# BIOLOGICAL SCIENCES MAJOR AT SHADY GROVE

**The Universities at Shady Grove**
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http://shadygrove.umd.edu/academics/degree-programs/bs-biological-sciences/

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**Assistant Program Director:** Tracy Odim

The Biological Sciences Program at the University of Maryland offers a degree program in Physiology and Neurobiology (PHNB) at the Universities at Shady Grove. The Biological Sciences Program at Shady Grove offers the Advanced Program courses normally taken in the junior and senior years.

All Biological Sciences majors complete a common sequence of introductory and supporting courses referred to as the Basic Program. For students matriculating at the Universities at Shady Grove most of these introductory and supporting courses are taken at a community college or at another four-year institution prior to admission to the Biological Sciences Program. Depending on space available, students who matriculated at College Park may transfer to the Shady Grove Program in their junior year, where they may complete the Advanced Program in Physiology and Neurobiology.

## Program Learning Outcomes

1. Students should have mastered the critical knowledge at each level in the curriculum that is necessary to move on to the next level in the curriculum.
2. Students should demonstrate an ability to use and apply quantitative methods, especially: interpretation of graphical or tabular data; expression of physical, chemical, or biological process in mathematical form; solving equations to determine the value of physical, chemical, or biological variables.
3. Students at the lower level should demonstrate an ability to carry out key experimental techniques used in the chemical and life sciences disciplines.
4. Students at the lower level should have a basic understanding of how to express questions as a hypothesis, how to design a test of a hypothesis, and how to gather and analyze simple data.
5. Students at the upper level should be able to integrate and apply a relevant body of basic knowledge to the evaluation of existing scientific studies and to design studies to test specific hypotheses that includes design elements typically found in a specific field of the chemical and life sciences.
6. Students should effectively communicate in writing the processes of science and the results of scientific inquiry.

## REQUIREMENTS

| Course | Title | Credits |
|---|---|---|
| **General Education Program Requirements** [1] | | |
| Complete General Education | | |
| **Basic Program in Biological Sciences** [1] | | |
| BSCI170 | Principles of Molecular & Cellular Biology | 3 |
| BSCI160 | Principles of Ecology and Evolution | 3 |
| BSCI180 | Principles Biology Laboratory (BSCI171 and BSCI161 may count for BSCI180) | 1 |
| BSCI223 | General Microbiology | 4 |
| BSCI222 | Principles of Genetics | 4 |
| MATH130 | | 4 |
| or MATH140 | Calculus I | |
| MATH131 | | 4 |
| or MATH141 | Calculus II | |
| CHEM131 & CHEM132 | Chemistry I - Fundamentals of General Chemistry and General Chemistry I Laboratory | 4 |
| CHEM231 & CHEM232 | Organic Chemistry I and Organic Chemistry Laboratory I | 4 |
| CHEM241 & CHEM242 | Organic Chemistry II and Organic Chemistry Laboratory II | 4 |
| CHEM271 & CHEM272 | General Chemistry and Energetics and General Bioanalytical Chemistry Laboratory [2] | 4 |
| **Courses taken at the Universities at Shady Grove** | | |
| PHYS131 | Fundamentals of Physics for Life Sciences I | 4 |
| or PHYS331 | Physics for Life Sciences I | |
| PHYS132 | Fundamentals of Physics for Life Sciences II | 4 |
| or PHYS332 | Physics for Life Sciences II | |
| PHNB | Advanced Program in Physiology and Neurobiology | 27 |
| ELECT | Electives | 22 |
| **Total Credits** | | **96** |

1 Courses equivalent to be taken at an institution that offers lower level course work.

2 CHEM272 is not offered at most institutions. Students accepted into the UMCP Shady Grove Biological Sciences may substitute a General Chemistry II Lab for this course

## Advanced Program in Physiology and Neurobiology

| Course | Title | Credits |
|---|---|---|
| **Required Courses** | | **13** |
| BCHM461 | Biochemistry I | 3 |
| or BCHM463 | Biochemistry of Physiology | |
| BSCI331 & BSCI332 | Cell Biology and Physiology and Cell Biology and Physiology Laboratory (BSCI330 may count for BSCI331 & BSCI332) | 4 |
| BSCI353 | Cellular and Molecular Neuroscience [1] | 3 |
| BSCI450 | Mammalian Systems Physiology | 3 |
| **Physiology and Neurobiology** | | **11** |
| BSCI338 | Special Topics in Biology (BSCI338E: Neuroethology) | |

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|---|---|
| BSCI338 | Special Topics in Biology (BSCI338G: Seminar on Deregulated Cell Growth in Cancer and Drug Development) |
| BSCI338 | Special Topics in Biology (BSCI338P: Pathophysiology of the Circulatory System) |
| BSCI338 | Special Topics in Biology (BSCI338R: Darwinian Medicine) |
| BSCI339 | Selected Topics in Biology (BSCI339D: Biology of Chemosensory Systems) |
| BSCI339 | Selected Topics in Biology (BSCI339F: Neurophysiology of Cells and Circuits) |
| BSCI339 | Selected Topics in Biology (BSCI339G: Advanced Physiology) |
| BSCI339 | Selected Topics in Biology (BSCI339I: Cellular Mechanisms of Aging and Disease) |
| BSCI339 | Selected Topics in Biology (BSCI339Q: Diseases Due to Dysfunctional Cell Organelles) |
| BSCI339 | Selected Topics in Biology (BSCI339W: Molecular Neuroethology) |
| BSCI339 | Selected Topics in Biology (BSCI339X: Advanced Cellular Neuroscience) |
| BSCI348 | Special Topics in Cell Biology and Molecular Genetics (BSCI348C: Cell Biology Lab) [2,3] |
| BSCI355 | Neurobiology of Extraordinary Senses |
| BSCI360 | Principles of Animal Behavior |
| BSCI370 | Principles of Evolution |
| BSCI374 | Mathematical Modeling in Biology [4] |
| BSCI401 | Animal Communication |
| BSCI402 | |
| BSCI403 | Biology of Vision |
| BSCI406 | Membranes and Biological Interfaces |
| BSCI407 | Behavioral Genetics |
| BSCI410 | Molecular Genetics |
| BSCI414 | Recombinant DNA Laboratory |
| BSCI416 | Human Genetics |
| BSCI420 | Cell Biology Lectures |
| BSCI421 | |
| BSCI422 | Principles of Immunology |
| BSCI423 | Immunology Laboratory [3] |
| BSCI430 | Developmental Biology |
| BSCI433 | Biology of Cancer |
| BSCI434 | |
| BSCI442 | Plant Physiology |
| BSCI443 | Microbial Physiology |
| BSCI446 | Advanced Systems Neuroscience |
| BSCI447 | General Endocrinology |
| BSCI452 | Diseases of the Nervous System |
| BSCI454 | Neurobiology Laboratory [3] |
| BSCI462 | Population Ecology |
| BSCI464 | Microbial Ecology |
| BSCI465 | |
| Statistics, one course maximum | |
| BIOM301 | Introduction to Biometrics |
| STAT400 | Applied Probability and Statistics I |
| STAT464 | Introduction to Biostatistics |
| Special Topics Courses [5] | |
| BSCI328 | Special Topics in Entomology |
| BSCI338 | Special Topics in Biology |
| BSCI339 | Selected Topics in Biology |
| BSCI348 | Special Topics in Cell Biology and Molecular Genetics |
| Departmental Honors Seminar [6] | |
| BSCI378H | Cell Biology and Molecular Genetics Department Honors Seminar |
| BSCI398H | Biology Department Honors Seminar |
| **Enrichment** | **3** |
| Minimum 3 credits from any 300- or 400-level BSCI, CHEM, or BCHM course. | |
| **Total Credits** | **40** |

# ADVISING

Advising is mandatory during each pre-registration period for all Biological Sciences majors at Shady Grove, and students are assigned to an advisor during their first semester in the program. Prospective student advising for transfer students interested in the Shady Grove Program is available from the Assistant Director. Advising for current UMD students interested in transferring from the College Park campus to the Shady Grove Program is available from the Director. Contact the program at usgbiosci@umd.edu for more information about advising appointments.