

Medical Laboratory Science

Degrees Offered:	M.S.
Director:	Floyd Josephat, EdD
Phone:	(205) 934-1348
E-mail:	josephat@uab.edu
Website:	http://www.uab.edu/shp/cds/clinical-laboratory-sciences

Program Information

Program Mission

The Faculty of the Medical Laboratory Science program is committed to service to the community and to providing high quality education to prepare students with a solid educational background and a set of skills translatable to a variety of laboratory settings including hospital 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.

M.S. Admission Requirements

In addition to the general Graduate School admission requirements, applicants to the M.S. program must:

- Have a biology, chemistry, or a related major from an accredited college or university,
- Have a minimum undergraduate GPA of 3.0 (A = 4.0), computed from all undergraduate credits or from the last 60 semester hours of undergraduate course credit,
- Provide a written statement of career goals,
- If foreign-educated, have a score of at least 550 for paper version (or 80 for Internet version; or 213 for computer version) on the TOEFL, submit a transcript evaluation from World Education Services (WES) at www.wes.org

If accepted, students must complete the UAB medical history questionnaire and physical, provide proof of required immunizations, and receive satisfactory screening by the UAB Medical Center Student Health Service before enrollment. A background check and drug screen will be required at program admission and prior to clinical placement.

Persons with a Bachelor of Science degree may be eligible to register for courses as non-degree seeking graduate students before acceptance into the M.S. program. If a non-degree seeking graduate student meets the M.S. program admission requirements, up to 12 semester hours of approved non-degree graduate coursework may be accepted for the M.S. degree. Admission of a student to any course as a non-degree student does not constitute admission to the M.S. degree program.

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 CLS website under the link *Admission* (<http://www.uab.edu/shp/cds/clinical-laboratory-sciences>). 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 goals. The essential requirements include categories of observation, movement, communication, intellect, and behavior.

If you have a disability, but have not contacted Disability Support Services (DSS), please call 934-4205 or visit the DSS offices at 1701 9th Avenue South. Additional information is available at <http://www.uab.edu/students/disability/>.

Accreditation and Certification

The program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences. 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/>

Additional Information:

Entry Term:	Fall semester
Deadline for All Application Materials to be in the Graduate School Office:	Early Admission: February 1; Regular Admission: May 1
Entrance Tests:	GRE and for international applicants from non- English speaking countries, scores for the Test of English as a Foreign Language (TOEFL) and the Test of Written English(TWE)
Comments:	Scholarship money is available, but is limited; transcript evaluation by WES is required for applicants with foreign university degrees

Contact Information

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

Master of Science in Medical Laboratory Science

Requirements	Hours
CLS 502 Fundamentals of Phlebotomy and Body Fluid Collection	1
CDS 505 Professional Skills Development	1
CDS 610 Research Design and Statistics	3
CDS 625 Analysis of Scientific Publications	3
CLS 501 Introduction to the Clinical Laboratory	3
CLS 503 Body Fluids	1
CLS 504 Lab Analysis of Body Fluids	1
CLS 505 Laboratory Management	3
CLS 518 Immunology	3
CLS 523 Clinical Microbiology	3
CLS 524 Clinical Microbiology Laboratory	1
CLS 526 Instrumentation & Automation	2
CLS 527 Instrumentation and Automation Laboratory	1
CLS 528 Hematology I	3
CLS 529 Hematology I Laboratory	1
CLS 530 Immunohematology	4
CLS 531 Immunohematology Laboratory	1
CLS 532 Hematology II	3
CLS 533 Hematology II Laboratory	1
CLS 538 Infectious Diseases	3
CLS 539 Infectious Diseases Laboratory	1
CLS 542 Molecular Diagnostics	3
CLS 543 Molecular Diagnostics Lab	1
CLS 551 Clinical Chemistry	4
CLS 552 Clinical Chemistry Laboratory	1
CLS 560 Clinical Correlations	3
CLS 570 Professional Development	1
CLS 595 Clinical Practice	12
CLS 698 Master's Level Non-Thesis Research	4
Total Hours	72

Courses

CLS 501. Introduction to the Clinical Laboratory. 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.

CLS 502. 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.

CLS 503. Body Fluids. 1 Hour.

Diagnosis and monitoring of 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.

CLS 504. Lab Analysis of Body Fluids. 1 Hour.

Application of diagnosis and monitoring of 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.

CLS 505. Laboratory Management. 3 Hours.

Roles and functions of clinical laboratories and practitioners; professionalism and ethics; educational methodology and training; professional and interpersonal communication; behavioral aspects of management; leadership styles and management theory; team-building; legal issues related to employment; recruitment, interview and selection of personnel; organizational culture and behavioral change; laboratory operations; safety, governmental regulations, standards and compliance; marketing, outreach, and business plan; budget, cost analysis, reimbursement; critical pathways, decision-making, test utilization; performance improvement, quality assessment; risk management, evidence-based laboratory medicine.

CLS 518. Immunology. 3 Hours.

Physiology of immune responses to infectious agents, tumors, transplant; abnormal responses: hypersensitivity, autoimmunity, immunoproliferative disorders, and immunodeficiencies; antigen-antibody reaction; complement; application of immunologic tests.

CLS 523. 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.

CLS 524. 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.

CLS 526. Instrumentation & Automation. 2 Hours.

Study of the theory and principles of automation and instrumentation used in laboratories 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.

CLS 527. Instrumentation and Automation Laboratory. 1 Hour.

Practical application of automation and instrumentation used in laboratories. 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.

CLS 528. Hematology I. 3 Hours.

Systematic examination of blood cells: normal function; recognizing their microscopic appearance; blood cell disorders; standard and special clinical hematology laboratory procedures; validation of laboratory data; interpretation of results, and quality assurance.

CLS 529. Hematology I Laboratory. 1 Hour.

Practical application of Hematology I as applicable to diagnostic assays in clinical laboratories. An emphasis will be placed on hematology lab principles; complete blood count analysis, manual hematology procedures, automated and manual differentials, cell identification, procedural determination of various clinical diseases and disorders (anemia, leukemia etc.,) quality control and quality assurance procedures in the hematology lab.

CLS 530. Immunohematology. 4 Hours.

Immunogenetics, serological characteristics, and clinical significance of blood group systems; antibody identification; pretransfusion testing and problem-solving; donor blood collection; component preparation; transfusion and cellular therapy; investigation and treatment of immune hemolytic disorders.

CLS 531. Immunohematology Laboratory. 1 Hour.

Red cell phenotyping, antibody detection and identification, pretransfusion testing, and laboratory investigation to diagnosis and treat hemolytic anemias.

CLS 532. Hematology II. 3 Hours.

Structure and function of hematopoietic and lymphatic tissue. Stem cell differentiation, hematopoiesis, erythrocyte and leukocyte kinetics. Laboratory diagnosis and case management of anemia, lymphoma, myeloma, acute and chronic cell morphology, cell population scatter plots and histograms, cytochemistry, immunophenotyping, molecular methods, and cytogenetics. Hematology laboratory problem solving.

Prerequisites: CLS 528 [Min Grade: C]

CLS 533. Hematology II Laboratory. 1 Hour.

Practical application as applicable to diagnostic assays in clinical laboratories. An emphasis will be placed on hematology lab principles; complete blood count analysis, manual hematology procedures, normal and abnormal peripheral blood smear differentials, cell identification, procedural determination of various clinical diseases and disorders (anemia, leukemia etc.), bone marrow analysis, quality control and quality assurance procedures in the hematology lab.

CLS 538. 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: CLS 523 [Min Grade: C]

CLS 539. 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: CLS 524 [Min Grade: C]

CLS 542. Molecular Diagnostics. 3 Hours.

Study of molecular biochemistry, medical genetics, molecular pathophysiology, and the theory of molecular tests.

CLS 543. Molecular Diagnostics Lab. 1 Hour.

Practical application of the isolation of nucleic acids, analysis of nucleic acids and protein, cytogenetics, and the interpretation of various molecular methods.

CLS 551. 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.

CLS 552. 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.

CLS 560. Clinical Correlations. 3 Hours.

Correlate clinical, technical and analytical proficiencies that comprise clinical laboratory science practice. Analyze and interpret case studies through selection, application, and interpretation of clinical laboratory protocols.

Prerequisites: CLS 532 [Min Grade: C](Can be taken Concurrently) and CLS 538 [Min Grade: C](Can be taken Concurrently) and CLS 551 [Min Grade: C](Can be taken Concurrently)

CLS 570. Professional Development. 1 Hour.

Review of medical technology/ clinical laboratory science body of knowledge with required comprehensive final certification 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.

CLS 595. Clinical Practice. 1-12 Hour.

Directed clinical practice in immunohematology laboratory procedures and methods, problem-solving, quality assurance, preventive maintenance, and safety.

CLS 686. Special Topics in Clinical Laboratory Sciences. 1-4 Hour.

Selected advanced topics of current scientific, clinical, and professional importance; specific topics designed to meet student need and interest.

CLS 698. Master's Level Non-Thesis Research. 1-6 Hour.**CLS 699. Thesis Research. 1-6 Hour.**

Implementation of research. Must be admitted to master level candidacy. Must have approval IRB. Must have a 3 member committee approved by the graduate dean.

Prerequisites: GAC M