

Medical Laboratory Science Certificate Program

Chairperson: Valerie Everard-Gigot, Ph.D.

Department of Medical Laboratory Science website

The mission of the Department of Medical Laboratory Science (MLSC) is to educate persons to be highly skilled in laboratory medicine and possess those professional qualities necessary for the practice of medical laboratory science. The certificate awarded in this department qualifies one to work as a medical laboratory scientist or technologist (aka, clinical laboratory scientist/technologist) in hospital laboratories, clinics, physicians' offices, research and teaching laboratories, as well as in biotechnology and pharmaceutical companies and public health labs.

The Medical Laboratory Science certificate program sequence includes two years of study. The first year consists of classrooms and labs experience on campus. The teaching laboratories on the university campus are structured to simulate a clinical setting. The second year consists of the clinical practicum required for this certificate which involves clinical rotations in laboratories in the metro-Milwaukee area.

Accreditation

The Medical Laboratory Science program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences; 5600 N. River Road, Suite 720; Rosemont, IL 60018; (773) 714-8880. Upon successful completion of the course work and practicum, students are eligible for the appropriate certification and/or licensure examinations. The university assumes no responsibility for the success of its students in obtaining professional certification or other types of professional licensure.

Admission requirements

1. A U.S. citizen or an eligible non-citizen
2. Completion of an undergraduate degree from a regionally accredited university in a science-related field with a minimum 2.800 cumulative and science GPA's
3. Completion of the following course prerequisites at a regionally accredited college/university with a minimum grade of C. It is strongly preferred that courses be completed within 5 years of matriculation, however, exceptions may be granted based on a holistic review of the application:
 - a. Two courses in general biology, lab not required
 - b. Two courses in general chemistry (year sequence), with lab
 - c. One course in biochemistry (minimum 3 credit survey course)
 - d. One course in organic chemistry, with lab (of a year-long sequence)
 - e. One course in physiology or a complete anatomy and physiology (A&P) sequence minimum 5 credits

Certain essential functions represent the non-academic requirements of the program that a student must possess to successfully complete the program and become employable. These include: the ability to distinguish colors, the ability to learn to perform and interpret highly complex testing methods and the ability to disseminate information in an accurate and confidential manner. Students must have good tactile skills, possess adequate physical and emotional health to work under stress and time constraints and demonstrate respect and care for others. Students must also be able to work efficiently and accurately in a clinical laboratory environment that often includes:

- Loud noises
- Strong odors
- Biohazardous materials
- Repetitive motions
- Standing for long periods of time

Ordinarily, MLSC courses are not approved for transfer from other institutions except with approval of the department chair. The following courses must be taken in the year immediately preceding the final (clinical) year:

Code	Title	Hours
MLSC 7124	Medical Microbiology 1	4
MLSC 7127	Medical Microbiology 2	4
MLSC 7163	Clinical Chemistry and Concepts 1	4
MLSC 7173	Clinical Chemistry and Concepts 2	4
MLSC 7174	Clinical Hematology 1	4

Professional Standards

In addition to being evaluated through the use of written examinations and assignments, class participation and practical examinations, medical laboratory science students are also evaluated with respect to their professional qualities. The instructors in most medical laboratory science courses complete a written evaluation of each student. Students who fail to comply with the rules and regulations of the department with respect to immunizations, health insurance, safety, honesty or whose conduct or health is unsatisfactory may be dismissed from the MLSC certificate program.

During the final (clinical) year, students are subject to academic and professional policies of the department as well as the rules and regulations of the affiliating clinical facility to which they are assigned. Students who are in violation of the rules and regulations of the clinical facility are subject to dismissal from that facility. This action is under the jurisdiction of the authorities of that institution in consultation with the university's department chair.

In medical laboratory science courses, a student who in any way acts dishonestly in class assignments or examinations is in violation of the Health Sciences Professional Academic Honesty policy may be subject to dismissal from the certificate program.

For the safety of patients, peers and themselves, students are required to dress appropriately while attending clinical laboratory science sessions for all courses.

Academic Progression

Successful program progression requires students to complete each term in a lock-step sequence with a grade of C or higher in all courses in the certificate program. Each course is only offered once each academic year and should a student fall out of sequence, they will be delayed one year to continue. Students who fail to maintain progress necessary to meet the minimum requirements because of grade point average or excessive failure (F or U) grades are subject to review by the MLSC Progress and Promotions Committee, and they may be dismissed from the MLSC certificate program.

During the final (clinical) year the academic actions taken are varied in severity dependent upon the scholastic and/or professional deficiency. These actions are the following: written warning, clinical academic warning, clinical academic censure and required to withdraw. The method of making up unacceptable grades during the final year which have resulted in the issuing of an action of clinical academic warning or clinical academic censure are determined by mutual agreement between the university department chair and the affiliation clinical program director. The MLSC Progress and Promotion Committee prescribes, in writing, conditions under which these students are allowed to continue. Students who do not meet the conditions thus stipulated are dismissed from the certificate program.

Students must have a criminal background check prior to beginning their clinical assignments. Some clinical sites may have requirements beyond those of the university (e.g. physical examination, drug testing, etc.). Students are expected to participate in the state clinical laboratory science conference during the final (clinical) year of the program.

Medical Laboratory Science Certificate

The certificate in Medical Laboratory Science requires completion of the following courses:

Code	Title	Hours
First Year		
PHIL 4336	Applied Ethics for the Health Sciences	1
MLSC 2200	Concepts in Medical Laboratory Science	3
MLSC 7124	Medical Microbiology 1	4
MLSC 7127	Medical Microbiology 2	4
MLSC 7163	Clinical Chemistry and Concepts 1	4
MLSC 7173	Clinical Chemistry and Concepts 2	4
MLSC 7174	Clinical Hematology 1	4
Second Year		
MLSC 7180	Concepts in Clinical Education Methods and Practicum	2
MLSC 7181	Modern Management Concepts for the Medical Laboratory and Practicum	2
MLSC 7183	Clinical Chemistry and Practicum	6
MLSC 7184	Clinical Hematology 2 and Practicum	4
MLSC 7185	Clinical Hemostasis and Practicum	3
MLSC 7186	Clinical Immunohematology and Practicum	6
MLSC 7187	Clinical Immunology and Practicum	2
MLSC 7188	Clinical Microbiology and Practicum	6
MLSC 7189	Clinical Urinology and Practicum	2

Total Credit Hours:

57

Students must complete all MLSC courses with a C or better and have a cumulative GPA of at least 2.200 prior to entering the final clinical year (fall/spring) of the program.

Tuition and Financial Aid

Individuals accepted to the MLSC Certificate program are admitted to Health Science Professional. As a certificate program, students may be eligible for financial aid. Completion of the Free Application for Federal Student Aid (FAFSA) is required in order to apply for financial aid.

Courses

MLSC 7124. Medical Microbiology 1. 4 cr. hrs.

Emphasis on the theoretical foundations and methods employed in a medical microbiology laboratory. Topics include: 1) structure (including microscopic techniques), cultivation, selection and differentiation of medically-important microbes; 2) control of microbes (disinfection/antiseptics/sterilization, human immunology, antimicrobial agents); 3) Gram-positive bacteria; 4) obligate intracellular bacteria; 5) spirochetes and curved bacteria; 6) fastidious bacteria (including anaerobic bacteria); 7) acid-fast bacilli; and 8) introductory virology. Taxonomy, epidemiology, pathogenicity and treatment of selected microbes are explored. Weekly laboratory sessions reinforce and augment lecture topics, as well as introduce students to isolation, examination and identification of medically-significant bacteria. Lab fee. Prereq: Admitted to MLSC certificate program.

MLSC 7127. Medical Microbiology 2. 4 cr. hrs.

Continuation of concepts presented in MLSC 4124/7124. Topics include: 1) enteric Gram-negative bacilli; 2) non-glucose-fermentative Gram-negative bacilli; 3) medical mycology; 4) medical parasitology; and 5) medical microbiology review (including specimen processing) using a human organ system approach. Taxonomy epidemiology, pathogenicity and treatment of selected microbes are explored. Weekly laboratory sessions reinforce and augment lecture topics, as well as further examine the isolation and identification/detection of medically-significant bacteria, fungi and parasites. Students recognize potential bacterial pathogens in culture settings versus commensal organisms and correlate findings to medical scenarios. Lab fee. Prereq: Admitted to MLSC certificate program and MLSC 7124.

MLSC 7163. Clinical Chemistry and Concepts 1. 4 cr. hrs.

Emphasis on the analysis of macromolecules (nucleic acids, lipids, proteins and carbohydrates) in a clinical setting for diagnostic purposes. Lecture and weekly laboratory sessions explore 1) diagnostic molecular testing including PCR and bioinformatics; 2) regulation of lipids, proteins and carbohydrates in healthy versus diseased patients; 3) diagnostic chemistry methodologies; and 4) clinical correlation. Further medical laboratory topics include quality control, quality assurance and specimen collection. Prereq: Admitted to the MLSC certificate program.

MLSC 7173. Clinical Chemistry and Concepts 2. 4 cr. hrs.

Continuation of concepts presented in MLSC 4163/7163. Emphasis on medical laboratory instrumentation and techniques, and the chemical composition of body fluids. Specific topics of lecture and weekly laboratory include blood pH regulation; electrolytes; hormones; clinical enzymes; therapeutic drugs; drugs of abuse; vitamins; metals; and renal, liver, cardiac and pancreatic function. Further emphasis placed on patient testing and disease correlation. Prereq: Admitted to the MLSC certificate program.

MLSC 7174. Clinical Hematology 1. 4 cr. hrs.

Study of blood cells, blood forming organs and blood cell diseases with emphasis on hematopoiesis, blood cell morphology, blood cell function and pathophysiology. Lecture and weekly laboratory sessions explore identification of blood cells, routine hematology testing, hematology instrumentation, identification of blood parasites and clinical correlation. Prereq: Admitted to the MLSC certificate program.

MLSC 7180. Concepts in Clinical Education Methods and Practicum. 2 cr. hrs.

Educational concepts especially appropriate to instruction in a clinical setting using clinical materials. Concepts discussed include: writing learning objectives, learning styles, testing and evaluation methods and use of audio-visuales. Prereq: Admitted to MLSC certificate program; MLSC 7173.

MLSC 7181. Modern Management Concepts for the Medical Laboratory and Practicum. 2 cr. hrs.

Comparison of management theories and styles for effective leadership. Principles and methods of communication essential to the delivery of quality health care. Strategic financial planning ensuring cost effectiveness in the diagnostic laboratory. Statistical analysis comparing alternative methodologies for selection of reliable laboratory procedures. Selected projects relating managerial practices to clinical laboratory organization and use of laboratory data systems for health care delivery. Prereq: Admitted to the MLSC certificate program; MLSC 7173.

MLSC 7183. Clinical Chemistry and Practicum. 6 cr. hrs.

The chemical constituents of blood and other body fluids in health and disease. Principles of the methods used in qualitative and quantitative determination of these constituents. Treatment of the theoretical aspects of instrumentation used in these determinations. Prereq: Admitted to the MLSC certificate program; MLSC 7173.

MLSC 7184. Clinical Hematology 2 and Practicum. 4 cr. hrs.

Quantitative and qualitative study of blood, bone marrow and body fluid cells and alterations present in disease. Principles of procedures used. Methods of obtaining and preserving blood specimens with consideration of the theory and practice of aseptic technique. Prereq: Admitted to the MLSC certificate program; MLSC 7173.

MLSC 7185. Clinical Hemostasis and Practicum. 3 cr. hrs.

The components in the blood related to the hemostatic mechanisms, the principles of the procedures involved and their relationship to the diagnosis and treatment of disease. Prereq: Admitted to the MLSC certificate program; MLSC 7173.

MLSC 7186. Clinical Immunohematology and Practicum. 6 cr. hrs.

Therapeutic and diagnostic aspects of immunohematology. Aspects of blood transfusion and of methods used in preservation and selection of properly matched blood for transfusion. Lab fee. Prereq: Admitted to MLSC certificate program; MLSC 7173.

MLSC 7187. Clinical Immunology and Practicum. 2 cr. hrs.

The diagnostic procedures used to determine immune system status and diagnosing immunodeficiency, autoimmunity and immunoproliferative diseases. The use of immunoassays to diagnose bacterial and viral infections and malignancies. Basic immunology is reviewed. Prereq: Admitted to the MLSC certificate program; MLSC 7173.

MLSC 7188. Clinical Microbiology and Practicum. 6 cr. hrs.

Advanced study of pathogenic and normal flora microorganisms having medical importance. Includes methods for obtaining and handling specimens for culture as well as principles of current instrumentation. Identification protocol include cultural, morphological, biochemical, immunological, and molecular characteristics. Examines pathophysiology of infectious diseases caused by bacteria, fungi, parasites and viruses. Prereq: Admitted to MLSC certificate program; MLSC 7124, MLSC 7127 and MLSC 7173.

MLSC 7189. Clinical Urinology and Practicum. 2 cr. hrs.

Physical, chemical and microscopic study of urine with emphasis on the changes exhibited in disease with related physiology. Prereq: Admitted to the MLSC certificate program; MLSC 7173.

MLSC 7995. Independent Study in Medical Laboratory Studies. 1-4 cr. hrs.

Faculty-supervised, independent study/research of a specific area or topic in Medical Lab Science. Prereq: Admitted to the MLSC certificate program; cons. of dept. ch.