Biomedical Sciences

Degrees Offered

- Master of Science
- Doctor of Philosophy

Lisa M. Salati, Ph.D., Program Director and Assistant Vice President for Graduate Education at the WVU Health Sciences Center; lsalati@hsc.wvu.edu

The Masters of Science (M.S.) in the Biomedical Sciences 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 Doctor of Philosophy (Ph.D.) program. The M.S. degree has a thesis and non-thesis option, the latter with additional elective coursework that should align with career goals. Completion of the M.S. degree is realized when the student successfully presents the research results to faculty of the student’s graduate thesis committee. Typically, two to three years are required to realize this goal.

A Ph.D. in the Biomedical Sciences at West Virginia University offers you 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 Biology, Cancer Cell Biology, Cellular and Integrative Physiology, Exercise Physiology, Immunology and Microbial Pathogenesis, Neuroscience, and Pharmaceutical and Pharmacological Sciences. They share a common admission’s process and a common core curriculum in the first semester. You 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 you for entry into a myriad of careers in research, teaching, industry, government, and other positions that require specialized training at the graduate level.

As an incoming student, you will:

- start your graduate studies with an orientation that will prepare you to successfully transition into graduate studies, and allow you 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;
- take a course in scientific writing during the summer of Year 2;
- have the opportunity to participate in seminar series, workshops, and career-development sessions.

FACULTY

ASSISTANT VP FOR GRADUATE EDUCATION
- Lisa M. Salati - Ph.D.

DIRECTOR M.D./PH.D. PROGRAM
- David P. Siderovski - Ph.D.

STAFF ASSISTANT
- Penny Phillips
  M.D./Ph.D. Scholars Program

All applications are accepted electronically and must be submitted electronically via the official WVU Graduate Education application: https://app.applyyourself.com/AYApplicantLogin/fi_ApplicantConnectLogin.asp?id=wvugrad.

Applications are reviewed from November through March by a Common Admissions Committee comprised of the graduate directors or faculty representatives of our seven Ph.D. graduate training programs and a senior graduate student representing the Graduate Student Organization. The Assistant Vice President for Graduate Education and the Assistant Director of HSC Graduate Education are ex officio members.

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 to both the Ph.D. and M.S. programs include a Personal Statement, transcripts from all Colleges or Universities attended, GRE scores, and 3 letters of recommendation. Applicants must arrange to have official copies of transcripts and tests scores sent directly to the WVU Office of Graduate Admissions and Recruitment, PO Box 6510, Morgantown, WV 26506-6510.

Additional Information:

To review the programs and application process, please visit:
For Ph.D. applicants: http://www.hsc.wvu.edu/resoff/graduate-education/phd-programs/biomedical-sciences/prospective-students/

For M.S. applicants: http://www.hsc.wvu.edu/resoff/graduate-education/ms-programs/biomedical-sciences/

Qualified M.S. applicants are invited, along with Ph.D. applicants, to an all-expense paid, 2.5 day visit/interview to the campus. Students with excellent credentials and who can clearly describe their past research and demonstrate passion for research at the interview are seriously considered for acceptance. Decisions of acceptance are made on a rolling basis, and all decisions made by the Admissions Committee are final. For maximum admissions consideration, we recommend that you apply as early as possible.

**Master of Science**

**MAJOR REQUIREMENTS**

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<thead>
<tr>
<th>Scientific Integrity</th>
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<tbody>
<tr>
<td>BMS 700</td>
<td>Scientific Integrity</td>
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<tr>
<td>BMS 706</td>
<td>Cellular Methods</td>
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<tr>
<td>BMS 715</td>
<td>Molecular Genetics</td>
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<tr>
<td>BMS 720</td>
<td>Scientific Writing</td>
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Program-specific elective: 3

Journal Clubs: 3

| BMS 702              | Biomedical Lab Experience |
| BMS 747              | Foundations for Contemporary Biomedical Research I |
| BMS 777              | Foundations for Contemporary Biomedical Research II |

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)

**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

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<tr>
<th>Fall</th>
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<td>1 BMS 715</td>
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<td>BMS 706</td>
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<tr>
<td>BMS 791A</td>
<td>2 Journal Club</td>
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<td>BMS 793A</td>
<td>4 BMS 797</td>
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<td>BMS 793B</td>
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**12** **8** **3**

#### Second Year

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<td>Journal Club</td>
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<td>Thesis proposal</td>
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**8** **7** **3**

Total credit hours: **41**

### NON THESIS OPTION

#### First Year

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<td>4 Journal Club</td>
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**12** **10** **3**

#### Second Year

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**8** **5** **3**

Total credit hours: **41**

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 Goals

**Master of Science (M.S.) in the 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
• Design and interpret experiments to test molecular, cellular, and integrative systems mechanisms
• Demonstrate technical skills in conducting scientific experimentation
• 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 the 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.

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
• Articulate, verbally and in writing, the understanding of concepts during scientific discussions
• 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