# BIOLOGY, BS

## Contact

Academic Support Coordinator
114 Life Sciences Complex
biougrad@syr.edu, 315-443-9139

## Faculty

Yasir Ahmed-Braimah, Abrar (Abbi) Adnan Aljiboury, David M. Althoff, Carlos A. Castañeda, Heather D. Coleman, Jen Cook, Melanie J. Decker, Steve Dorus, Scott E. Erdman, Christopher W. Fernandez, Austin M. Garner, Sarah E. Hall, Heidi Hehnly, James A. Hewett, James Hougland, Li-En Jao, Eundeok Kim, L. Jamie Lamit, Katharine Lewis, Chih Hung Lo, Sarah K. Lucas, Jessica MacDonald, Lauren Mavica, Vera McIlvain, Heather Meyer, Allison D. Oakes, Angela Oliverio, Susan E. Parks, Melissa E. Pepling, Scott Pitnick, Ramesh Raina, Surabhi Raina, Julia Snyder, Roy D. Welch, Michele G. Wheatly, and Jason R. Wiles

Students majoring in biology establish a general background in the discipline through a series of first-year/sophomore-level core courses that preview the major sub-disciplines of biology. This introductory program is followed by courses that allow the student to focus on more advanced material.

The major in biology leads to either the B.A. or the B.S. degree. The B.S. degree is intended for students interested in graduate study in biological science or the health professions (medicine, dentistry, or veterinary medicine). In addition to biology requirements, students pursuing a B.S. degree take general chemistry, organic chemistry, and calculus. Students pursuing the B.S. degree are also able to personalize their curriculum with elective courses in one of five tracks: Biological Sciences; Ecology and Environmental Science; Genetics, Genomics, and Evolution; Integrative and Biomedical Sciences; and Molecular, Cellular, and Developmental Biology. Students are also encouraged to gain practical experience and academic credit through the University.

The B.A. degree is intended for students who wish to pursue technical or science-related careers that do not require a graduate or professional degree, or careers outside of biology in which a background in science may be useful, such as science writing, business, or law. Although the first- year/sophomore-level core biology course requirements for the B.A. and the B.S. degrees are similar, there are key differences. The B.A. degree requires fewer courses in chemistry, mathematics, and upper division Biology.

## Student Learning Outcomes

1. By the end of their first year, students will be able to recognize and distinguish theories, concepts and principles, as defined by the Vision and Change core from the major sub-fields of biology including molecular, cellular and developmental biology; physiology; and ecology and evolution.
2. By the end of their second year, students will be able to analyze, synthesize and apply theories, concepts and principles, as defined by the Vision and Change core, from the major sub-fields of biology listed above.
3. By the end of their degree, students will be able to analyze and synthesize more specific and advanced concepts and demonstrate implicit knowledge and understanding in at least one major sub-field of biology (specific outcomes defined by the track of study).
4. Apply skills in biological research and demonstrate knowledge of the nature and practice of science.
5. Apply communication/collaboration skills relevant to biological sciences.
6. Apply quantitative reasoning and methods to solve problems in the biological sciences.
7. Describe the relationship between science and society; identify ways that this has had both positive and negative impacts.

## Major Requirements

### B.S. Degree Requirements (58 to 60 credits)

#### To Declare the B.S. Major in Biology

A student may declare the B.S. major in Biology during the admission process or anytime thereafter by contacting the Academic Coordinator of the Biology Department.

Students cannot double major in biotechnology, biochemistry or biology. They cannot complete a minor in biology in conjunction with one of those three programs.

| Code | Title | Credits |
|---|---|---|
| **Core Courses** | | |
| All core courses should be completed by the end of a student's sophomore year. | | |
| BIO 121 | General Biology I | 3 |
| BIO 122 | General Biology I Laboratory | 1 |
| BIO 123 | General Biology II | 3 |
| BIO 224 | Integrative Biology Laboratory | 2 |
| BIO 322 | Cell and Molecular Biology | 4 |
| BIO 323 | Integrative Physiology and Ecology | 4 |
| BIO 324 | Evolution | 4 |
| BIO 224 cannot be omitted nor substituted. No transfer credit petitions will be accepted for BIO 224. | | |
| **Upper-Division Courses** | | |
| Students in the B.S. program complete an additional 18 credits of upper-division coursework in Biology in a specific track. Of the 18 credits, students must take: (a) the foundation course for their chosen track; (b) 9 credits of electives; and (c) 6 credits of laboratory courses. Students may complete 6 lab credits through any combination of laboratory courses offered in their chosen track, except the combinations of BIO 316 - Anatomy and Physiology I for Biology Majors and BIO 317 - Anatomy and Physiology II for Biology Majors or BIO 316 and BIO 482 - Neuroanatomy Lab or BIO 317 and BIO 482 - Neuroanatomy Lab or BIO 463 - Molecular Biotechnology and BIO 464 - Applied Biotechnology. By petition, laboratory courses with significant biological relevance offered by other departments may also be counted toward the requirement. Regarding electives, one upper division course must include a significant focus on communication skills experience and one upper division elective or lab course may be taken from another track without requiring a petition. | | 18 |
| **Math and Chemistry Requirements** | | |

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|---|---|
| The B.S. degree in Biology requires: (1) two semesters of general or inorganic chemistry with laboratory; (2) one semester of organic chemistry with laboratory; and (3) one semester of calculus and MAT 221 Elementary Probability & Statistics I or a 300 to 500-level statistics course. | 19-21 |
| **Total Credits** | **58-60** |

**College of Arts and Sciences Requirements**
For all Arts and Sciences|Maxwell students, successful completion of a bachelor's degree in this major requires a minimum of 120 credits, 96 of which must be Arts and Sciences|Maxwell credits, completion of the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text) requirements, and the requirements for this major (30 credits) that are listed above.

**Dual Enrollments:**
Students dually enrolled in **Newhouse*** and Arts and Sciences|Maxwell will complete a minimum of 122 credits, with at least 90 credits in Arts and Sciences|Maxwell coursework and an Arts and Sciences|Maxwell major.

*Students dually enrolled in the College of Arts and Sciences|Maxwell as first year students must complete the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text). Students who transfer to the dual program after their first year as singly enrolled students in the Newhouse School will satisfy general requirements for the dual degree program by completing the Newhouse Core Requirements.

**Undergraduate University Requirements**
The following requirements and experiences apply to all Syracuse University Undergraduate matriculated degree programs.

- IDEA Course Requirement (https://coursecatalog.syracuse.edu/undergraduate/idea-course-requirement/)
- First Year Seminar (https://coursecatalog.syracuse.edu/undergraduate/courses/fys/)