Medical Laboratory Science

Medical Laboratory Science

Program Director: Floyd Josephat, MLS (ASCP), AHI (AMT), EdD

Program Mission

The Bachelor of Science in Medical Laboratory Science (BS MLS) program is committed to providing students with a solid educational background and a set of skills translatable to a variety of laboratory settings including hospital laboratories, reference laboratories, industry, research laboratories, and many more. The faculty, in its concern for the health and safety of the general public, is committed to ensuring that each student develops knowledge, skills, and values essential to the appropriate role, providing the basis for continuing intellectual and professional growth.

Admission Requirements

In addition to the general UAB admission requirements, to gain admission to the BS MLS program, applicants must:

- Have a minimum cumulative overall GPA of 2.75 at the time of application. A minimum cumulative GPA of 2.75 does not guarantee admission to the BS MLS program. Admission is competitive and is based on space available.
- Have successfully completed a minimum of 58 semester credit hours prior to matriculation into the BS MLS program.
- Have successfully completed all BS MLS prerequisite courses with a "C" or above prior to matriculation into the BS MLS program.
  - MA 105 Pre-Calculus Algebra or higher
  - CH 115 and CH 116 General Chemistry I and Lab
  - CH 117 and CH 118 General Chemistry II and Lab
  - CH 235 and CH 236 Organic Chemistry and Lab
  - BY 123 General Biology and Lab
  - BY 261 or BY 271 Microbiology and Lab
  - BY 210 Genetics
- Provide a written statement of interest and career goals.
- If accepted, a background check and drug screening will be required at program admission and again prior to clinical placement.
- If accepted, complete the UAB Student Health and Wellness Level III Immunization requirements and provide proof of medical coverage.

Application Procedure

Students are eligible to apply when they have successfully completed a minimum of 40 semester hours of credit. If accepted, applicants are enrolled in the Fall semester after completion of all admission requirements. Applicants should submit the following materials:

To the UAB Undergraduate Admissions Office:

- Completed UAB undergraduate application and fee, if applicable. The online application can be found at https://www.uab.edu/admissions/apply.
- Official transcripts from each college or university attended.

To the Medical Laboratory Science program, School of Health Professions:

- Completed application to the BS MLS Program. Application form is available online at https://www.uab.edu/shp/cds/undergraduate/medical-laboratory-science-major.
- Unofficial copies of all transcripts from each college or university attended.

Essential Functions

Essential functions are fundamental tasks, behaviors, and abilities necessary to successfully complete the requirements of the Program. A full list of the essential functions of the program is available from the BS MLS website under the Admissions link. Essential functions are physical abilities, mental abilities, skills, attitudes, and behaviors the students must evidence or perform at each stage of their education. The absence of an essential function would fundamentally alter a student's ability to meet the program's goals. The essential requirements include categories of observation, movement, communication, intellect, and behavior.

Accreditation and Certification

The program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Program graduates are eligible to apply for the certification examination offered by the American Society of Clinical Pathology Board of Certification (ASCP-BOC).

NAACLS
5600 N River Road, Suite 720
Rosemont, IL 60018-5119
Phone: 773.714.8880
Fax: 773.714.8886
URL: http://www.naacls.org/

ASCP Board of Certification
33 West Monroe Street, Suite 1600
Chicago, IL 60603
Phone: 312.541.4999
Fax: 312.541.4998
URL: http://www.ascp.org/

Contact Information

For detailed information, contact the Department of Clinical and Diagnostic Sciences, Medical Laboratory Science Program in the UAB School of Health Professions:
1716 9th Avenue South, SHPB 430
Birmingham, AL 35294-1212
Telephone: 205-934-3209
E-mail: AskMLS@uab.edu

Bachelor of Science in Medical Laboratory Science

Requirements		Hours
Blazer Core [1]		**41**
MA 105	Pre-Calculus Algebra [2]	
CH 115	General Chemistry I	

or CH 125	General Chemistry I HONORS	
CH 116	General Chemistry I Laboratory	
or CH 126	General Chemistry I HONORS Laboratory	
CH 117	General Chemistry II	
or CH 127	General Chemistry II HONORS	
CH 118	General Chemistry II Laboratory	
or CH 128	General Chemistry II HONORS Laboratory	
Prerequisites		**16**
BY 123	Introductory Biology I	
CH 235 & CH 236	Organic Chemistry I and Organic Chemistry I Laboratory	
or CH 245	Organic Chemistry I Honors	
BY 261	Introduction to Microbiology	
or BY 271	Biology of Microorganisms	
or BMD 330	Clinical Microbiology for Health Professions	
BY 210	Genetics	
or BMD 440	Human Genetics for Health Professions	
Major Requirements		
MT 401	Introduction to Medical Laboratory Science	3
MT 403	Body Fluids	1
MT 404	Body Fluid Lab	1
MT 418	Immunology	3
MT 428	Hematology I	4
CLS 402	Fundamentals of Phlebotomy and Body Fluid Collection	1
MT 423	Clinical Microbiology	3
MT 424	Clinical Microbiology Laboratory	1
MT 426	Instrumentation and Automation	2
MT 427	Instrumentation and Automation Laboratory	1
MT 432	Hematology II	4
MT 430	Immunohematology	4
MT 431	Immunohematology Laboratory	1
MT 438	Infectious Diseases	3
MT 439	Infectious Diseases Laboratory	1
MT 442	Molecular Diagnostics	3
MT 443	Molecular Diagnostics Laboratory	1
MT 405	Laboratory Management	3
MT 451	Clinical Chemistry	4
MT 452	Clinical Chemistry Laboratory	1
MT 460	Clinical Correlations	3
MT 470	Certification Review	1
MT 495	Clinical Practice	12
General Electives		**2**
Total Hours		**120**

[1] Discuss Blazer Core options with your advisor to meet the following requirements:
Reasoning, History and Meaning, Creative Arts, Humans and Their Societies, Thinking Broadly, and City as a Classroom

[2] MA 105 or MA 106 or MA 107 or MA 125 or MA 225 or MA 126 or MA 226

Example Program of Study for a Major in Medical Laboratory Science

Freshman

First Term	Hours	Second Term	Hours
EH 101	3	EH 102	3
HRP 101	3	Reasoning	3
BY 123 & 123L	4	BY 124 & 124L	4
CH 115 & CH 116	4	CH 117 & CH 118	4
	14		**14**

Sophomore

First Term	Hours	Second Term	Hours
BY 210	3	BY 271 & 271L	4
CH 235 & CH 236	4	History	3
MA 105	3	Humans and Society	3
History	3	Creative Arts	3
Communications	3	City as a Classroom	3
	16		**16**

Junior

First Term	Hours	Second Term	Hours	Summer Term	Hours
MT 401	3	MT 423 & MT 424	4	MT 430 & MT 431	5
MT 403 & MT 404	2	MT 426 & MT 427	3	MT 438 & MT 439	4
MT 418	3	MT 432	4	MT 442 & MT 443	4
MT 428	4	CLS 402	1		
	12		**12**		**13**

Senior

First Term	Hours	Second Term	Hours
MT 405	3	MT 495	12
MT 451 & MT 452	5	MT 470	1
MT 460	3		
CDS 405[1]	1		
	12		**13**

Total credit hours: 122

[1] Or another 1 credit hour elective, approved by your academic advisor

CLS-Clinical Laboratory Sci Courses

CLS 402. Fundamentals of Phlebotomy and Body Fluid Collection. 1 Hour.
An in depth course in phlebotomy covering aspects of safety procedures, hygiene, capillary puncture, venipuncture, arterial access and maintenance, intravenous access and maintenance, drug administration via IV, intramuscular and subcutaneous methods and non-blood collections of bodily fluids.

MT-Medical Technology Courses

MT 350. Special Topics: Chemistry. 1-3 Hour.
Designed specifically for individual student to cover topics not covered in MLT curriculum.

MT 400. Health and Safety Management. 1 Hour.
Review of infection control principles focused on bloodborne, airborne, drug-resistant and opportunistic pathogens, and general health and safety guidelines and standards.

MT 401. Introduction to Medical Laboratory Science. 3 Hours.
Overview of issues and skills surrounding working in the modern laboratory environment; introduction to roles and functions of a medical laboratory scientist; includes safety, equipment, mathematics, measurements, microscopy, dilutions, quality assurance, regulations of the laboratory, laboratory operations, and educational principles.

MT 403. Body Fluids. 1 Hour.
Diagnosis and monitoring renal and systemic disease through the physical, biochemical, and microscopic analysis of urine and feces. Diagnosis of central nervous system and systemic disease through cerebrospinal fluid analysis. Diagnosis of metabolic and infectious disease through analysis of peritoneal fluid, synovial fluid, transudates, and exudates. Fertility testing using semen analysis.

MT 404. Body Fluid Lab. 1 Hour.
Diagnosis and monitoring renal and systemic disease through the physical, biochemical, and microscopic analysis of urine and feces. Diagnosis of central nervous system and systemic disease through cerebrospinal fluid analysis. Diagnosis of metabolic and infectious disease through analysis of peritoneal fluid, synovial fluid, transudates, and exudates. Fertility testing using semen analysis. Concurrent enrollment MT 403.
Prerequisites: MT 403 [Min Grade: C](Can be taken Concurrently)

MT 405. Laboratory Management. 3 Hours.
Current catalog description will remain unchanged. Ethics and Civic Responsibility are significant components of this course.

MT 406. Laboratory Techniques. 2 Hours.
Overview of issues and skills surrounding working in the modern laboratory environment; includes safety, collection of specimens, equipment, mathematics, measurements, microscopy, dilutions, quality assurance, basic spectrophotometry, phlebotomy, automation of laboratory testing and lab computers.

MT 418. Immunology. 3 Hours.
Physiology of immune responses to infectious agents, tumors, transplant; abnormal responses: hypersensitivity, autoimmunity, immunoproliferative disorders, and immunodeficiencies; antigen-antibody reactions; complement; principles and applications of clinical immunology.

MT 423. Clinical Microbiology. 3 Hours.
Reservoirs, modes of transmission, disease associations, and morphological and biochemical characteristics of microorganisms commonly isolated in the clinical laboratory; methods used to isolate and identify bacteria, parasites, and fungi.
Prerequisites: BY 271 [Min Grade: C] or BY 261 [Min Grade: C]

MT 424. Clinical Microbiology Laboratory. 1 Hour.
Performance of techniques and tests used in the isolation and identification of bacteria, fungi and parasites commonly seen in a clinical microbiology laboratory. Concurrent enrollment MT 423.
Prerequisites: (BY 261 [Min Grade: C] or BY 271 [Min Grade: C]) and MT 423 [Min Grade: C](Can be taken Concurrently)

MT 426. Instrumentation and Automation. 2 Hours.
This course includes the study of the theory and principles of automation and instrumentation used in laboratories. An emphasis will be placed on quality control, quality assurance, instrumentation principles, basic statistics, and the regulatory, and economic issues encountered in laboratories including, clinical labs, health labs, government labs, private labs and other laboratories.
Prerequisites: CH 117 [Min Grade: C] and CH 118 [Min Grade: C]

MT 427. Instrumentation and Automation Laboratory. 1 Hour.
This course includes the practical application of automation and instrumentation used in laboratories. An emphasis will be placed on quality control, quality assurance, instrumentation principles, basic statistics, and the regulatory, and economic issues encountered in laboratories including, clinical labs, health labs, government labs, private labs and other laboratories.
Prerequisites: CH 117 [Min Grade: C] and CH 118 [Min Grade: C] and MT 426 [Min Grade: C](Can be taken Concurrently)

MT 428. Hematology I. 4 Hours.
Systematic examination of the normal hematologic and hemostatic systems: blood cell production, structure and function; blood cell morphology; performance, evaluation and interpretation of routine and special tests; primary hemostasis, coagulation and fibrinolysis. The course includes a mandatory laboratory component.

MT 430. Immunohematology. 4 Hours.
Analyze blood group antigen-antibody reactions;donor blood collection and testing serological characteristics and immunogenetics of the major blood group systems; pretransfusion testing, basic and advanced techniques of antibody identification and problem-solving; transfusion therapy; laboratory eveluation of hermolytic disease of the newborn; and the investigation of immune coating of red cells in vivo, including autoimmune hemolytic anemia. Application of theory and problem-solving skills is emphasized.
Prerequisites: MT 418 [Min Grade: C]

MT 431. Immunohematology Laboratory. 1 Hour.
Performance and evaluation of: red cell phenotyping, antibody detection and identification, pretransfusion testing, and laboratory investigation to diagnosis and treat hemolytic anemias and adverse effects of transfusion.

Prerequisites: MT 418 [Min Grade: C] and MT 430 [Min Grade: C](Can be taken Concurrently)

MT 432. Hematology II. 4 Hours.
Pathology of the hematologic and hemostatic systems: anemias, leukopenias, myelodysplastic syndromes, myeloproliferative syndromes, chronic leukemias, acute leukemias, primary hemostatic disorders, coagulopathies, thrombophilia, and interpretation and correlation of laboratory data supporting diagnosis and management or treatment. The course includes a mandatory laboratory component.
Prerequisites: MT 428 [Min Grade: C]

MT 438. Infectious Diseases. 3 Hours.
Pathogenic mechanisms of infectious diseases; normal flora and pathogens of various body sites; methods for collection, transport, and culturing different types of clinical specimens; interpretation of cultures.
Prerequisites: MT 423 [Min Grade: C] and MT 424 [Min Grade: C]

MT 439. Infectious Diseases Laboratory. 1 Hour.
Performance and interpretation of direct Gram stains; culturing various types of clinical specimens for isolation of bacteria; performing and interpreting tests used in the identification of potential pathogens; reporting culture results; antimicrobial susceptibility and resistance testing.
Prerequisites: MT 423 [Min Grade: C] and MT 424 [Min Grade: C] and MT 438 [Min Grade: C](Can be taken Concurrently)

MT 442. Molecular Diagnostics. 3 Hours.
The course will focus on the development of knowledge in and the fundamental principles of: molecular biochemistry, medical genetics, molecular pathology, performance, evaluation and interpretation of molecular tests.
Prerequisites: BY 210 [Min Grade: C]

MT 443. Molecular Diagnostics Laboratory. 1 Hour.
The course will focus on applications and analysis, and the development of competencies in: nucleic acid isolation, analysis of nucleic acids and protein, cytogenetics, PCR and others.
Prerequisites: MT 442 [Min Grade: C](Can be taken Concurrently)

MT 451. Clinical Chemistry. 4 Hours.
Theory of clinical laboratory techniques to identify and quantitate chemical analytes in body fluids and the correlation of these analytes to human disease.
Prerequisites: MT 426 [Min Grade: C] and MT 427 [Min Grade: C]

MT 452. Clinical Chemistry Laboratory. 1 Hour.
Performance of laboratory techniques used to identify and quantitate chemical analytes in body fluids and the correlation of these analytes to human disease.
Prerequisites: MT 451 [Min Grade: C]

MT 455. Research Principles. 2 Hours.
Clinical research principles and methods relevant to laboratory medicine assays; applications of descriptive and inferential statistics with diagnostic assay accuracy studies; development of competencies for critical analyses of empirical research papers to determine quality of empirical evidence and the operating characteristics of the diagnostic assays studied and the planning process for verification studies of diagnostic assays. Quantitative Literacy is a significant component of this course.

MT 460. Clinical Correlations. 3 Hours.
Analyze and interpret laboratory case studies; correlate clinical and technical information obtained from various topics covered throughout the curriculum; work with groups to present case studies with an emphasis on application and interpretation of laboratory protocols, competence in grammar usage and mechanics, and writing conventions required for laboratory professionals. Writing is a significant component of this course.

Prerequisites: MT 430 [Min Grade: C](Can be taken Concurrently) and MT 432 [Min Grade: C](Can be taken Concurrently) and MT 451 [Min Grade: C](Can be taken Concurrently) and MT 438 [Min Grade: C](Can be taken Concurrently)

MT 470. Certification Review. 1 Hour.
Review of medical technology/ clinical laboratory science body of knowledge with required comprehensive trial certification final examination using self-directed online materials. Experience with the development of a personal certification maintenance plan to meet requirements defined by national certification agencies in Clinical Laboratory Sciences. Medical Technology students only.
Prerequisites: MT 495 [Min Grade: C](Can be taken Concurrently)

MT 495. Clinical Practice. 1-12 Hour.
This CLS program capstone course involves directed clinical practice in hematology, chemistry, microbiology, immunology and immunohematology with focused activities to reinforce, integrate and apply knowledge obtained throughout the curriculum. Students will organize, build on, and reflect on previous assignments/experiences to demonstrate attainment of discipline-specific writing, quantitative literacy, ethical issues, and civic engagement.