare*, *M. fortuitum*, *M. goodnae*, *M. kansasii*, *M. leprae*, *M. marinum*, *M. scrofulaceum*)
- Viruses (rapid antigen detection)
- Other microorganisms (e.g., *Chlamydia*, *Mycoplasma*)
- Parasites
 - Blood and tissue protozoa (e.g., *Plasmodium*, *Pneumocystis*, *Trypanosoma*)
 - Intestinal and urogenital protozoa (e.g., *Cryptosporidium*, *Entamoeba*, *Giardia*, *Trichomonas*)
 - Intestinal and tissue helminths (e.g., *Ascaris*, *Enterobius*, hookworm, *Schistosoma*, *Strongyloides*, *Taenia*, *Trichinella*, *Trichuris*)

Required Textbooks

MLS 400 no text required

MLS 453 and 458 *Clinical Chemistry*, 8th ed. Bishop. 2018.

Fundamentals of Urine and Body Fluid Analysis, 4th Edition, Brunzel, Nancy A. 2018.

MLS 463 and 468 *Clinical Laboratory Hematology*, 3rd ed. McKenzie, Shirlyn B., Pearson Hall Publishers 2015, ISBN: 13:978-0-13-307601-1

Clinical Hematology Atlas, 5th ed, Carr, Jacqueline H., Rodak, Bernadette F., Elseiver 2016, ISBN:978-0323322492.

MLS 473 and 478 *Modern Blood Banking and Transfusion Practices*, 7th ed, Harmening, Denise M. F.A. Davis 2018.

MLS 482 *Molecular Diagnostics: Fundamentals, Methods & Clinical Applications*. 3rd ed. Buckingham, L & Flaws, ML, FA Davis 2019.

MLS 495 and 499 *Introduction to Diagnostic Microbiology for the Laboratory Sciences*, Maria Dannessa Delost. Jones & Bartlett Learning, 2014. ISBN-13: 9781284032314

MLS 411, 479, 488 and 498- no text required (all program textbooks are recommended references)

Program Expenses (Estimates)

Tuition and Fees

Tuition and fees are set by the Board of Regents and are subject to change. Current charges and the university refund policy may be found on the WSU registrar's web site. The MLS department charges a \$100.00 program fee/semester.

Application Expenses (current at the time of handbook preparation)

Program Acceptance Deposit	\$100.00
The program application deposit is non-refundable. It is applied to tuition for MLS courses when the program is commenced. The acceptance fee is forfeited if the program is not commenced.	
Background Checks	\$48.00
Immunization Charges/Tb Test	\$100-\$200
Health Insurance coverage (current health insurance is required throughout the program)	
Health Physical (you may use your doctor or WSU Student Health Clinic. Must be current at the beginning of the clinical semester)	\$30-\$100

Coursework Expenses

Textbooks (used - new)	\$400-\$850
Liability Insurance (required for the clinical semester-included with student fees)	\$16.00
ASCL Student Membership (optional)	\$ 25.00
CPR certification	\$ 30.00
Lab Fee: \$ 50/lab course	\$250.00

Post-Program Expenses:

National Certification Examination	\$250.00
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Financial Assistance

Scholarships and grants are available through the University, College, Department and Professional Organizations. For scholarship information on sponsorship program information, consult with the Program Director. Department scholarships are awarded in the fall and spring. Students may not apply until they are in the program.

POLICIES YOU NEED TO KNOW

Safety First!

Student laboratory and clinical setting experiences are important aspects of study for all programs of the College of Health Professions. Such study comes with responsibilities: you must protect yourself from infectious agents with which you may contact and your patients must be protected from agents which you may spread.

The student laboratory is a simulation of clinical experience. All safety procedures that are in place in a clinical facility are also in place in the student laboratories. During Clinical Semester, students will follow the policies and procedures of the clinical facility.

Rules for the Student Laboratory

Students and faculty in the MLS program are expected to observe the following rules:

1. Do not eat, drink, apply cosmetics or smoke in the lab area. Do not store food or drinks in the lab area. Do not use electronic devices, such as cell phones or I-pads/pods, that may become contaminated or distract faculty and students from safety alarms, in the lab.
2. Wear a buttoned/snapped lab coat; closed-toed, hard-bodied shoes; and WSU scrubs in the lab area. Remove the lab coat when leaving the lab.
3. Wear gloves at all times when handling body fluids (blood, urine and other fluids from the body)
 - a. Remove gloves when leaving the lab area.
 - b. Wash hands after removing gloves and before leaving the lab area.
4. Open specimen containers which may produce aerosols (Vacutainers, tubes with corks, etc.) under plastic shields.
5. Know where and how to use:
 - a. Different types of fire extinguishers
 - b. Safety showers
 - c. Fire blankets
 - d. Safety protocol for evacuating the lab or the building
 - e. Safety Data Sheets (SDS)
 - f. Globally Harmonized System (GHS) to classify and label hazardous chemicals
6. Add acid to water (alphabetical); not water to acid.
7. Do not pipette by mouth, use a bulb.
8. Maintain a clean and orderly work station. Wipe down bench tops with disinfectant at the completion of a lab session. Clean up spills immediately.
9. Dispose of waste in the proper container:
 - a. Dispose of contaminated needles and sharp objects in the biohazardous sharps containers.
 - b. Dispose of broken glass in the container that is labeled for broken glass.

- c. Place dirty glassware in containers for wash.
 - d. Do not dispose non-infectious items in biohazardous containers.
10. Clean microscope lenses and cover microscopes after use. Turn off equipment that will not be used after the end of the lab session as directed by your lab instructor. Return reagents and supplies to their appropriate storage place.
 11. Cooperate with lab instructors and your peers to maintain a safe, clean work area.

Accidental Exposure Protocol

Students should be completely familiar with the safety precautions and other material detailed in the student safety manual kept in the student lab. The clinical laboratory can be a safe place to learn and work when appropriate procedures and proper equipment are utilized. However, in the event of accident, injury, or exposure to a biohazard or chemical hazard, the following protocol should be implemented:

- Immediately notify the faculty member or clinical supervisor (during clinical rotations).
- Perform appropriate first-aid procedures to include washing the skin or wound with soap and water or flood the affected mucous membranes with water.
- If the exposure involves potential blood-borne pathogen contact to non-intact skin or mucous membranes (such as a needle stick or splashing in the eyes), or a chemical exposure or other serious injury, the student will be immediately escorted to Student Health. During clinical rotations, the student should inform the MLS program office immediately. Clinical supervisor should be informed and the protocol of the facility must be followed which may include going to the emergency department of the facility in which they are training. The student will assume responsibility for all costs.
- Assist the laboratory instructor in completing two incident reports for ALL injuries. See link below for Student Health incident report:
 - https://www.wichita.edu/student_life/health_and_wellness/shc/SubLinks/QuicklinksandForms.php
- Comply with medical advice for follow-up care.

Required Health Records

To ensure safety for patients and co-workers, students must comply with health and safety requirements of the program and the clinical affiliates of the program. The following documentation must be on file in the MLS office before starting the professional program. Health requirements may be obtained through WSU Student Health Services (second floor, Ahlberg Hall) or the student's own health care provider.

Physical Examination: Completion and documentation of a physical exam is required prior to the start of the **Clinical** semester. The physical exam date must be less than one year prior to the clinical semester start date. Physical exams may be performed by your personal health care provider or WSU student health. Physical exam forms used by the WSU student health clinic are available in the MLS office.

Hepatitis B Vaccination (three immunizations) - All students are required to have the Hepatitis B vaccination series started before entering the program and completed before entering the Clinical

Semester. The series of inoculations may be received from a personal physician or from WSU Student Health Services. If the student does not wish to be vaccinated, they must sign a declination form. This form will be kept in the student's file and stored in the MLS office.

Influenza- Documentation of immunization for current (seasonal) strain of influenza virus before entering the Clinical Semester is required.

Two MMRs or Positive Rubella titer- All students, male and female, under forty years of age without documentation of: (1) positive titer for Rubella or, (2) Rubella immunizations, will have a titer performed to determine Rubella susceptibility status. All those students having negative titer status will receive Rubella immunizations prior to beginning the Clinical Semester.

Tetanus Vaccination- Protection against tetanus is required. The Tdap vaccine protects against diphtheria, tetanus, and pertussis (whooping cough).

Varicella- Documentation of titer showing immune status, or documentation of two Varicella immunizations is required.

Tuberculosis Test- All students are required to be tested for tuberculosis before the start of the **Clinical Semester**. Health providers will follow current Centers for Disease Control and Prevention (CDC)/State of Kansas guidelines for choice of test.

Additional Compliance may be required for the Clinical Semester at some Affiliate Clinical Sites, such as:

Meningococcal Vaccine- Documentation of immunization against *Neisseria meningitis* infection for students who will complete microbiology rotation at some medical facilities is required. Documentation must be received before start of the Clinical Semester for students attending rotations at these facilities.

Urine Test for Drugs of Abuse- Documentation of negative tests for drugs of abuse is required before the start of the Clinical Semester at some affiliated site facilities.

Health Insurance – Our affiliation agreements with clinical affiliates require documentation of health insurance coverage throughout the Clinical Semester. Application information for insurance may be obtained through WSU at the Student Health Services.

Pregnancy- Pregnant students are required to submit a physician's statement to the clinical coordinator verifying ability to start or continue the Clinical Semester.

Background Checks

Clinical facilities must ensure the integrity of all persons with access to patients. Background checks are required for all students entering into the MLS program. Background checks are prepared by Validity Screening Solutions, 9393 West 110th Street, Suite 420, Overland Park, KS 66210 (866) 256-0624.

The background check includes criminal records, verification of employment, listing on registered sex offender lists and listing on the U.S. Office of Inspector General's Excluded Parties Lists. The cost of obtaining such information must be assumed by the student. Results are kept on file in the MLS office. Findings from background checks must be reported to one designated person at the healthcare facility at

which a student is assigned. Findings are not shared with other individuals at the healthcare facility. **The healthcare facility will accept or deny admission of the student to their facility based on the policies of their facility. Be aware that findings of a felony or certain misdemeanors detected on the background check may determine if you can be placed at a clinical facility.** Prospective applicants are encouraged to consult with the program director for more detailed information before applying.

Statement of Confidentiality

MLS students attend training on patient confidentiality during orientation and will sign a ***Statement of Confidentiality***. By signing this form, the student indicates that they will not discuss patient information outside of the affiliate laboratory. This policy is enforced as a component of the Affiliation Agreement.

Liability Insurance

Each student will be required to carry professional and general liability insurance of at least \$1,000,000 each occurrence/ \$3,000,000 total per year, during his/her Clinical Semester. This insurance is obtained by the College of Health Professions and paid with a \$16.00 fee that is assessed during your clinical coursework (MLS 488, 479 and 498) as part of your student fees. Proof of this insurance (memorandum of insurance –MOI) must be presented and on file with the MLS program before the Clinical Semester begins.

Students who enter the Clinical Semester of the MLS program must have submitted and have on file in the MLS office all compliance documentation, including background check, current health insurance, physical exam, current immunizations, tuberculosis test and drug testing as required by the clinical facility. Students will not be placed at a clinical site until all compliance documentation is on file in the MLS office.

Student Laboratory and Clinical Semester Attire

During student laboratories and the Clinical Semester:

- Official WSU MLS scrubs will be worn
- Shoes that protect the entire foot including the toe and heel should be worn
- Hair should be secured and/or contained if hair is a danger to being caught in any machinery or fall into biohazardous material. Beards, mustaches and other facial hair must be kept well-trimmed and clean. Hair should not obstruct vision
- Jewelry, such as dangling necklaces, should not be worn in the laboratory
- Students are expected to maintain proper hygiene

Some clinical affiliates will not accept rotation students who have visible tattoos or body piercing. This may result in delay of program completion if an alternate site is not available.

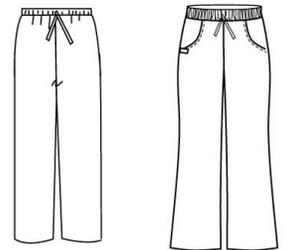
Students must have at least one set of scrubs, including scrubs top and scrubs pants, for student laboratories and the Clinical Semester. The school or clinical site will provide one lab coat per semester for student laboratories on the WSU campus. A charge of \$5 will be requested for each additional lab coat.

Scrubs top must be V-neck, short-sleeved and all one color. The top may be black (from the same company as pants to match the black), gold or white. Prints are not acceptable. Tops must have WSU Med Lab or WSU Medical Laboratory Sciences, embroidered on the front left side, in this format:



WSU Med Lab or WSU Medical Laboratory Sciences

Embroidery thread should be yellow or gold thread on black tops; black thread on gold or white tops. Any style font is acceptable as long as it would be legible from four feet away.



The scrub pants should be black in either draw-string or elastic waist style. Pants must be full-length (no capri-style, no cuffs). Length should be so they are not dragging on the floor when standing. They must be altered if they are too long. Most of the appropriate pants styles are available in average, petite and tall sizes. Pants should fit comfortably and modestly when sitting down in a straddled position.



Scrubs jacket is optional and, if purchased, must conform to the dress policy. Jacket must be solid black with yellow or black embroidery, as described above, on the front left side as previously described.

During winter months, a long-sleeved knit shirt may be worn under the scrubs top. The shirt must be black or yellow without decoration or writing. When in the lab, shirt sleeves must be completely covered by the lab coat.

Scrubs may be ordered through the WSU Shockerstore, at uniforms shops in Wichita, or through online sources. You may purchase scrubs from any company. Be sure you are ordering the correct size when you request the embroidery; **embroidered scrubs are not returnable**. Shockerstore scrubs will include the WSU logo with the wording; **allow 7-21 days from order to receipt of scrubs at the Shockerstore.**

Scrubs should be purchased for use during all student labs and all rotation days.

Students will adhere to all policies of the clinical affiliate, including dress code, when on clinical rotations. In the event facilities have less stringent policies than the WSU policies stated in this manual, students will be expected to follow the more stringent WSU policies as outlined in this manual. In the event facilities have more stringent policies than the WSU policies stated in this manual, students will be expected to follow the more stringent policies of the facility.

You Have Rights!

In addition to your academic rights to appeal decisions about academic progression, described in the following sections, you have the right to privacy and the right to make complaints. Your right to privacy is described by FERPA.

Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act of 1974 (FERPA) is a Federal law which provides that the institution will maintain the confidentiality of student education records. Wichita State University accords all the rights under the law to students who are declared independent. Those rights are the right to inspect and review the student's education records; the right to request the amendment of the student's education records to ensure that they are not inaccurate, misleading, or otherwise in violation of the student's privacy or other rights; the right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent; the right to file with the U.S. Department of Education a complaint concerning alleged failures by Wichita State University to comply with the requirements of FERPA; and the right to obtain a copy of Wichita State University's student records policy. You can obtain a copy of the policy from the Registrar's office.

Right to Complain

You have the right to make complaints to instructors, the program chair and administration of the college and university but be cognizant of the proper chain of command. Problems with individual courses should first be made known to the instructor of the course. Meet with the instructor during the instructor's office hours. If you are unable to resolve the problem, you may discuss the issue with the program director. The program director may be able to resolve the issue or may direct you to another resource within the university. If you are unable to resolve your issue at the department level, you may appeal to the Associate Dean of the College of Health Professions. Use the following link: https://thecube.wichita.edu/ucontent/3a4a974e38474e809b7cf7266ce9bc94_en-US/index.pdf which can be found on the CHP website for the proper chain of command for both academic and non-academic issues.

Policies for Academic Progression

The following policies will be followed concerning student progression in the professional phase of the WSU MLS program.

Enrollment

A student must maintain enrollment either as a full-time student or as a part-time student. The program plans for both options are listed in this handbook. Full-time enrollment is required during the Clinical Semester.

Student Attendance Obligation

As outlined in the WSU Student Handbook, students are expected to attend all classes and clinical rotation days for which they are enrolled, and faculty members are expected to monitor attendance.

Administrative withdrawal may be initiated by the dean's office of the college in which the student is enrolled, if the student's class attendance is so poor that, in the instructor's opinion, full benefit cannot be derived from the course.

Each student is expected to arrive on time and stay for completion of the assigned period. No student shall expect, request or otherwise arrange for altered assignment hours in order to participate in paid employment. If possible, students should make all appointments at times that do not interfere with assignments.

In the event of legitimate and necessary absence, such as infectious illness, the student should:

- During on-campus semesters, notify the MLS department by phone (316-978-3146)
- During the Clinical Semester, notify the supervisor of the assigned department at the clinical affiliate by phone as soon as possible and notify the MLS department within 24 hours by phone or email.

In the event of unavoidable late arrival:

- During on-campus semesters, notify the department by phone (316-978-3146 or 316-978-5657) as soon as possible
- During the Clinical Semester, notify the supervisor of the assigned department at the clinical affiliate by phone as soon as possible and notify the MLS department within 24 hours.

Make-Up Policy

Students are allowed to make up lecture examinations, including the final examinations, upon establishment of reasons which are satisfactory to the instructor, such as personal or immediate family illness. Documentation of inability to attend at the scheduled time must be provided before a makeup examination is scheduled. Please see individual course syllabi for information about make-up quizzes and lab assignments.

Holidays

School holidays are posted on the university web site. During the Clinical Semester, holidays will conform to the holiday schedule of the clinical affiliate of the current rotation. These differences to the WSU holiday schedule listed for the university are necessary to provide clinical instruction when the most qualified clinical instructors are available. During the Clinical Semester, student breaks, such as spring break, are listed on the rotation schedule and are at least one week in length.

Student Conduct

Students are expected to read and adhere to the policies of WSU as presented in the WSU Academic Policies and Student Code of Conduct Process and Procedures.

https://www.wichita.edu/services/mrc/WSU_Academic_Policies.php

https://www.wichita.edu/about/student_conduct/FAQs.php
https://www.wichita.edu/about/student_conduct/Conduct_Process.php

Professionalism

Students are expected to maintain a professional attitude during the MLS program. Professional attitude includes: accepting responsibility for didactic and laboratory course work, patient confidentiality, academic integrity, ethics, and respect for others at all times. Non-professional behavior includes: non-completion of tasks, failure to follow instructions, verbal abuse including swearing, rudeness, overly argumentative, and violation of copyright policies.

The student laboratory is a simulation of clinical laboratory experience. In keeping with clinical practice guidelines, information gained through clinical laboratory practice will not be discussed in the public arena, including public meeting areas and social networking sites.

While they are useful and convenient tools for the student, personal electronic devices can be a source of distraction for others and a potential temptation towards unethical behavior when used inappropriately or unprofessionally during a student's learning experience. Personal electronic devices are defined as electronic, portable, entertainment, communication, or information storage devices.

These devices include, but are not limited to, the following:

- Cellular phones
- Laptop and handheld computers
- Media players (includes MP3 players, audio & video players, etc.)
- Audio recorders
- Video and still cameras

The use of personal electronic devices during *graded activities*, including clinical preceptorships, is prohibited unless explicitly authorized by faculty. **Cell phones are not allowed in the student laboratory.** Students may make arrangements in the department office to receive emergency messages.

The communication devices present at the clinical affiliate facility are for the purpose of patient care. These devices should not be used by the student without permission of clinical faculty. Photographs and audio recordings will not be taken within the clinical facility without the permission of the laboratory director.

Social Media: Think before you post

If you have any doubt about whether or not you should post something on Facebook or other social media, most likely you should just keep it to yourself. With that in mind, always review what you're about to share from every possible angle to determine what negative consequences exist and decide whether or not you're comfortable accepting the responsibility of those consequences.

All specimens, lab results and interpretations of lab results are ultimately the property of the patient. Protect the patient's confidentiality. Do not assume ownership of any information that you gather through your association with the clinical facility.

Under no circumstances should you remove patient information, either physically or electronically, from a medical facility.

Academic Standards

All students will be required to obtain a "C" (2.0) or above in all pre-requisite courses and professional courses of the MLS program. Failure to maintain an acceptable academic performance may result in dismissal from the program as described in the following statements.

Grading Policy

Grades for MLS courses are defined as follows:

Letter Grade	Credit Points	Percentage of Coursework Completed Successfully
A	4.0	92% and above
A-	3.7	90 up to (but not including) 92%
B+	3.3	87 up to (but not including) 90%
B	3.0	83 up to (but not including) 87%
B-	2.7	80 up to (but not including) 83%
C+	2.3	77 up to (but not including) 80%
C	2.0	70 up to (but not including) 77%
C-	1.7	67 up to (but not including) 70%
D+	1.3	63 up to (but not including) 67%
D	1.0	60 up to (but not including) 63%
F	0.0	below 60%

Academic Warning

An instructor may issue an academic warning to any student who either:

1. Earns less than 70% on two examinations in any one course or
2. Fails to successfully complete (earns less than 70%) and/or hand in to the instructor, two or more assignments on the date due or
3. Exhibits an unprofessional manner or
4. Fails to meet the attendance obligations

An academic warning will be issued in writing and will be documented in the student's file.

Probationary Status

The department chairperson may place the student on probationary status if the student:

1. Earns less than 70% cumulative grade at mid-term in any MLS professional course or
2. Has not passed any of the five sections of the comprehensive exam with scores of 70% or better after the second comprehensive exam or
3. Exhibits unprofessional manner on two or more occasions or
4. Fails to meet minimal performance standards on a skills checklist of any clinical rotation

The student, who has been placed on probation for academic reasons, will be returned to full academic standing after successful completion of a semester with a minimum grade of 70% in all courses and consistent demonstration of professional behavior and performance. The student, who has been placed on probation for anything other than academic reasons, will remain on probation for the duration of their MLS Program.

Dismissal

The department chairperson may dismiss a student from the program if:

1. A grade of less than C (2.0) or NCR (no credit) is earned in one or more professional courses or
2. He/she purposely damages or abuses departmental equipment instruments or supplies or
3. He/she fails to meet the attendance policy, safety regulations, professional standards of the MLS Department, or academic honesty policies of WSU or
4. He/she fails to meet the safety regulations or professional standards of the affiliated clinical facilities during clinical education assignments

Each student shall have the right to appeal an academic or disciplinary termination or removal from the professional phase. The student shall first appeal within ten instructional days of the termination or removal action to the Chairperson of the MLS Department. Within three working days, the Chairperson shall inform the student in writing of the Departmental decision.

The student, if dissatisfied with the decision at the departmental level, may appeal to the Assistant to the Dean for Academic Affairs, the CHP Admission-Exception Committee, and the Dean. If the student wishes to appeal beyond the college level, he/she may contact the Wichita State University Court of Student Academic Appeals, Division of Student Affairs, 103 Grace Wilkie Hall. Consult the WSU Student Handbook for further information about appeal procedures.

Application for Degree

Students are responsible for applying for a degree online through MyWSU, Graduation Links, Application for Degree (AFD), in the semester prior to the Clinical Semester.

Faculty Recommendations

Requests for recommendations for student or graduate scholarships, awards or employment must originate from the student or graduate and come directly to the applicable faculty.

Certification Examinations

Students successfully completing the MLS program are eligible to take national certification examinations. Students are not eligible to take the exam until all requirements of the MLS program have been successfully completed. The certification examination is not required to earn the degree from WSU. Students are responsible for the completion and submission of their applications and supporting documents for the examination before the specific deadline. The national certification examinations are computerized examinations. Applications and additional information for certification examinations may be found on-line at:

<https://www.ascp.org/content/board-of-certification>

WSU School Code for the ASCP exam: 015019

Professional Organizations

Students are encouraged, but not required, to join a National Professional Organization such as the American Society for Clinical Pathology (ASCP) or American Society of Clinical Laboratory Sciences (ASCLS). By joining ASCLS, you also will be a member of the Kansas Society of Clinical Laboratory Scientists (KSCLS). Applications for membership may be obtained from the MLS office or on-line at: <http://www.ascls.org>.

Tornado Warning Policy and Procedures

It is the policy of Wichita State University that all classes (including examinations, lectures, and laboratories in progress) and activities on campus will be officially suspended when the City of Wichita is included in an officially declared tornado warning. Faculty, staff, students, and visitors shall be instructed to seek appropriate shelter for the duration of the warning. Evacuation plans are posted in all rooms. The MLS laboratories, Ahlberg Hall rooms 113, 125 and 127, are officially-declared tornado shelters.

THE CLINICAL SEMESTER

The Clinical Semester for the WSU MLS program consists of 3 rotations, Core Lab, Clinical Microbiology and Blood Bank. The College of Health Professions has affiliation agreements with many clinical sites. Some sites are program specific such PT or PA. Please let us know at the beginning of the program if there is a particular site that you wish to complete your clinical practicum as we may or may not have an affiliation agreement with your preferred clinical site. This is especially true if you would like a site outside of Kansas. It may take upwards of a year to obtain an affiliation agreement with particular clinical sites.

Core Lab Practicum: MLS 488.

Core lab practicum includes experiences in clinical chemistry, manual and automated immunology, hematology, hemostasis, urinalysis, phlebotomy, specimen processing and the general operations of a clinical laboratory. In addition, students review management issues and are evaluated for professional behavior.

Clinical chemistry includes automated procedures; tests of routine chemicals and electrolytes; therapeutic drug monitoring, toxicology and endocrinology; quality assurance; and method evaluation. Procedures that are not available at a facility will be marked as NA, not applicable. The suggested division of time during the clinical chemistry rotation is:

- 3 weeks for routine and specialized chemistry, including electrolytes, quality assurance and method evaluation, therapeutic drug monitoring, toxicology, endocrinology, and automated immunoassay.

Hematology includes automated methods, cell morphology, special stains, manual methods, bone marrow interpretation and analysis of body fluids. The suggested division of time during the hematology rotation is:

- 3 weeks for automated methods, cell morphology and special procedures

The hemostasis rotation consists of manual and automated coagulation procedures. The suggested time period for hemostasis/coagulation experiences is:

- 1 week in hemostasis/coagulation (may be completed during 3 weeks of hematology)

The urinalysis rotation includes the physical, chemical and microscopic examination of urine. The suggested time duration for urinalysis rotations is:

- 3 days to 1 week with a minimum of 25 complete urinalysis procedures (may be completed with phlebotomy)

Phlebotomy and specimen processing rotation includes venipuncture and capillary puncture, processing specimens and storing and transporting samples for future testing. The suggested time duration is:

- 3 days to 1 week with a minimum of 25 blood draws (may be completed with urinalysis)

Students also complete management techniques in which they observe and reflect on such issues as chemical safety procedures and quality assurance issues. These experiences occur throughout the rotation and are evaluated by student written documentation.

- Complete as allowable throughout the core lab rotation

Applied Immunohematology (Blood Bank) Rotation: MLS 479.

Blood Bank or Immunohematology rotation, includes grouping, antibody screening, compatibility testing, antibody identification and donor processing. Students who complete the immunohematology rotation near Wichita usually complete 1 week of the rotation at the American Red Cross processing center.

The suggested division of time during the immunohematology rotation is:

- 3 weeks at a medical center plus 1 week at the Red Cross center (Wichita area only); OR
- 4 weeks at a regional medical center

Applied Clinical Microbiology Rotation: MLS 498.

Clinical Microbiology rotation includes interpretation and work-up for body site cultures, automated methods, stain interpretation, antimicrobial susceptibility testing, quality control, mycology testing, parasitology testing and virology testing, as available at the clinical site. The suggested division of time during the clinical microbiology rotation is:

- 2 weeks for body site culture interpretation
- 2 weeks for special testing

Preparing for the Clinical Semester

To be eligible for the Clinical Semester, the student must have submitted documentation of the following compliance issues:

- Current physical exam
- Background Check
- Health Insurance
- Liability Insurance
- Hepatitis B Immunity
- Rubella Immunity
- Tetanus Immunization
- Tuberculosis Testing Status
- Varicella Immunization
- Phlebotomy Assessment
- Community/Interprofessional Service
- Other documentation specifically required by the facility

Upon request and with permission of the student, health information documents may be sent to the clinical affiliate.

Students are encouraged to contact the on-site clinical coordinator approximately one week before the start of each rotation to ask about time to arrive, dress policy, parking and other first day issues.

Pre-Rotation Competencies to Obtain Prior to Entering the Clinical Semester

Upon entering the Clinical Semester, every student should be able to, at minimum:

Applied Hematology/Hemostasis

1. List reference ranges for the components of a CBC.
2. Use the rule-of-three.
3. Determine if scatterplot/histograms represent normal or abnormal blood.
4. Count cells, using a hemocytometer, and calculate cell concentrations.
5. Recognize normal vs. abnormal WBC, RBC and platelets on a blood smear.
6. 7. Correlate CBC findings with WBC differential findings.
8. Recognize specimen problems and respond appropriately.
9. Make a good peripheral blood smear.
10. Use a microscope.
11. Perform and respond to delta check outliers
12. Recognize and respond to critical values.
13. State the basic operating principles of hematology/hemostasis instrumentation.
14. Use Standard Precautions when handling patient samples.
15. Perform counts and cell differentiation on CSF and other body fluids. Respond appropriately to abnormal results.
16. Collect adequate specimens for procedures. 17. Perform and respond appropriately to QC findings.

Applied Chemistry:

1. State the purpose and common uses of SOP.
2. Perform and respond to delta check outliers
3. List appropriate reference ranges for test and patient.
4. Respond appropriately to abnormal and critical results.
5. Collect adequate specimens for procedures.
6. State the difference between serum, plasma and whole blood in chemical analysis.
7. State the procedures for drawing peak and trough drug levels.
8. Recognize specimen problems and respond appropriately.
9. State the rules of specimen rejection.
10. Perform and respond appropriately to QC.
11. Pipette and make dilutions accurately.
12. State the purpose of calibration and respond appropriately to calibration problems.
13. Correlate chemistry results with clinical implications and respond appropriately.
14. Define common abbreviations: SOP, QC, QA, STAT, QNS, SST, BMP, CMP.
15. Correlate macroscopic findings and microscopic finding in urinalysis.
16. State the basic operating principles of urinalysis instrumentation.

Applied Immunohematology:

1. Identify specimens correctly 100% of the time.
2. Perform type and screen.
3. Perform cross-match.
4. Perform DAT.
5. State the differences between forward and reverse typing.
6. Perform antibody identification in both tube and gel.
7. Select appropriate blood units based on above testing.

8. Follow procedures.
9. Define antibody and antigen.
10. State shelf life requirements for blood bank units.
11. State the importance of testing for MRSA, VRE and C diff in blood bank.

Applied Clinical Microbiology:

1. Perform and report specimen gram stain accurately.
2. Use sterile technique.
3. Streak for isolation.
4. Describe colony morphology adequately, using color, shape and hemolysis.
5. Describe the purpose and appearance of organisms on commonly used media.
6. List normal flora and common pathogens for body specimens.
7. Recognize pathogenic fungi and parasites and determine the clinical need for further testing.

Clinical Semester Policies

Attendance

Students are scheduled Monday through Friday day shift rotation for eight hour/day periods. The clinical day will begin and end at times established by the clinical affiliate and individual programs. Lunch periods and breaks are assigned at the discretion of each individual department and/or supervisor. No student shall expect, request, or otherwise arrange for altered clinical hours or early release in order to participate in paid employment. If possible, students should make appointments at times that do not interfere with the rotation schedule or require leaving early.

Each student is expected to arrive on time each day during his/her clinical rotation. If the student is unable for legitimate reasons to be in the department ready for clinical instruction at the assigned time, the student shall notify the clinical faculty. Lost time, outside the parameters set up by the affiliate, shall be made up at the convenience of the clinical affiliate.

Housing during the Clinical Semester

Neither WSU nor the Clinical Affiliate assumes responsibility for housing during the student's rotations. It is the student's responsibility to identify and secure adequate housing.

Student Employment

Students are encouraged to commit their energies to the development of professional performance skills during their clinical rotation. While it is recognized that financial requirements might necessitate student employment during the Clinical Semester, at no time shall that employment jeopardize the student's academic performance, the assigned clinical hours, or the student's health.

Service Work

Students may not be substituted for regular staff nor may they receive compensation for work performed during assigned classroom or clinical procedure rounds. Service work by students in a clinical setting outside of regular academic hours must be noncompulsory. However, after demonstrating proficiency, students with qualified supervision, may perform laboratory procedures.

Laboratory and Clinical Semester Attire

- Official WSU MLS scrubs will be worn without accessories
- Shoes that protect the entire foot including the toe and heel should be worn
- Long hair should be secured so as not obstruct vision or become a biohazard
- Dangling jewelry, which may create a hazard, should not be worn in the laboratory
- Students are expected to maintain proper hygiene
- Students will adhere to requirements of their rotation site

Professionalism

Students will follow the safety and confidentiality policies of the facility at which they are completing a rotation. Students will maintain a professional attitude during all aspects of the MLS program. Professional attitude includes: accepting responsibility for didactic and laboratory course work confidentiality, academic integrity, ethics, and respect for others at all times. Non-professional behavior includes: non-completion of tasks, failure to follow instructions, verbal abuse including swearing, rudeness, overly argumentative, and violation of copyright policies.

Students may not bring personal electronic devices into the clinical laboratory. Personal electronic devices are defined as electronic, portable, entertainment, communication, or information storage devices, such as cell phones, computers and media players. Students may not use the communication devices present at the clinical affiliate facility for purposes other than patient care. Students may request permission from the clinical instructor to carry a personal electronic device under unusual circumstances, such as monitoring a sick child at home.

Holidays and Student Breaks

Student holidays (Labor Day, Martin Luther King Day, etc.) conform to the holiday schedule of the clinical affiliate for the current rotation. Student breaks (spring break, winter break, etc.) are at least one week in length and are listed on the rotation schedule.

Evaluation

The student in the clinical facility is expected to develop required competencies in each MLS area. Therefore, it is expected that the student will improve their performance during the clinical experience as a result of their learning experience. Evaluation is based on observation of skills and behavior during the rotation period, and by written and oral quizzes which help the clinical instructor determine competency development. Final evaluation is documented on Rotation Checklists and signed by clinical instructors and the student. These checklists are sent, or brought by the student, to the school and contribute to the grade for clinical rotation courses.

Reflection Classes and Comprehensive Examination Fridays

On assigned Fridays during the Clinical Semester period, the student will return to WSU for reflection and review classes in the morning and comprehensive exams in the afternoon. The student will not go to the clinical site on these Fridays. Students, who are completing clinical rotations that are over 100 miles from WSU, may request to leave 2 hours early on the Thursday before the Friday exam in order to travel back to WSU. The request should be sent to the program director by email and must also be approved by the clinical instructor. Synthesis of information and experience is a critical part of transforming a student into a professional. Reflection classes are designed to help the student integrate knowledge and skill domains and to promote a thorough understanding of information in its entirety. Students must

successfully pass all sections of the comprehensive examinations in order to pass clinical rotations courses and achieve eligibility to apply for certification examinations.

Conduct

Conduct in direct violation of professional ethics or standards, or conduct in direct violation of the policies and procedures of either the clinical affiliate or MLS program, will result in the immediate removal of the student from the clinical assignment and may result in termination from the professional program.

**MEDICAL LABORATORY SCIENTIST
STUDENT SURVIVAL GUIDE**
(From Previous MLS Classes to You)

I. Parking

- a. **DO NOT BE LATE**
- b. Plan to arrive 15 minutes before 8 am in order to get a parking spot
- c. If you have problems in the morning, give the office a call and let them know. It is much more likely to be forgiven if you do so. Put the number on your speed dial: 316-978-3146.

II. Study Tips

- a. Exchange e-mails and phone numbers with your classmates. Find out who lives close to you and start study groups (you can reserve rooms in the library).
- b. Start good study habits now. Meaning: **STUDY YOUR NOTES EVERY NIGHT!!! DO NOT CRAM, IT WILL NOT WORK.** First, the volume of information is too large to do so and second, we actually need this stuff in our profession, so learn it.
- c. Find what works for you early. The typical student purchases 2 ½” to 3” binders for each class (no exaggeration – you will have a lot of notes).
- d. Figure out how you learn. If you are visual, draw pictures, charts, graphs to help yourself. If you are an auditory learner, then get a recorder and listen to the lectures.
- e. Extra books – get advice from past students on which reference books to purchase and help with your studies. Some suggestions from previous students:
 - Board of Certification Study Guide for Clinical Laboratory Certification Examinations (BOR Study Guides), Patricia Tanabe
 - Clinical Laboratory Science Review (with Brownstone CD-ROM), Robert Harr
 - Clinical Laboratory Science Review: A Bottom Line Approach, Patsy Jarreau
 - SUCCESS! in Clinical Laboratory Science (4th Edition), Anna Ciulla, Donald Lehman
 - Quick Review Cards for Clinical Laboratory Science Examinations [Flash Cards] Valerie Polansky
 - Lab CE <http://www.labce.com/start.aspx>
- f. If you feel overwhelmed (which you will), don't be afraid to ask for help. However, your teachers and classmates can't help you the last week of class, **GET HELP EARLY!!!**
- g. ISL = computer room, on the first floor next to the elevator. You can put money on your shocker ID card, print documents, and copy documents there. **IT IS CHEAPER THAN THE MAIN LIBRARY.**
- h. Vending machines are on the first floor, but coffee machine is on the second floor

- i. Remember: a 70% is good enough to pass, get a diploma, become a medical laboratory scientist

III. Hints

- a. General information
 - Come to class, seriously
 - Don't be late, it's rude and unprofessional
 - PAY ATTENTION, TAKE NOTES**
- b. Plan for full days
- c. Ask questions
- d. Pick out important information in test questions
- e. The Clinical Semester
 - The Comps: will cover all material from the program, including reading assignments from the texts. Save everything.
 - Clinical days: Arrive to the site on time and be ready to work
 - Remember this is a job interview
 - Keep a positive attitude
 - Show respect for your clinical mentors

IV. Miscellaneous Hints

- a. On a stress scale from 1 to 10, it changes daily and depending on your strong points but it will be between 5-10
 - i. Get into a routine
- b. You will probably be lost your first semester, latch onto someone who has been here and stick with them (ask questions, get help, etc....)
- c. Be prepared to try new skills
- d. MLS Library in office if you need more resources- Books can be checked out
- e. Review the assigned textbooks before first day of class!!!
- f. On-campus students really do have Fridays off, don't come to school. Fridays are for clinical rotation students.
- g. Take advantage of your breaks, you will need them!!!
- h. Remember your actions affect the students who enter after you!!!
- i. **KEEP ALL MATERIAL, BOOKS, AND NOTES FROM ALL CLASSES**
 - i. THESE ARE NEEDED FOR THE COMPREHENSIVE EXAMS AND THE REGISTRY

Tips from the class of 2017/2018:

HOW TO SUCCEED IN THIS PROGRAM:

- Take notes and pay attention during lecture
- Study a little bit each day
- Don't be afraid to go and talk to the professors if you aren't understanding something.
- Try your best to get enough sleep. You're in lecture for six hours, and it's much easier to use those six hours effectively (taking notes, filling out study guides, generally trying to comprehend new concepts) if you're well rested.

ABOUT YOUR INSTRUCTORS:

Professor Laurie Alloway

- Always fill out her study guides. Will help you pass the exams
- Try to fill out the study guides ahead of the review so you can ask questions.
- Powerpoints are filled with good information. Take notes or highlight the critical information on the slides for studying for the exams.
- After filling out the study guide, highlight any information you have trouble remembering. Sometimes using different colors is helpful as well e.g. pink for conditions associated with an elevated level of an analyte and blue for conditions associated with a decreased level

Dr. Diana Cochran-Black

- Objectives are where exam content is taken.
- Study off the charts given during lecture
- Study ahead of time. You can't cram for this class!
- Diana tells you to memorize certain things - like the coagulation cascade - from the get go. Heed the advice and memorize it.
- Flashcards are extremely helpful for memorization of things like normal reference ranges, blood cell morphology, and coag tests; Quizlet has a lot of public study sets so you don't even have to make your own, just double check the information.

Professor Reitha Deiter

- Pay attention during lecture- not everything is on her powerpoint slides.
- The book is a good tool - especially the questions at the end of the chapters [answers are in the back of the book]
- Review questions at the end of the PowerPoint will sometime appear on the test
- There is a lot of material in the class. Pay attention.
- Read the assigned reading
- Consolidate powerpoints into your own study guide, and make charts when possible. The HTR and blood component charts are very helpful.