

# BIOLOGY, B.S. (ABINGTON)

**Begin Campus:** Any Penn State Campus

**End Campus:** Abington

## Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2022-23 academic year. To access previous years' suggested academic plans, please visit the archive (<https://bulletins.psu.edu/undergraduate/archive/>) to view the appropriate Undergraduate Bulletin edition (*Note: the archive only contains suggested academic plans beginning with the 2018-19 edition of the Undergraduate Bulletin*).

### General Biology Option: Biology, B.S. at Abington Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

Fall	Credits Spring	Credits
ENGL 15 or 30H (GWS)	3 BIOL 240W (GN)*	4
MATH 140 or 140B (GQ)**	4 MATH 141 or 141B (GQ)†	4
BIOL 110 (GN)**†	4 CHEM 112 (GN)**†	3
CHEM 110 (GN)**†	3 CHEM 113 (GN)	1
CHEM 111 (GN)**†	1 General Education Course	3
	General Education Health and Wellness	1.5
	<b>15</b>	<b>16.5</b>

#### Second Year

Fall	Credits Spring	Credits
BIOL 230W (GN)*	4 STAT 200 or 250 (GQ)	3-4
BIOL 220W (GN)*	4 CHEM 212	3
CHEM 210	3 CHEM 213	2
General Education Course	3 General Education Course	3
Elective	3 General Education Course	3
	Elective	3
	<b>17</b>	<b>17-18</b>

#### Third Year

Fall	Credits Spring	Credits
BIOL 400-Level Group I Course	3 BIOL 400-Level Group II Course	3
PHYS 250 (GN)	4 PHYS 251 (GN)	4
CAS 100A or 100B (GWS)	3 General Education Health and Wellness	1.5
General Education Course	3 ENGL 202C (GWS)	3
Elective	3 Elective	3
	<b>16</b>	<b>14.5</b>

#### Fourth Year

Fall	Credits Spring	Credits
BIOL 400-Level Group III Course	3 BIOL 400-Level Group V Course	3
BIOL 400-Level Group IV Course	3 BIOL 400-Level Group VI Course	3
General Education Course	3 Elective	3
Elective	3 Elective	3
Elective	3 Elective	3
	<b>15</b>	<b>15</b>

#### Total Credits 126-127

\* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

#### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

#### Course Lists

##### GROUP I - PLANTS AND FUNGI

BIOL 406 Symbiosis (3 cr.)  
 BIOL 441 Plant Physiology (3 cr.)  
 BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)  
 BIOL 482 Coastal Biology (3 cr.)

##### GROUP II - EVOLUTIONARY BIOLOGY

BIOL 406 Symbiosis (3 cr.)  
 BIOL 427 Evolution (3 cr.)  
 BIOL 429 Animal Behavior (3 cr.)  
 BIOL 433 Evolution of Vertebrates (3 cr.)  
 BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)  
 BIOL 460 Human Genetics (3 cr.)

##### GROUP III - GENETICS

BIOL 416 Biology of Cancer (3 cr.)  
 BIOL 422 Advanced Genetics (3 cr.)  
 BIOL 430 Developmental Biology (3 cr.)  
 BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)  
 BIOL 460 Human Genetics (3 cr.)  
 BMB 400 Molecular Biology of the Gene (2-3 cr.)  
 MICRB 410 Principles of Immunology (3 cr.)  
 MICRB 415 General Virology: Bacterial and Animal Viruses (3 cr.)

GROUP IV - ECOLOGY

BIOL 406 Symbiosis (3 cr.)  
BIOL 429 Animal Behavior (3 cr.)  
BIOL 436 Population Ecology and Global Climate Change (3 cr.)  
BIOL 482 Coastal Biology (3 cr.)

GROUP V - ANIMAL PHYSIOLOGY

BIOL 406 Symbiosis (3 cr.)  
BIOL 409 Biology of Aging (3 cr.)  
BIOL 416 Biology of Cancer (3 cr.)  
BIOL 430 Developmental Biology (3 cr.)  
BIOL 437 Histology (4 cr.)  
BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)  
BIOL 460 Human Genetics (3 cr.)  
BIOL 469 Neurobiology (3 cr.)  
BIOL 472 Mammalian Physiology (3 cr.)  
BIOL 479 General Endocrinology (3 cr.)

GROUP VI - PRACTICUM

BIOL 402 ( cr.)  
BIOL 437 Histology (4 cr.)  
BIOL 461 Contemporary Issues in Science and Medicine (3 cr.)  
BIOL 473 Laboratory in Mammalian Physiology (2 cr.)

**Disallowed Courses**

Students may select free elective courses from nearly the entire range of the University's offerings. However, the following courses may NOT be used to satisfy degree requirements in the Biology major, regardless of option, not even as free electives.

ASTRO 001\*\*, 010\*\*, 011\*\*, 120\*\*, 140\*\*

BIOL 011\*\*, 012\*\*

BISC 001, 002, 003\*\*, 004\*\*

BMB 001\*\*

CHEM 001, 002, 006, 101

CMPSC 001, 100, 110

ENGL 004, 005

LL ED 005, 010

MATH 001, 002, 003, 004, 017, 018, 021, 022, 026, 030, 035, 036, 040, 041, 081, 082, 083, 110, 111, 200

MICRB 106, 107, 120, 121A, 121B, 150 151A, 151C,

151D, 151E, 151F, 151W

PHYS 001, 150, 151

CAS 004, 126

STAT 100

In addition, the following types of courses may NOT be used to satisfy degree requirements in the Biology major:

- Courses which are remedial in nature or which focus on reading improvement or study skills. NOTE: Only 3 credits of CHEM 017 and only 4 credits of MATH 140A may be used to satisfy degree requirements.

- Courses which substantially duplicate the subject matter covered in other completed courses taught at a comparable level.
- No more than 6 credits of ROTC and 12 credits of Independent Study (296, 496) may be used to satisfy degree requirements. Unless special permission is granted, Independent Study credit may only be used in the "Free Electives" category.
- No more than 5 credits of KINES may be used to satisfy degree requirements.
- \*\* On rare occasions, with adequate justification, a student may be permitted to use one or more of these courses to satisfy degree requirements. A petition must be submitted to request such an exception and will be considered on a case-by-case basis.

## Genetics and Developmental Biology Option: Biology, B.S. at Abington Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

Fall	Credits Spring	Credits
ENGL 15 or 30H (GWS)	3 BIOL 240W (GN) <sup>*#</sup>	4
MATH 140 or 140B (GQ) <sup>*#</sup>	4 MATH 141 or 141B (GQ) <sup>†</sup>	4
BIOL 110 (GN) <sup>*#</sup>	4 CHEM 112 (GN) <sup>*†</sup>	3
CHEM 110 (GN) <sup>*#</sup>	3 CHEM 113 (GN)	1
CHEM 111 (GN) <sup>†</sup>	1 General Education Course	3
	General Education Health and Wellness	1.5
	<b>15</b>	<b>16.5</b>

### Second Year

Fall	Credits Spring	Credits
BIOL 230W (GN) <sup>*#</sup>	4 STAT 200 or 250 (GQ)	3-4
BIOL 220W (GN) <sup>*</sup>	4 CHEM 212	3
CHEM 210	3 CHEM 213	2
General Education Course	3 MICRB 201	3
Elective	3 MICRB 202	2
	General Education Course	3
	<b>17</b>	<b>16-17</b>

### Third Year

Fall	Credits Spring	Credits
BIOL 400-Level Group I Course	3 BIOL 430 (or BIOL 400-Level Group II Course)	3
PHYS 250 (GN)	4 PHYS 251 (GN)	4
CAS 100A or 100B (GWS)	3 General Education Health and Wellness	1.5
General Education Course	3 ENGL 202C (GWS)	3
Elective	3 BIOL 422 (or BIOL 400-Level Group I Course)	3
	<b>16</b>	<b>14.5</b>

### Fourth Year

Fall	Credits Spring	Credits
BMB 401	3 BMB 402	3
BIOL 400-Level Group III Course	3 BIOL 430 (or BIOL 400-Level Group II Course)	3
General Education Course	3 BIOL 422 (or BIOL 400-Level Group I Course)	3
Elective	3 General Education	3
Elective	3 Elective	3
	<b>15</b>	<b>15</b>

### Total Credits 125-126

\* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Course Lists

GROUP I - CHOOSE 6 CREDITS FROM THE FOLLOWING COURSES:

- BMB 400 Molecular Biology of the Gene (2-3 cr.)
- BIOL 416 Biology of Cancer (3 cr.)
- BIOL 427 Evolution (3 cr.)
- BIOL 437 Histology (4 cr.)
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
- BIOL 460 Human Genetics (3 cr.)
- BIOL 469 Neurobiology (3 cr.)
- MICRB 410 Principles of Immunology (3 cr.)

GROUP II - CHOOSE 3 CREDITS FROM THE FOLLOWING COURSES:

- BIOL 406 Symbiosis (3 cr.)
- BIOL 427 Evolution (3 cr.)
- BIOL 429 Animal Behavior (3 cr.)
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
- BIOL 460 Human Genetics (3 cr.)
- MICRB 415 General Virology: Bacterial and Animal Viruses (3 cr.)

GROUP III - CHOOSE 3 CREDITS FROM THE FOLLOWING COURSES:

- BIOL 402 ( cr.)
- BIOL 437 Histology (4 cr.)
- BIOL 473 Laboratory in Mammalian Physiology (2 cr.)
- BIOL 496 Independent Studies
- BMB 442 Laboratory in Proteins, Nucleic Acids, and Molecular Cloning (3 cr.)

### Disallowed Courses

Students may select free elective courses from nearly the entire range of the University's offerings. However, the following courses may NOT be used to satisfy degree requirements in the Biology major, regardless of option, not even as free electives.

ASTRO 001\*\*, 010\*\*, 011\*\*, 120\*\*, 140\*\*

BIOL 011\*\*, 012\*\*

BISC 001, 002, 003\*\*, 004\*\*

BMB 001\*\*

CHEM 001, 002, 006, 101

CMPSC 001, 100, 110

ENGL 004, 005

LL ED 005, 010

MATH 001, 002, 003, 004, 017, 018, 021, 022, 026, 030, 035, 036, 040, 041, 081, 082, 083, 110, 111, 200

MICRB 106, 107, 120, 121A, 121B, 150 151A, 151C,

151D, 151E, 151F, 151W

PHYS 001, 150, 151

CAS 004, 126

STAT 100

In addition, the following types of courses may NOT be used to satisfy degree requirements in the Biology major:

- Courses which are remedial in nature or which focus on reading improvement or study skills. NOTE: Only 3 credits of CHEM 017 and only 4 credits of MATH 140A may be used to satisfy degree requirements.
- Courses which substantially duplicate the subject matter covered in other completed courses taught at a comparable level.
- No more than 6 credits of ROTC and 12 credits of Independent Study (296, 496) may be used to satisfy degree requirements. Unless special permission is granted, Independent Study credit may only be used in the "Free Electives" category.
- No more than 5 credits of KINES may be used to satisfy degree requirements.
- \*\* On rare occasions, with adequate justification, a student may be permitted to use one or more of these courses to satisfy degree requirements. A petition must be submitted to request such an exception and will be considered on a case-by-case basis.

## Vertebrate Physiology Option: Biology, B.S. at Abington Campus

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### First Year

Fall	Credits Spring	Credits
ENGL 15 or 30H (GWS)	3 BIOL 240W (GN)*	4
MATH 140 or 140B (GQ)**†	4 MATH 141 or 141B (GQ)†	4
BIOL 110 (GN)**†	4 CHEM 112 (GN)**†	3
CHEM 110 (GN)**†	3 CHEM 113 (GN)	1
CHEM 111 (GN)†	1 General Education Course	3
	General Education Health and Wellness	1.5
	<b>15</b>	<b>16.5</b>

### Second Year

Fall	Credits Spring	Credits
BIOL 230W (GN)*	4 STAT 200 (GQ)	4
BIOL 220W (GN)*	4 CHEM 212	3
CHEM 210	3 CHEM 213	2
General Education Course	3 General Education Course	3
Elective	3 General Education Course	3
	Elective	3
	<b>17</b>	<b>18</b>

### Third Year

Fall	Credits Spring	Credits
BIOL 472	3 BIOL 400-Level Group I Course	3
BIOL 473	2 PHYS 251 (GN)	4
PHYS 250 (GN)	4 General Education Health and Wellness	1.5
CAS 100A or 100B (GWS)	3 ENGL 202C (GWS)	3
General Education Course	3 Elective	3
Elective	3	
	<b>18</b>	<b>14.5</b>

### Fourth Year

Fall	Credits Spring	Credits
BMB 401	3 BMB 402	3
BIOL 400-Level Group I Course	3 BIOL 400-Level Group II Course	3
General Education Course	3 General Education Course	3
Elective	3 Elective	3
Elective	3 Elective	3
	<b>15</b>	<b>15</b>

**Total Credits 129**

\* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Course Lists

GROUP I - CHOOSE 6 CREDITS FROM THE FOLLOWING COURSES:

BIOL 406 Symbiosis (3 cr.)  
 BIOL 409 Biology of Aging (3 cr.)  
 BIOL 416 Biology of Cancer (3 cr.)  
 BIOL 430 Developmental Biology (3 cr.)  
 BIOL 437 Histology (4 cr.)  
 BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)  
 BIOL 460 Human Genetics (3 cr.)  
 BIOL 469 Neurobiology (3 cr.)  
 BIOL 479 General Endocrinology (3 cr.)  
 MICRB 410 Principles of Immunology (3 cr.)

GROUP II - CHOOSE 3 CREDITS FROM THE FOLLOWING COURSES:

BIOL 406 Symbiosis (3 cr.)  
 BIOL 427 Evolution (3 cr.)  
 BIOL 429 Animal Behavior (3 cr.)  
 BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)  
 BIOL 460 Human Genetics (3 cr.)  
 MICRB 415 General Virology: Bacterial and Animal Viruses (3 cr.)

GROUP III

BIOL 473 Laboratory in Mammalian Physiology (2 cr.)

### Disallowed Courses

Students may select free elective courses from nearly the entire range of the University's offerings. However, the following courses may NOT be used to satisfy degree requirements in the Biology major, regardless of option, not even as free electives.

ASTRO 001\*\*, 010\*\*, 011\*\*, 120\*\*, 140\*\*

BIOL 011\*\*, 012\*\*

BISC 001, 002, 003\*\*, 004\*\*

BMB 001\*\*

CHEM 001, 002, 006, 101

CMPSC 001, 100, 110

ENGL 004, 005

LL ED 005, 010

MATH 001, 002, 003, 004, 017, 018, 021, 022, 026, 030, 035, 036, 040, 041, 081, 082, 083, 110, 111, 200

MICRB 106, 107, 120, 121A, 121B, 150 151A, 151C,

151D, 151E, 151F, 151W

PHYS 001, 150, 151

CAS 004, 126

STAT 100

In addition, the following types of courses may NOT be used to satisfy degree requirements in the Biology major:

- Courses which are remedial in nature or which focus on reading improvement or study skills. NOTE: Only 3 credits of CHEM 017 and only 4 credits of MATH 140A may be used to satisfy degree requirements.
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