

Medical laboratories analyze patient samples to aid physicians in making correct diagnoses.

Patients never see the inner workings of a medical laboratory but the lab is critically important to their health.

Medical Laboratory Technicians (MLT AAS) are members of the laboratory team and work with Medical Laboratory Scientists (B.S. MLS), pathologists (PhD) and phlebotomists (certificate). MLTs collect patient samples, perform, and report all patient test results.

MLT is a great entry point to medicine for students whose goal is a bachelor degree in Medical Laboratory Science. Lake Superior College and St. Cloud State are working together to provide a systematic completion of the Medical Laboratory Scientist Bachelor of Science degree. Students can begin by completing prerequisites for both programs. Completing the MLT program also completes up to 2 years of the MLS program. Students then complete requirements for the B.S. MLS. Benefits of completing an MLT AAS degree before the MLS include:

- early entry into medical lab field
- decrease overall education cost: some courses are offered CIS or PSEO, and employers often help pay for additional education
- flexible job: good salary while attending school
- St. Cloud State University's MLS program offered live ITV on the LSC campus: no need to move out of town to complete the MLS
- These degrees lead directly to jobs in greater Minnesota

Medical laboratories require that MLT/MLS personnel become certified. Administration of the Board of Certification (BOC) exam for MLT/MLS professionals is by the American Society for Clinical Pathology (ASCP). NAACLS (National Accrediting Agency for Clinical Laboratory Sciences) accredits educational programs for all medical laboratory professions. ¹

Checklist comparing courses required for the MLT and MLS programs

Please Note: *Courses with an asterisk are available during high school through CIS or PSEO.

Courses in blue: MLT program and preparation for the MLS program, completed before or during MLT program.

Courses in green: Requirements for the MLS program. May be completed before starting MLT program or while working as an MLT. Work closely with your LSC advisor to minimize credits taken and follow the articulation agreement between Lake Superior College and St. Cloud State University.

MLT program AAS degree Required courses			MLS program Bachelor of Science degree Required courses <small>Refer to the articulation agreement between SCSU and LSC and the SCSU 2+2 website for more information. Bolded courses are prerequisites for admission to the SCSU MLS program.</small>		
	cr	√		cr	√
ALTH1410 Medical Terminology*	1		Elective	1	
BIOL1170 Microbiology	3		BIOL151 Cell Function and Inheritance*	4	
BIOL1140 A & P I*	4		BIOL202Human A & P I	4	√
BIOL1141 A & P II	4		BIOL204 Human A & P II	4	
CHEM1110 Aspects of Chemistry or CHEM1210 General Chemistry (MLS track)*	3 (5)		CHEM1210 General Chemistry I (This course is a prerequisite for SCSU admission*)	5	
ENGL1106 or COMM1100 or COMM1105*	3 (3)		ENGL191 College Composition I* (MNTC area 1) (COMM1100 satisfies CMST192 for SCSU, goal area 1 for MNTC)	3 (3)	√
ALTH1440 Medical Ethics or PHIL1130 Ethics (PHIL 1125 or 1140 would also transfer to SCSU as PHIL194)	1 (3)		PHIL194 Clinical Reasoning	3	
PSYC1135 or PSYC1120 or SOC1111*	3		MN Transfer elective requires a total of 9 credits in goal areas 5 & 7	3 6	√
Math requirement of MATH0470 Algebra II or Placement test score of 50 or higher on College Level Math Test*			MATH1100 College Algebra This course is a prerequisite for SCSU admission*	4	
MLTN1400 Intro to Medical Lab Techniques and Instrumentation	2		MLS200 Medical Lab Basics & Instrumentation	2	√
MLTN1572 Phlebotomy HC Professionals or MLTN1574 Collection skills	1 (3)		Elective	1 (3)	
MLTN1410 Immunology and Serology	3		MLS303 Medical Immunology	2	√
MLTN1420 Hematology	3		MLS301 Medical Hematology	4	√
MLTN2420 Sp. Hematology	3				√
MLTN1422 Med Micro	3		MLS304 Medical Microbiology	7	√
MLTN2422 Sp. Med Micro	2				
MLTN1430 Molecular Diagnostics	1		Elective	1	
MLTN1424 Urinalysis	2		MLS306 Medical Microscopy and Urinalysis	2	√
MLTN1426 Immunohematology	2		MLS305 Medical Immunohematology	3	√
MLTN2426 Sp. Immunoheme	2				
MLTN1428 Clinical Chemistry	2		MLS302 Medical Chemistry	4	√
MLTN2428 Sp. Clinical Chemistry	3				

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	cr	√		cr	√
MLTN2444 Medical Laboratory Skill Development	2		Elective	2	
MLTN2500 MLT seminar	1		MLS 301, 302, 304, 305, 306 Applied	11	√
MLTN2505 Medical Laboratory Technician Clinical Practicum	11		Microbiology, Immunoheme, Hematology, Urinalysis, Phlebotomy, Chemistry		
Graduate AAS MLT ASCP certification Exam for MLT	65		MLTs, who are employed, will find that most employers will help them pay a significant portion of the remaining courses to earn their BS MLS.		
			CHEM211 Gen Chem II (CHEM1211 at LSC)	5	
			ENGL192 College Composition II (ENGL1109 at LSC)	3	
			CMST192 Introduction to Communication studies (COMM1100 at LSC)	3	
			STAT193 Statistical Methods (MATH2210 at LSC)	3	
Students may require 6 credits in MNTC area 6 including one literature course Students may require one course each in MNTC areas 8 and 10, dependent on which courses are already completed at LSC. Work with an advisor for efficient selection of courses				12	
The remaining coursework is ITV from SCSU only after acceptance to their program. You must be a working, certified MLT with the support of your employer for admittance to the program.					
CHEM240 Basic Organic Chemistry (CHEM2111at LSC, also available online from other institutions)				4	
CHEM240 Biochemistry or other Biochemistry course offered from local colleges or SCSU				4	
MLS 310 Anatomy & Physiology for MLS majors				2	
MLS 312 Molecular Pathology				3	
MLS 401 Advanced Clinical Hematology				2	
MLS 401 Advanced Applied Clinical Hematology (MLS internship)				2	
MLS 402 Advanced Clinical Chemistry				2	
MLS 402 Advanced Applied Clinical Chem (MLS internship)				2	
MLS 403 Advanced Clinical Immunology and Molecular genetics				1	
MLS 403 Advanced Applied Clinical Immunology and Molecular genetics (MLS internship)				1	
MLS 404 Advanced Clinical Micro				2	
MLS 404 Advanced Applied Clinical Micro (MLS internship)				2	
MLS 405 Advanced Clinical Immunohematology				2	
MLS 405 Advanced Applied Clinical Immunohematology (MLS internship)				2	
MLS 406 Advanced Clinical Urinalysis				1	
MLS 406 Advanced Applied Clinical Urinalysis (MLS internship)				1	
MLS 407 Advanced Laboratory Management and Education				1	
MLS 407 Advanced Applied Clinical laboratory management and Ed. (MLS internship)				1	
			Graduate Bachelor of Science Medical Laboratory Scientist (MLS) ASCP Board of Certification for MLS	+73	
Total credits will vary based on electives chosen. See the articulation agreement and your advisor for more information.					

References

1. <http://www.naaccls.org/>

2. Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2016-17 Edition, Medical and Clinical Laboratory Technologists and Technicians, on the Internet at <https://www.bls.gov/ooh/healthcare/medical-and-clinical-laboratory-technologists-and-technicians.htm> (visited February 09, 2017).

3. Minnesota Employment and Economic Development. (visited February 2017) <https://mn.gov/deed/newscenter/publications/review/july-2014/employment-outlook-2022.jsp>

4. Lake Superior College and St. Cloud State University have an articulation agreement. See your advisor and visit the SCSU website: <http://www.stcloudstate.edu/programs/medical-laboratory-science/>

What do MLTs do?

MLTs graduate from LSC with entry-level knowledge, and technical skills, required for employment in a medical (clinical) laboratory.

A few examples of MLT responsibilities include:

- Hematology: counting and identifying cells
- Assessing clotting and bleeding disorders
- Performing chemical analysis with sophisticated instrumentation
- Blood collection (phlebotomy)
- Microbiology: preparing samples
- Matching patient blood types to donors and choosing blood units for transfusion

How can I get a job in a medical laboratory?

Earning a Bachelor's degree in Chemistry or Biology is not enough to qualify for work in a medical laboratory: requirements are different and specific to medicine. You must:

- graduate from a NAACLS accredited MLT or MLS program
- pass the ASCP BOC Exam

Job Prospects

Currently, there is a shortage of MLT and MLS certified personnel.

- US: MLT/MLS Job growth projection-16% (52,000 jobs) between 2014 and 2024.²
- MN: 23.4% projected MLT/MLS need between 2012 and 2022 (767 jobs).³



Will I like the medical laboratory?

- Students who succeed in laboratory careers have an aptitude for:
- math
 - medicine
 - science
 - mechanical and electronic devices
- Students must be able to:
- carefully follow written/oral instructions
 - work accurately under pressure
 - prioritize work
 - work independently and as part of a team
- Students should also possess:
- good personal interaction skills
 - good fine and gross motor coordination
 - moral and intellectual integrity
 - a desire to help people

How can I get started?

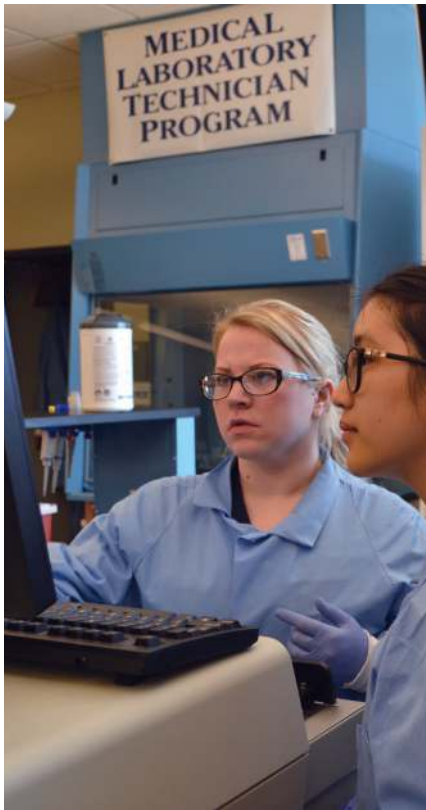
- MLT and MLS program guide sheets detail entrance requirements
- Work closely with high school and/or LSC advisors to choose appropriate coursework
- Some courses for MLT and MLS programs are available through CIS or PSEO

After I finish MLT, when can I start the MLS program?

- As a certified, employed, MLT AAS, you are eligible to apply to St. Cloud State University's MLS program offered on the LSC campus.
- Work closely with your advisor
 - Plan ahead to meet entrance requirements for the MLS program⁴

Anything else I should know?

Some students begin laboratory careers with phlebotomy certificates: an excellent option for students who are unsure about career choice or who want a job in medicine sooner. Some coursework is available PSEO or CIS. See your advisor.



A member of Minnesota State



Pathway to Medical Laboratory Science Careers