

Biomedical Laboratory Diagnostics, B.S.

Degree Offered

- Bachelor of Science

Nature of the Program

The BS in Biomedical Laboratory Diagnostics has two tracks: Medical Laboratory Science (<https://medicine.wvu.edu/biomedical-laboratory-diagnostics/medical-laboratory-science-bs-ms/>) (formerly Clinical Laboratory Science) and Histotechnology (<https://medicine.wvu.edu/biomedical-laboratory-diagnostics/histotechnology-bs/>). Medical laboratory scientists are healthcare professionals educated in all aspects of clinical laboratory analysis, including test development, performance, and evaluation. Medical laboratory scientists may work in many areas, including clinical chemistry, hematology, immunohematology, immunology, clinical microbiology, and molecular diagnostics.

Histotechnologists are healthcare professionals who are qualified through academic and applied science education and training to provide service, research, and management in histotechnology and areas related to anatomic pathology. Histotechnologists are integral to the success of the anatomic pathology department by performing routine and complex procedures to preserve and process tissue specimens for examination and diagnosis by a pathologist.

Practice settings for both medical laboratory scientists and histotechnologists include hospital, clinic, public health, or private clinical laboratories; research, cytogenetic, pharmaceutical, or in-vitro fertilization laboratories; technical or sales representatives for medical manufacturers and suppliers; biotechnology; and state or federal forensics laboratories.

Students may be admitted into either the medical laboratory science or the histotechnology track within the biomedical laboratory diagnostics major after completing the pre-requisite courses at an accredited college or university. As students complete the pre-requisite courses, they may apply to the biomedical laboratory diagnostics major, typically during the sophomore year.

Within both tracks, the junior year (the first year of the professional curriculum) includes core and area-specific lecture and laboratory courses to prepare for the senior year curriculum. During the senior year (the second year of the professional curriculum), the student receives didactic and student laboratory instruction, as well as practical experience at one or more of the affiliated hospital laboratories. Students must provide their own transportation and housing during the clinical rotations.

ADMINISTRATION

INTERIM PROGRAM DIRECTOR, MEDICAL LABORATORY SCIENCE

- Jason Evans - PhD, MLS(ASCP) (West Virginia University)
Associate Professor

PROGRAM DIRECTOR, HISTOTECHNOLOGY

- Kimberly Feaster - MA, HTL(ASCP)QIHC (West Virginia University)
Assistant Professor

FACULTY

ASSOCIATE PROFESSORS

- Jason V. Evans - PhD, MLS(ASCP) (West Virginia University)
- Michelle Herdman - PhD, MLS(ASCP) (Marshall University)

ASSISTANT PROFESSORS

- Kimberly Feaster - MA, HTL(ASCP)QIHC (West Virginia University)
- Rebecca A. Radabaugh - MA, HTL(ASCP)QIHC (West Virginia University)
- Jessica Rubenstein - MPH, MLS(ASCP) (West Virginia University)
- Amara Sugalski - MA, MLS(ASCP) (University of Michigan)

INSTRUCTORS

- Magdalena Baumgartner - BS, MLS(ASCP) (West Virginia University)

ASSOCIATE PROFESSORS EMERITI

- Barbara J. Gutman
- Kerry Harbert
- Beverly Kirby
- Mary Ellen Koenn
- Karen S. Long

Admissions for 2026-2027

DIRECT ADMIT

Entering WVU freshman may be admitted directly into the biomedical laboratory diagnostics major if they meet the minimum general admission requirements to the University. Direct admit students must maintain a minimum 3.0 overall GPA, and a prerequisite GPA of 2.75.

CURRENT WVU STUDENTS

Students enrolled in another major at WVU who have sophomore level or higher standing and who do not meet the Direct Admit requirements must complete the Professional Program Admissions process (see below).

PRE-REQUISITES

Code	Title	Hours
Biology		
BIOL 101 & 101L	General Biology 1 and General Biology 1 Laboratory (GEF 2)	4
or BIOL 115 & 115L	Principles of Biology and Principles of Biology Laboratory	
BIOL 102 & 102L	General Biology 2 and General Biology 2 Laboratory (GEF 8)	4
or BIOL 117 & 117L	Introductory Physiology and Introductory Physiology Laboratory	
Chemistry		
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory (GEF 8)	4
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory	4
CHEM 233 & 233L	Organic Chemistry 1 and Organic Chemistry 1 Laboratory	4
or CHEM 231 & 231L	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course Laboratory	
Mathematics		
MATH 124	Algebra with Applications (GEF 3)	3
Statistics		
STAT 211	Elementary Statistical Inference (GEF 8)	3
or ECON 225	Elementary Business and Economics Statistics	
Physiology		
BIOL 235	Human Physiology	3
or PSIO 241	Elementary Physiology	
Medical Terminology		
PALM 200	Medical Terminology	3
GEF		18
Credits to satisfy foundations 1, 4, 5, 6 & 7		
Total Hours		50

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Students may take either CHEM 233 and CHEM 235 or CHEM 231 and CHEM 231L; however, two semesters of organic chemistry (CHEM 233/235 and CHEM 234/236) are strongly recommended to better prepare for the professional curriculum.

Although not required for admission to the biomedical laboratory diagnostics tracks in medical laboratory science and histotechnology, eight credits of organic chemistry, eight credits of physics, cell biology, and six credits of social sciences are suggested electives for those students interested in applying to medical, dental, or other graduate programs. In addition, a foreign language is recommended for students who plan to do graduate work.

Admission decisions are based upon the applicant's grade point average, recommendations, and interview. Applicants should have a minimum overall and pre-requisite science and math GPA of 2.5. A GPA of 2.5 or above does not ensure admission. Two letters of recommendation are required; one from a college science professor is preferred. A personal interview with the Biomedical Laboratory Diagnostics Admissions Committee is required.

APPLICATION PROCEDURE

Each year the biomedical laboratory diagnostics major selects a limited number of applicants from the applications received for admission into the medical laboratory science and histotechnology track. The application is available online beginning December 1st.

There is an application fee for residents and non-residents. The priority deadline is March 15th. Applications received by March 15th will be given first consideration for admissions. The standard deadline is June 1st. In the event the class is not filled, the application deadline may be extended.

Major Code: 8351

Click each link below to view the corresponding track requirements and Suggested Plans of Study.

- Medical Laboratory Science (p. 6)
- Histotechnology (p. 5)

General Education Foundations

Please use this link to view a list of courses that meet each GEF requirement. (<http://registrar.wvu.edu/gef/>)

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

Code	Title	Hours
General Education Foundations		
F1 - Composition & Rhetoric		3-6
ENGL 101 & ENGL 102 or ENGL 103	Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research Accelerated Academic Writing	
F2A/F2B - Science & Technology		4-6
F3 - Math & Quantitative Reasoning		3-4
F4 - Society & Connections		3
F5 - Human Inquiry & the Past		3
F6 - The Arts & Creativity		3
F7 - Global Studies & Diversity		3
F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)		9
Total Hours		31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

Curriculum Requirements

Code	Title	Hours
	University Requirements	19
	Biomedical Laboratory Diagnostics Program Requirements	32
	Biomedical Laboratory Diagnostics Major Requirements	71-72
Total Hours		122-123

University Requirements

Code	Title	Hours
	General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)	
	Outstanding GEF Requirements 1, 4, 5, 6, and 7	18

PALM 191	First-Year Seminar	1
Total Hours		19

Biomedical Laboratory Diagnostics Program Requirements

Code	Title	Hours
BIOL 101 & 101L or BIOL 115 & 115L	General Biology 1 and General Biology 1 Laboratory Principles of Biology and Principles of Biology Laboratory	4
BIOL 102 & 102L or BIOL 117 & 117L	General Biology 2 and General Biology 2 Laboratory Introductory Physiology and Introductory Physiology Laboratory	4
BIOL 235 or PSIO 241	Human Physiology * Elementary Physiology	3
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory	4
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory	4
Organic Chemistry **		4
CHEM 233 & 233L	Organic Chemistry 1 and Organic Chemistry 1 Laboratory	
Or		
CHEM 231 & 231L	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course Laboratory	
MATH 124	Algebra with Applications (or higher)	3
PALM 200	Medical Terminology	3
STAT 211 or ECON 225	Elementary Statistical Inference Elementary Business and Economics Statistics	3
Total Hours		32

Biomedical Laboratory Diagnostics Major Requirements

Code	Title	Hours
MICB 200	Medical Microbiology	3
PALM 300	Introduction to Pathology	3
PALM 303	Laboratory Methods	1
PALM 320	Medical Biochemistry	3
PALM 322	Medical Biochemistry Laboratory	1
PALM 380	Medical Immunology	3
PALM 381	Research and Educational Methodology	2
PALM 464	Scientific Writing Seminar	1
PALM 465	Medical Laboratory Management	2
PALM 475	Medical Relevance - Capstone	3
There are two Tracks: Histotechnology or Medical Laboratory Science		49-50
Histotechnology (50 credits)		
PSIO 441	Mechanisms of Body Function	
PALM 307	Introduction to Histotechniques	
PALM 205	Introduction to Human Anatomy	
PALM 304	Histotechnology Microanatomy	
PALM 305	Staining Techniques 1	
PALM 306	Histotechnique 1	
PALM 405	Staining Techniques 2	
PALM 406	Histotechnique 2	

PALM 407	Histology Laboratory
PALM 408	Histotechnologist Practicum
PALM 409	Molecular Pathology for Laboratory Professionals
Medical Laboratory Science (49 credits)	
PALM 312	Phlebotomy
PALM 350	Clinical Mycology & Parasitology
PALM 360	Urinalysis and Body Fluids
PALM 382L	Medical Immunology Laboratory
PALM 401	Phlebotomy Practicum
PALM 410	Molecular Diagnostics
PALM 412	Molecular Diagnostics Laboratory
PALM 420	Immunochemistry
PALM 422	Immunochemistry Laboratory
PALM 425	Immunochemistry Practicum
PALM 430	Clinical Chemistry
PALM 432	Clinical Chemistry Laboratory
PALM 435	Clinical Chemistry Practicum
PALM 440	Clinical Hematology
PALM 442	Clinical Hematology Laboratory
PALM 444	Hemostasis
PALM 445	Clinical Hematology Practicum
PALM 446	Hemostasis Laboratory
PALM 450	Clinical Microbiology
PALM 452	Clinical Microbiology Laboratory
PALM 455	Clinical Microbiology Practicum
PALM 462	Urinalysis and Body Fluids Laboratory
PALM 466	Med Lab Science Review
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Total Hours	71-72

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Or 2 semester of combined Anatomy and Physiology courses.

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Two semesters of organic chemistry (CHEM 233/235 and CHEM 234/236) are strongly recommended to prepare for graduate level education.

PALM 100, PALM 101, and PALM 201 are required for Direct Admit students and highly recommended for Pre-Biomedical Laboratory Diagnostics students. A minimum of 120 hours are required for graduation. However, students may have to take additional hours.

SUGGESTED PLAN OF STUDY FOR HISTOTECHNOLOGY

First Year

Fall	Hours	Spring	Hours
CHEM 115 & 115L (GEF 8)		4 CHEM 116 & 116L	4
MATH 124 (or higher; GEF 3)		3 ENGL 101 (GEF 1)	3
Select one of the following (GEF 2):		4 Select one of the following (GEF 8):	4
BIOL 101 & 101L		BIOL 102 & 102L	
BIOL 115 & 115L		BIOL 117 & 117L	
GEF 4, 5, 6, or 7		3 GEF 4, 5, 6, or 7	3

PALM 191	1				
	15			14	
Second Year					
Fall	Hours	Spring	Hours		
ENGL 102 (GEF 1)		3 BIOL 235 or PSIO 241		3	
STAT 211 or ECON 225 (GEF 8)		3 PALM 200		3	
CHEM 233 & 233L		4 GEF 4, 5, 6, or 7		3	
GEF 4, 5, 6, or 7		3			
	13			9	
Third Year					
Fall	Hours	Spring	Hours	Summer	Hours
PSIO 441		4 MICB 200		3 PALM 305	4
PALM 300		3 PALM 205		3 PALM 406	3
PALM 303		1 PALM 304		4	
PALM 307		1 PALM 306		3	
PALM 320		3 PALM 381		2	
PALM 322		1			
PALM 380		3			
	16			15	7
Fourth Year					
Fall	Hours	Spring	Hours		
PALM 405		4 PALM 408		14	
PALM 407		8 PALM 475		3	
PALM 409		2			
PALM 464		1			
PALM 465		2			
	17			17	

Total credit hours: 123

SUGGESTED PLAN OF STUDY FOR MEDICAL LABORATORY SCIENCE

First Year					
Fall	Hours	Spring	Hours		
CHEM 115 & 115L (GEF 8)		4 CHEM 116 & 116L		4	
MATH 124 (or higher; GEF 3)		3 ENGL 101 (GEF 1)		3	
Select one of the following (GEF 2):		4 Select one of the following (GEF 8):		4	
BIOL 101 & 101L		BIOL 102 & 102L			
BIOL 115 & 115L		BIOL 117 & 117L			
GEF 4, 5, 6, or 7		3 GEF 4, 5, 6, or 7		3	
PALM 191		1			
	15			14	
Second Year					
Fall	Hours	Spring	Hours		
ENGL 102 (GEF 1)		3 BIOL 235 or PSIO 241		3	
STAT 211 or ECON 225 (GEF 8)		3 PALM 200		3	

CHEM 233 & 233L		4 GEF 4, 5, 6, or 7		3	
GEF 4, 5, 6, or 7		3			
		13		9	
Third Year					
Fall	Hours	Spring	Hours	Summer	Hours
MICB 200		3 PALM 350		2 PALM 312	1
PALM 300		3 PALM 360		1 PALM 401	1
PALM 303		1 PALM 381		2 PALM 444	1
PALM 320		3 PALM 430		3 PALM 446	1
PALM 322		1 PALM 432		2	
PALM 380		3 PALM 440		3	
PALM 382L		1 PALM 442		2	
		PALM 462		1	
		15		16	4
Fourth Year					
Fall	Hours	Spring	Hours		
PALM 410		2 PALM 425		4	
PALM 412		1 PALM 435		4	
PALM 420		3 PALM 445		4	
PALM 422		2 PALM 455		4	
PALM 450		3 PALM 466		1	
PALM 452		2 PALM 475		3	
PALM 464		1			
PALM 465		2			
		16		20	

Total credit hours: 122

Major Learning Outcomes

BIOMEDICAL LABORATORY DIAGNOSTICS

Upon graduation, students will:

- Demonstrate entry level knowledge for a laboratory medicine professional.
- Perform accurate and reliable qualitative and quantitative test procedures using sophisticated instrumentation.
- Model the professional traits of a laboratory medicine practitioner in a workplace setting (e.g., during clinical rotations).
- Communicate effectively in written and oral forms appropriate to a laboratory medicine professional.

Accreditation

The WVU Biomedical Laboratory Diagnostics tracks in Medical Laboratory Science and Histotechnology are accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), 5600 N. River Road, Suite 720, Rosemont, IL 60018, and (773) 714-8880. Graduates of the Medical Laboratory Science and Histotechnology programs are eligible for certification by the Board of Certification of the American Society for Clinical Pathology (ASCP).