

Bachelor of Science in BIOLOGY: Requirements

Rev: 2009-2010

To obtain a BS in Biology you must satisfy the Biology Major Requirements, the General University Requirements (GURs, <http://catalog.njit.edu/undergraduate/frontmatter/generaluniv.php>), and complete a minimum of 128 credits.

Biology Major Requirements

The requirements for a BS in Biology consist of 35 credits in Biological Sciences plus cognate courses in Chemistry, Physics, and Mathematics. All required courses listed below, including cognate courses, must be completed with a grade of C or better.

1. CORE COURSES

| | |
|---|--------|
| General Biology (120:101-102) | 8 crs. |
| Foundations of Biology Lecture (120:201) | 3 crs. |
| Foundations of Biology Laboratory (120:202) | 1 cr. |

2. MAJORS MUST COMPLETE ONE COURSE FROM EACH OF THE THREE CLUSTERS LISTED BELOW.

A. ECOLOGY AND EVOLUTION All courses three credits

Evolution (120:222 or Biol 222)
Plant Ecology (120:270)
Ecology (120:280)
Ecology & Evolution of Disease (Biol 368)
Conservation Biology (Biol 375)
Animal Behavior (120:382)
Neural Basis of Behavior (Biol 383)

B. THE FUNCTIONAL ORGANISM All courses four credits

Plant Kingdom (120:211)
Biology of Seed Plants (120:230)
Plant Physiology (120:330)
General Microbiology (120:335)
Mammalian Physiology (120:340)
Developmental Biology & Lab (120:342 & 343 or Biol 342)

C. MOLECULAR AND CELLULAR MECHANISMS

All courses three credits

Genetics (120:352)
Cell Biology (120:355)
Molecular Biology (120:356)
Biochemistry (120:360 OR Chem 473)

D. COMPUTATIONAL

All courses three credits

Physiology & Medicine (Math 371)
Population Biology (Math 372)
Intro to Mathematical Biology (Math 373)
Computational Neuroscience (Math 430)

3. MAJORS ARE REQUIRED TO HAVE AT LEAST TWO ADDITIONAL LABORATORY COURSES CHOSEN FROM SECTION 2B ABOVE OR FROM THE LIST BELOW:

Laboratory Courses (4cr.)

Biology of Invertebrates (120:227)
Comparative Vertebrate Anatomy (120:285)
Taxonomy of Vascular Plants (120:311)
Animal Parasites & Lab (120:325 & 326)
Microanatomy (120:358)
Mycology (120:413)
Plant Growth & Dev. (120:430)
Marine Biology (120:481)

Laboratory Courses (3 cr.)

Ecology of Birds (120:328)
Field Studies in Plant Ecology (120:371)
Field Ecology (120:380)
Field Studies in Animal Ecology (120:381)
Ecological Field Methods (Biol 475)
Tropical Field Biology (120:486) **2cr.**

4. THE COURSES LISTED BELOW MAY BE USED TO COMPLETE 35 CREDITS OF BIOLOGY COURSE WORK.

All courses three credits unless specified

Insects and Human Society (Biol 225)
Neurobiology (120:346)
Human Ecology (120:365)
Biological Ultrastructure (120:403)
Light & Elect Microscope (120:404)
Cell Physiology & Imaging (Biol 405)
Biological Invasions (120:422)
Immunology (120:443)
Endocrinology (120:445)
Cellular and Systems Neuroscience (Biol 447)
Cellular Biophysics (120:451) **4 crs.**
Molecular Biotechnology (120:452) **4 crs.**
Molecular Cell Biology (120:455)
Ecological Physiology (120:471)
Systems Ecology (120:487)
Problems in Biol. BIOL 491-492 (6crs. max.)

5. THE FOLLOWING COGNATE COURSES ALSO ARE REQUIRED:

- General Chemistry & Laboratory
Chem 124, 125, 126 OR Chem 121, 122, 123, 124
- Organic Chemistry & Laboratory
Chem 243, 244, 244A
- Physics & Laboratory
Phys 111, 111A, 121, 121A OR
Phys 105/105A, 106/106A, 121/121A
- Calculus II and III
Math 112, 211
- Math Cognate - Choice of:
Differential Equations (Math 222)
Discrete Analysis (Math 226)
Mathematical Modeling (Math 227)
Linear Algebra (Math 337)
Applied Numerical Methods (Math 340)
- Probability and Statistics (Math 333)
- BNFO 135 & 136 Programming for Bioinformatics I & II

Placement testing determines the appropriate sequence of courses for chemistry and physics.

B.S. BIOLOGY (128 Credits)
Sample Curriculum

FIRST YEAR

| First semester | Courses | Credits | Second semester | Courses | Credits |
|-----------------------|------------------------|----------------|------------------------|----------------------|----------------|
| 120:101 | General Biology I | 4 | 120:102 | General Biology II | 4 |
| Chem 125 | General Chemistry I | 3 | Chem 124 | General Chem. Lab | 1 |
| Math 111 | Calculus I | 4 | Chem 126 | General Chemistry II | 3 |
| HUM 101 | English I | 3 | Math 112 | Calculus II | 4 |
| BNFO 135 | Bioinformatics Prog. I | 3 | Hum 102 | English II | 3 |
| Frsh Sem | Freshman Seminar | 0 | GUR Elective | Physical Education | 1 |
| | | 17 | | | 16 |

SECOND YEAR

| First semester | Courses | Credits | Second semester | Courses | Credits |
|-----------------------|-------------------------|----------------|------------------------|-----------------------|----------------|
| 120:201/202 | Foundations of Biology | 4 | Chem 244 | Organic Chemistry II | 3 |
| Chem 243 | Organic Chemistry I | 3 | Chem 244A | Organic Chemistry Lab | 2 |
| Phys 111 | Physics I | 3 | Phys 121 | Physics II | 3 |
| Phys 111A | Physics I Lab | 1 | Phys 121A | Physics II Lab | 1 |
| Math 211 | Calculus III | 3 | Cognate ¹ | Math | 3 or 4 |
| BNFO 136 | Bioinformatics Prog. II | 3 | GUR Elective | Social Sciences | 3 |
| | | 17 | GUR Elective | Physical Education | 1 |
| | | | | | 16 or 17 |

THIRD YEAR

| First semester | Courses | Credits | Second semester | Courses | Credits |
|-----------------------|---------------------------------|----------------|------------------------|---------------------------------|----------------|
| Elective | Technical Elective ² | 3 | Elective | Technical Elective ² | 3 |
| Math 333 | Probability and Statistics | 3 | GUR Elective | Management | 3 |
| GUR Elective | English and Cultural Hist. | 3 | GUR Elective | HSS Upper Level | 3 |
| GUR Elective | Social Science | 3 | Biology Elective | Biology with lab | 4 |
| Biology Elective | Biology with lab | 4 | Biology Elective | Biology | 3 |
| | | 16 | | | 16 |

FOURTH YEAR

| First semester | Courses | Credits | Second semester | Courses | Credits |
|-----------------------|------------------|----------------|------------------------|--------------------|----------------|
| GUR Elective | HSS Upper Level | 3 | GUR Elective | HSS Senior Seminar | 3 |
| Biology Elective | Biology with lab | 3 or 4 | Biology Elective | Biology | 3 |
| Biology Elective | Biology | 3 | Biology Elective | Biology | 3 |
| Elective | Free | 3 | Elective | Free | 3 |
| Elective | Free | 3 | Elective | Free | 3 |
| | | 15 or 16 | | | 15 |

Total Minimum Credits: 128

Biology Credits: 35 (Including General Biology I, II, Foundations of Biology)

¹ Choice of Differential Equations, Math 222; Discrete Analysis, Math 226; Mathematical Modeling, Math 227; Linear Algebra, Math 337 or Applied Numerical Methods, Math 340.

² Technical Electives - Any course in biology chemistry, mathematics or physics beyond what is required for the major. Any course in architecture (except history), environmental science, computer science or engineering.