Biomedical Sciences, M.S., Ph.D.

Degrees Offered

- Doctor of Philosophy
- Master of Science

Nature of the Program

A Ph.D. in the **Biomedical Sciences** at West Virginia University offers the student the unique opportunity to explore multiple disciplines and areas of research in the biomedical sciences but to also fast track into a dissertation laboratory and a graduate program within one semester. Earning the Ph.D. will be through one of the 7 degree granting programs in the Biomedical Sciences: Biochemistry and Molecular Medicine, Cancer Cell Biology, Cellular and Integrative Physiology, Pathophysiology, Rehabilitation, and Performance, Immunology and Microbial Pathogenesis, Neuroscience, and Pharmaceutical and Pharmacological Sciences. These programs share a common admission's process and a common core curriculum in the first semester. Students will rotate through 3 laboratories during the fall semester with the potential to select a dissertation adviser by the end of the semester.

Doctoral study in these graduate programs allows the development of research and critical thinking skills as well as preparation in career development to prepare the student for entry into a myriad of careers in research, teaching, industry, government, and other positions that require specialized training at the graduate level.

All students will:

- start with an orientation that will prepare him/her to successfully transition into graduate studies, and to interact with an orientation adviser, faculty investigators, and current students;
- have the opportunity to match with a faculty mentor, or thesis or dissertation adviser through laboratory rotations during the first semester;
- have formal training in scientific writing;
- have the opportunity to participate in seminar series, workshops, experiential learning, and career-development sessions.

The Masters of Sciences (M.S.) in the **Biomedical Sciences** is designed to allow a pathway to graduation for students who have completed the requirements for a M.S. degree, and are not continuing their Ph.D. studies. Students in this program would have been initially admitted through the Ph.D. program.

FACULTY

ASSISTANT VICE PRESIDENT FOR GRADUATE EDUCATION

- Julie Lockman - Ph.D.

DIRECTOR OF ADMISSION

- Emidio Pistilli - Ph.D.

DIRECTOR M.D./PH.D. PROGRAM

- Albert Berrebi - Ph.D.

ASSISTANT DIRECTOR OF ADMISSIONS AND ACADEMIC AFFAIRS

- Joseph Andria

PROGRAM COORDINATOR

- Connor Ferguson

Admissions for 2025-2026

All applications are accepted electronically and must be submitted electronically via the official WVU Graduate Education application: https://westvirginia.force.com/wvugrad/TX_SiteLogin?startURL=%2Fwvugrad%2FTargetX_Portal__PB (https://westvirginia.force.com/wvugrad/TX_SiteLogin/?startURL=%2Fwvugrad%2FTargetX_Portal__PB).

Applications are reviewed beginning in November by a Common Admissions Committee comprised of the graduate directors or faculty representatives of our seven Ph.D. graduate training programs and one or more senior graduate students. The Assistant Vice President for Graduate Education is an *ex officio* member. The deadline for receipt of applications is December 1st for admission in the Fall semester of the next academic year. Students are not admitted for the spring semester.

All students interested in one of the 7 Biomedical Ph.D. programs must apply through a common admissions portal. Choice of a specific graduate program occurs during the first year of graduate study after selection of an adviser for your dissertation research and choosing one of the degree granting programs. Applications include a Personal Statement, transcripts from all Colleges or Universities attended, and 3 letters of recommendation. Applicants must arrange to have official copies of transcripts sent directly to the WVU Office of Graduate Admissions and Recruitment, PO Box 6510, Morgantown, WV 26506-6510.

For maximum admissions consideration and eligibility for graduate merit fellowships with enhanced benefits, we recommend that you apply as early as possible.

To review the programs and application process, please visit: https://www.hsc.wvu.edu/resoff/graduate-education/phd-programs/biomedical-sciences/admissions/

Major Code: 8344

Master of Science

MAJOR REQUIREMENTS

Code	Title	Hours
BMS 700	Scientific Integrity	1
BMS 701	Scientific Rigor and Ethics	1
BMS 706	Biomedical Research Methods	1
Select one of the following:		3
BMM 715	Molecular Genetics (Recommended)	
Elective (approved by advisor and advisory committee)		
BMS 720	Scientific Writing	2
Program- specific elective		3
Journal Clubs		3
BMS 702	Biomedical Lab Experience	2
BMS 747	Foundations for Contemporary Biomedical Research I	4
BMS 777	Foundations for Contemporary Biomedical Research 2	4
Select either the thesis or non-thesis option:		18
Thesis Option		
Elective (3 hours)		
Research (15 hours)		
BMS 797	Research	
Thesis Proposal		
Thesis Defense		
Non-Thesis Option		
Electives (12 hours)		
Research (6 hours)		
BMS 797	Research	
Total Hours		42

Seminars and Research Forum

It is recommended that students attend a weekly seminar in their chosen research area during each semester enrolled in the program.

Journal Club

Students are required to enroll in three Journal Clubs during their M.S. studies. The course involves the presentation and discussion of current research papers and will help acquaint students with the variety of methods used in scientific research.

Masters Research

Students will conduct research with a thesis mentor during time in the program. Students register for research credits each semester, and their performance is graded by their thesis mentor.

Thesis Proposal

The thesis proposal is completed in the beginning of the second year of study.

Thesis Defense

The final examination for the M.S. degree consists of orally defending a written thesis in private to the thesis committee – a prior public presentation is encouraged. Satisfactory performance in the oral defense will result in recommendation for granting of the M.S. degree.

Suggested Plan of Study

THESIS OPTION

First Year

Fall	Hours	Spring	Hours	Summer	Hours
BMS 700	1	BMS 701	1	BMS 797	3
BMS 706	1	BMM 715	3		
BMS 702	2	Program Specific Elective	3		
BMS 747	4	Journal Club	1		
BMS 777	4	BMS 797	1		
	12		9		3

Second Year

Fall	Hours	Spring	Hours	Summer	Hours
Elective	3	Journal Club	1	BMS 720	2
Journal Club	1	BMS 797	6	BMS 797	1
BMS 797	4				
Thesis proposal					
	8		7		3

Total credit hours: 42

NON THESIS OPTION

First Year

Fall	Hours	Spring	Hours	Summer	Hours
BMS 700	1	BMS 701	1	BMS 797	3
BMS 706	1	BMM 715	3		
BMS 702	2	Program-specific elective	3		
BMS 747	4	Elective	3		
BMS 777	4	Journal Club	1		
	12		11		3

Second Year

Fall	Hours	Spring	Hours	Summer	Hours
Elective	3	Elective	3	BMS 720	2
Elective	3	Journal Club	1	BMS 797	1
Journal Club	1	BMS 797	1		
BMS 797	1				
	8		5		3

Total credit hours: 42

NOTE: The graduate curriculum is finalized with a plan of study once the mentor and laboratory have been selected in the first year. The plan of study is developed by the graduate committee in consultation with the student. The courses listed above include the required and elective coursework necessary for the student to finalize his/her plan of study.

Major Learning Outcomes

BIOMEDICAL SCIENCES

This program is designed to assist in the selection of a career path, albeit industry, teaching, or a professional program, and/or for the transition to a biomedical Ph.D. program. The first-year curriculum imparts a fundamental understanding of the functional components of a cell and the basis for regulation of cellular processes and organ systems. After selecting a mentor, students take additional courses that align with their research interests.

Students will:

- Integrate molecular, cellular, and integrative systems concepts
- Critically interpret the current scientific literature
- Develop critical thinking and problem-solving skills
- Demonstrate technical skills in conducting scientific experimentation
- Design and interpret experiments to test molecular, cellular, and integrative systems mechanisms
- Articulate, verbally and in writing, their understanding of concepts during scientific discussions
- Discuss relevant scientific ethical issues presented as case studies
- Engage with fellow students and faculty and demonstrate teamwork

Doctor of Philosophy (Ph.D.) in one of 7 biomedical Ph.D. programs

Students in the first semester of year one in the Biomedical Sciences Graduate Programs take a common core curriculum that covers topics important to all biomedical sciences graduate programs. In addition, they begin training in the responsible conduct of research, and they conduct three short lab experiences to assist in the selection of a faculty mentor for dissertation research. The intended outcomes the first year in graduate school are to match with a faculty investigator who will guide the student to completion of dissertation research, and to successfully transfer into one of the Ph.D. degree-granting biomedical sciences programs.

By the end of the first year students will:

- Integrate molecular, cellular, and integrative systems concepts
- Identify the relevant scientific literature for their proposed area of research
- Conduct and optimize select laboratory procedures
- Develop an oral presentation on a topic that is new to them
- Discuss relevant scientific ethical issues presented as case studies
- Apply responsible research practices to the conduct of their experiments
- Engage with fellow students and faculty and demonstrate teamwork

The individual PhD programs have additional learning outcomes specific to the advanced skills required of a PhD and the specific discipline of that program and the student's research.