MEDICAL LABORATORY TECHNICIAN

ASSOCIATE OF APPLIED SCIENCE (AAS) – 60 CREDITS

About this program

Medical laboratory technicians perform a wide range of routine laboratory procedures associated with blood and body fluid analysis. In cooperation with affiliate healthcare facilities, the college offers a two-year hybrid program (online lectures, campus-based labs) for training medical laboratory technicians. The curriculum includes general education, science, and Medical Laboratory Technician courses and a 16-week clinical experience at an affiliate healthcare laboratory. Upon completion of the program, students are prepared for the American Society of Clinical Pathology (ASCP) Board of Certification exam. The majority of Medical Laboratory Technician graduates work in hospital and clinic laboratories. Graduates may articulate to a four-year institution to receive a bachelor of science degree in Medical Laboratory Science.

Program outcomes

1. Evaluate the importance of patient identification, collection, transport and processing of blood and body fluid specimens for analysis.
2. Safely collect and process biological specimens for analysis.
3. Perform accurate laboratory testing, including quality assurance and quality control procedures.
4. Operate laboratory instruments/analyzers and perform preventive and corrective maintenance when required.
5. Demonstrate multitasking skills where a wide variety of testing procedures are performed.
6. Correlate didactic and clinical phases of laboratory education in the evaluation and interpretation of laboratory test data.
7. Demonstrate career entry competencies as defined by NAACLS.
8. Demonstrate professional conduct and interpersonal communication skills with patients, lab personnel, healthcare professionals and the public.

Curriculum overview

Crds	Requirement type
60	Required courses
60	**Total**

Developmental courses note: A student may be required to enroll in developmental courses in reading, writing and math. A student's scores on the Accuplacer assessment will determine enrollment in developmental courses. The purpose of developmental courses is to prepare students for the demands of a college-level curriculum. *Credits may vary.*

Accreditation: Minnesota State Community and Technical College is accredited by the Higher Learning Commission, a regional accreditation agency recognized by the U.S. Department of Education. The Higher Learning Commission 230 South LaSalle Street, Suite 7-500 Chicago, IL 60604-1411 http://www.ncahigherlearningcommission.org Phone: 312.263.0456 / 800.621.7440

Curriculum requirement details

Required courses

Course	Crds
BIOL2260 - Human Anatomy and Physiology I	3
BIOL2261 - Human Anatomy and Physiology I Lab	1
BIOL2262 - Human Anatomy and Physiology II	3
BIOL2263 - Human Anatomy and Physiology II Lab	1
CHEM1100 - Fundamental Concepts of Chemistry	3
ENGL1101 - College Writing	3
ENGL1215 - Professional and Technical Writing	3
MLT1109 - Phlebotomy Skills Lecture	1
MLT1116 - Basic Lab Techniques Lecture	1
MLT1117 - Basic Lab Techniques Lab	1
MLT1119 - Phlebotomy Skills Lab	1
MLT1124 - Immunohematology	3
MLT1125 - Immunohematology Lab	1
MLT1131 - Laboratory Calculations Lecture	1
MLT1216 - Hematology	2
MLT1217 - Hematology Lab	1
MLT1227 - Biological Fluids	1
MLT1228 - Biological Fluids Lab	1
MLT2131 - Diagnostic Chemistry	3
MLT2132 - Diagnostic Chemistry Lab	1
MLT2151 - Introduction to Molecular Diagnostics	1
MLT2223 - Clinical Urinalysis and Body Fluids	2
MLT2224 - Clinical Immunohematology	3
MLT2227 - Clinical Chemistry and Immunology	3
MLT2231 - Clinical Microbiology	3
MLT2232 - Clinical Hematology and Coagulation	3
MLT2266 - Diagnostic Microbiology	3
MLT2268 - Diagnostic Microbiology Lab	2
MLT2316 - Immunology	1
MLT2317 - Immunology Lab	1
MLT2346 - Clinical Applications	1
MLT2350 - Professional Issues in Medical Laboratory Technology	2

Other requirements or restricted electives

Course summaries

BIOL2260 - Human Anatomy and Physiology I ..... ***(3 credits)***
Meets MnTC Goal Area 3. This course is a comprehensive introductory overview of human anatomy and physiology that includes basic fundamental concepts of cell biology, tissues and organs making up the integumentary, skeletal, muscular and nervous systems. It is the first of a two-semester sequence in which anatomy and physiology are studied with an emphasis on structure and functions of systems. This course contains a lab-like component.

Prerequisites:

- Assessment into ENGL 1101 or college level writing equivalent.

BIOL2261 - Human Anatomy and Physiology I Lab ..... ***(1 credits)***
Meets MnTC Goal Area 3 when taken with BIOL 2260. This course is the laboratory component of a comprehensive introductory overview of human anatomy and physiology that includes basic fundamental concepts of cell biology, tissues and organs making up the integumentary, skeletal, muscular and nervous systems. This course is the first of a two-semester sequence in which anatomy and physiology are studied with an emphasis on structure and functions of systems.

Prerequisites:

- Assessment into ENGL 1101 or College Level writing equivalent.

Corequisites:

- BIOL 2260

BIOL2262 - Human Anatomy and Physiology II ..... ***(3 credits)***
Meets MnTC Goal Area 3. This course is a continuation of Anatomy and Physiology I. Topics will include the study of cells, tissues and organs making up the endocrine, cardiovascular, lymphatic and immune, respiratory, digestive, urinary and reproductive systems. Emphasis is on the structure and function of included systems. This course contains a lab-like component.

Prerequisites:

- Assessment into ENGL 1101 or college level writing equivalent.
- BIOL2260

BIOL2263 - Human Anatomy and Physiology II Lab ..... ***(1 credits)***
Meets MnTC Goal Area 3 when taken with BIOL 2262. This course is the laboratory component of a comprehensive introductory overview of human anatomy and physiology that includes basic fundamental concepts of cells, tissues and organs making up the endocrine, cardiovascular, respiratory, digestive, urinary and reproductive systems. This course is the second of a two-semester sequence in which anatomy and physiology are studied with an emphasis on structure and functions of systems.

Prerequisites:

- Assessment into ENGL 1101 or College Level writing equivalent.
- BIOL2260
- BIOL2261

Corequisites:

- BIOL2262

CHEM1100 - Fundamental Concepts of Chemistry ..... ***(3 credits)***
Meets MnTC Goal Areas 2 and 3. Course deals with substances, their structures and properties, the changes they undergo and the laws that govern those changes. Intended for prospective elementary teachers, non-science majors and those who need background for General Chemistry. This course includes a lab.

Prerequisites:

- MATH0095 or placement by assessment

ENGL1101 - College Writing ..... ***(3 credits)***
Meets MnTC Goal Area 1. This is an introductory writing course designed to prepare students for later college and career writing. The course focuses on developing fluency through a process approach, with particular emphasis on revision. Students will consider purpose and audience, read and discuss writing and further develop their own writing processes through successive revisions to produce polished drafts. Coursework will include an introduction to argumentative writing, writing from academic sources and a short research project.

Prerequisites:

- Completion of ELL1085, ENGL0096, or ENGL0097 with a grade of C or higher OR placement into college-level English.

ENGL1215 - Professional and Technical Writing ..... ***(3 credits)***
Meets MnTC Goal Area 1. This course provides instruction in writing and designing professional and technical documents, including print and non-print correspondence, descriptions, instructions, reports and proposals, along with promotional material. Analysis, critical thinking and synthesis of sources will be covered, along with the development of presentation skills. Coursework also includes a formally documented, multi-source professional project.

Prerequisites:

- ENGL 1101 College Writing

MLT1109 - Phlebotomy Skills Lecture ..... ***(1 credits)***
This course is designed for phlebotomy and Medical Laboratory Technician students. The course covers didactic knowledge and performance of venipuncture, capillary and arterial blood draws. It also emphasizes other body fluid collection, specimen processing, point-of-care analysis and specimen storage.

MLT1116 - Basic Lab Techniques Lecture ..... ***(1 credits)***
This is an introductory course for Medical Laboratory Technology students covering the techniques, interpretation and correlation of results in urinalysis, hematology, chemistry, immunology, microbiology and immunohematology. Other topics included in the course are instrumentation, preparation of reagents, quality assurance and quality control, specimen collection, transportation, analysis and result reporting.

Corequisites:

- Must be taken with Lab MLT 1117

MLT1117 - Basic Lab Techniques Lab ..... ***(1 credits)***
This is an introductory course for Medical Laboratory Technology students covering the techniques, interpretation and correlation of results in urinalysis, hematology, chemistry, immunology, microbiology and immunohematology. Other topics included in the course are instrumentation, preparation of reagents, quality assurance and quality control, specimen collection, transportation, analysis and result reporting.

Corequisites:

- MLT1116

MLT1119 - Phlebotomy Skills Lab ..... ***(1 credits)***
This course is designed for phlebotomy and Medical Laboratory Technician students. The course covers knowledge and performance of venipuncture, capillary and arterial blood draws. It also emphasizes other body fluid collection, specimen processing, point-of-care analysis and specimen storage.

Corequisites:

- MLT1109

MLT1124 - Immunohematology ..... ***(3 credits)***
This introductory course for Medical Laboratory Technology students covers the clinical areas of blood banking and transfusion medicine. The course discusses compatibility theory, principles of antigens on red blood cells and serum antibodies.

Prerequisites:

- Admission to MLT program.

MLT1125 - Immunohematology Lab ..... ***(1 credits)***
This course is the laboratory component of MLT1124, Immunohematology, and addresses the analytical principles, techniques and correlation of results related to blood banking and transfusion medicine. The course covers techniques including evaluating criteria for specimen rejection, blood type and cross match procedures, antigen typing, identification of expected and unexpected antibodies, investigation of transfusion reactions and blood component preparation.

Prerequisites:

- Admission to the MLT program

MLT1131 - Laboratory Calculations Lecture ..... ***(1 credits)***
This course is designed to present mathematical operations commonly utilized in the medical laboratory. Topics include use of basic math processes, systems of measurement, conversion factors, solutions, dilutions, statistics for laboratory medicine and quality control. Upon completion, students should be able to solve practical problems in the context of the medical laboratory.

MLT1216 - Hematology ..... ***(2 credits)***
This is an introductory course for Medical Laboratory Technology students covering the production, maturation, function and abnormalities of blood cells and coagulation to maintain body homeostasis.

Prerequisites:

- Admission to the MLT program

MLT1217 - Hematology Lab ..... ***(1 credits)***
This course is the laboratory component for MLT1216, Hematology, and covers the analytical principles, techniques and correlation of results related to hematology and homeostasis. Learners will perform basic laboratory techniques related to hematological and coagulation analysis, including the preparation, analysis, interpretation and reporting of quality control material and patient sample results.

Prerequisites:

- Admission to the MLT program.

MLT1227 - Biological Fluids ..... ***(1 credits)***
This is an introductory course for Medical Laboratory Technology students. The course is an overview of the urinary system in health and disease. The course also includes study of other body fluids including cerebral spinal fluid, amniotic fluid, serous fluid, synovial fluid, sputum, semen and feces.

Prerequisites:

- Admission to the MLT program

MLT1228 - Biological Fluids Lab ..... ***(1 credits)***
This course is the laboratory component of the Biological Fluids course that includes basic fundamental concepts of analytical principles, techniques and correlation of results in the analysis of various biological fluids. Learners will practice the performance of basic laboratory techniques related to biological fluid analysis including the preparation, analysis, interpretation and reporting of quality control material and patient sample results.

Prerequisites:

- Admission to MLT program

MLT2131 - Diagnostic Chemistry ..... ***(3 credits)***
This is an introductory course for Medical Laboratory Technology students which covers the analytical principles, techniques and correlation of results in the science of body chemistry. Other topics included in the course are instrumentation, calculations, quality assurance and quality control, analysis and result interpretation.

Prerequisites:

- Admission to MLT program.

MLT2132 - Diagnostic Chemistry Lab ..... ***(1 credits)***
This course is the laboratory component of a comprehensive introductory overview of diagnostic chemistry that includes basic fundamental concepts of analytical principles, techniques and correlation of results in the science of body chemistry. Learners will practice performing basic laboratory techniques related to diagnostic chemistry analysis including the preparation, analysis, interpretation and reporting of quality control material and patient sample results.

Prerequisites:

- Admission to the MLT program

MLT2151 - Introduction to Molecular Diagnostics ..... ***(1 credits)***
This course is an introduction to specific molecular biology applications in the laboratory. The course includes a discussion of DNA, genetics, nucleic acid extraction and modification, blotting methods, polymerase chain reaction (PCR) and probe analysis in relation to the diagnosis of various diseases.

MLT2223 - Clinical Urinalysis and Body Fluids ..... ***(2 credits)***
This course is a clinical experience related to the analysis of urine and body fluids under the supervision of laboratory personnel at an affiliate laboratory. This course provides further investigation and study of the methods and techniques related to urinalysis and body fluid tests.

Prerequisites:

- MLT2350

MLT2224 - Clinical Immunohematology ..... ***(3 credits)***
This course is a clinical experience related to the performance of immunohematology testing under the supervision of laboratory personnel at an affiliate hospital. This course provides further investigation and study of the methods and techniques related to blood group serology and compatibility testing and selection of the proper blood components for transfusion medicine.

Prerequisites:

- MLT2350

MLT2227 - Clinical Chemistry and Immunology ..... ***(3 credits)***
This is a clinical experience course related to the performance of chemistry and immunology testing under the supervision of laboratory personnel at an affiliate hospital. This course provides further investigation and study of the methods and techniques related to chemistry and immunological testing.

Prerequisites:

- MLT2350

MLT2231 - Clinical Microbiology ..... ***(3 credits)***
This is a clinical experience course related to the performance of microbiological tests under the supervision of laboratory professionals at an affiliate laboratory. This course provides further investigation and study of the methods and techniques related to bacteriology, mycology and parasitology.

Prerequisites:

- MLT2350

MLT2232 - Clinical Hematology and Coagulation ..... ***(3 credits)***
This is a clinical experience course related to the performance of hematology and coagulation tests under the supervision of laboratory professionals at an affiliate laboratory. This course provides further investigation and study of the methods and techniques related to hematology and coagulation tests.

Prerequisites:

- MLT2350

MLT2266 - Diagnostic Microbiology ..... ***(3 credits)***
This is an introductory course for Medical Laboratory Technology students which covers the analytical principles, techniques and correlation of results related to diagnostic microbiology. This course discusses microorganisms of medical importance in relationship to disease and diagnosis, emphasizing identification of common pathogenic bacteria, fungi, yeast, viruses and parasites in humans. Other topics included in the course are instrumentation, calculations, quality assurance and quality control, analysis and result interpretation.

Prerequisites:

- Admission to MLT program

MLT2268 - Diagnostic Microbiology Lab ..... ***(2 credits)***
This course is the laboratory component of Diagnostic Microbiology that includes basic fundamental concepts such as the analytical principles, techniques and correlation of results related to diagnostic microbiology. This course covers basic techniques including reasons for specimen rejection, identification of normal flora and pathogens, morphology, classification and culturing of bacteria, identification of bacterial unknowns, fungi and parasites.

Corequisites:

- MLT2266

MLT2316 - Immunology ..... ***(1 credits)***
This is an introductory course for Medical Laboratory Technology students which covers fundamentals of the immune system. Other topics included in the course are discussion of laboratory methods that utilize principles of the immune system for diagnosis of disease and discussion of antigens and antibodies and their presence in health and disease.

Prerequisites:

- Admission to MLT program

MLT2317 - Immunology Lab ..... ***(1 credits)***
This course is the laboratory component of the Immunology course that includes the fundamental techniques related to the science of immunology. Learners will practice performing basic laboratory techniques related to immunological methods including the preparation, analysis, interpretation and reporting of quality control material and patient sample results. The course emphasizes testing and disease diagnosis of disorders such as hepatitis, acquired immune deficiency syndrome, lupus, rheumatoid arthritis, Lyme disease, syphilis, infectious mononucleosis and streptococcal infections.

Prerequisites:

- Admission to MLT program

MLT2346 - Clinical Applications ..... ***(1 credits)***
The Clinical Applications course is intended to broaden the learner's knowledge and correlate laboratory testing theories with states of health and disease across various clinical courses. Students will evaluate case studies, research new methods, correlate test results to states of health and disease, and prepare for entering the workforce.

Prerequisites:

- MLT1116
- MLT1124
- MLT1227

MLT2350 - Professional Issues in Medical Laboratory Technology ..... ***(2 credits)***
This course surveys professional issues in preparation for career entry. Emphasis is placed on professional issues, ethics, current topics in health care delivery, governmental regulations, state licensure, societal concerns, cultural diversity, disease prevention, research, public health and environmental testing.

MEDICAL LABORATORY TECHNICIAN

ASSOCIATE OF APPLIED SCIENCE (AAS) – 60 CREDITS

Program Plan — "Phlebotomy Certificate Bridge to MLT"

Locations: Moorhead

1st Fall Term (13 credits)

Courses

Course	Crds
BIOL2260 - Human Anatomy and Physiology I	3
BIOL2261 - Human Anatomy and Physiology I Lab	1
ENGL1101 - College Writing	3
MLT1109 - Phlebotomy Skills Lecture	1
MLT1116 - Basic Lab Techniques Lecture	1
MLT1117 - Basic Lab Techniques Lab	1
MLT1119 - Phlebotomy Skills Lab	1
MLT2350 - Professional Issues in Medical Laboratory Technology	2

1st Spring Term (17 credits)

Courses

Course	Crds
BIOL2262 - Human Anatomy and Physiology II	3
BIOL2263 - Human Anatomy and Physiology II Lab	1
CHEM1100 - Fundamental Concepts of Chemistry	3
ENGL1215 - Professional and Technical Writing	3
MLT1216 - Hematology	2
MLT1217 - Hematology Lab	1
MLT1227 - Biological Fluids	1
MLT1228 - Biological Fluids Lab	1
MLT2316 - Immunology	1
MLT2317 - Immunology Lab	1

2nd Fall Term (15 credits)

Courses

Course	Crds
MLT1124 - Immunohematology	3
MLT1125 - Immunohematology Lab	1
MLT1131 - Laboratory Calculations Lecture	1
MLT2131 - Diagnostic Chemistry	3
MLT2132 - Diagnostic Chemistry Lab	1
MLT2151 - Introduction to Molecular Diagnostics	1
MLT2266 - Diagnostic Microbiology	3
MLT2268 - Diagnostic Microbiology Lab	2

2nd Spring Term (15 credits)

Courses

Course	Crds
MLT2223 - Clinical Urinalysis and Body Fluids	2
MLT2224 - Clinical Immunohematology	3
MLT2227 - Clinical Chemistry and Immunology	3
MLT2231 - Clinical Microbiology	3
MLT2232 - Clinical Hematology and Coagulation	3
MLT2346 - Clinical Applications	1