

BIOLOGICAL SCIENCES MAJOR WITH BIOLOGY EDUCATION OPTION

Program Curriculum

Code	Title	Credits
Degree Core Requirements		
BIOL 1115	Principles of Biology Laboratory ^{1,2}	1
BIOL 1116	Principles of Biology Laboratory ^{1,2}	1
BIOL 2004	Genetics ³	3
BIOL 2134	Cell Function and Differentiation ³	3
BIOL 2704	Evolutionary Biology ³	3
BIOL 2804	Ecology ³	3
CHEM 1035	General Chemistry ^{1,2}	3
CHEM 1036	General Chemistry ^{1,2}	3
Subtotal		20
Major Requirements		
BIOL 1004	Biology Orientation Seminar ^{2,4,5}	1
CHEM 1045	General Chemistry Laboratory ²	1
CHEM 1046	General Chemistry Laboratory ²	1
CHEM 2535	Organic Chemistry ^{2,3}	3
CHEM 2536	Organic Chemistry ^{2,3}	3
CHEM 2545	Organic Chemistry Laboratory ^{2,3}	1
CHEM 2546	Organic Chemistry Laboratory ^{2,3}	1
PHYS 2205	General Physics ^{2,3}	3
PHYS 2206	General Physics ^{2,3}	3
PHYS 2215	General Physics Laboratory ^{2,3}	1
PHYS 2216	General Physics Laboratory ^{2,3}	1
Subtotal		19
Option Required Courses		
BIOL 2304	Plant Biology ³	3
BIOL 2504	General Zoology ³	3
BIOL 2604	General Microbiology ³	3
BIOL 2614	General Microbiology Laboratory ³	1-2
BMSP 2135	Human Anatomy & Physiology ³	3
GEOS 1014	Evolution of the Earth-Life System	3
Subtotal		16-17
Elective Courses		
Select at least 8 credits of Biological Sciences electives.		8
<i>a. Linked or Inclusive Laboratory Courses</i>		
Select at least two linked or inclusive laboratory courses of the following:		
BIOL 3014 & BIOL 3024	Insect Biology and Insect Biology Laboratory ³	
BIOL 3104	Cell and Molecular Biology Laboratory ³	
BIOL 3114	Field and Laboratory Ecology ³	
BIOL 3204	Plant Taxonomy ³	
BIOL 3254 & BIOL 3264	Medical and Veterinary Entomology and Medical and Veterinary Entomology Laboratory ³	

BIOL 3454	Introductory Parasitology ³
BIOL 3604	Food Microbiology ³
BIOL 4004	Freshwater Ecology ³
BIOL 4164	Environmental Microbiology ³
BIOL 4314	Plant Ecology ³
BIOL 4354	Aquatic Entomology ³
BIOL 4404	Ornithology ³
BIOL 4454	Invertebrate Zoology ³
BIOL 4484	Freshwater Biomonitoring ³
BIOL 4624 & BIOL 4644	Microbial Genetics and Microbial Molecular Genetics and Physiology Laboratory ³
BIOL 4674 & BIOL 4724	Pathogenic Bacteriology and Pathogenic Bacteriology Lab ³
BIOL 4704 & BIOL 4714	Immunology and Immunology Laboratory ³
BIOL 4824	Bioinformatics Methods ³
<i>b. Approved Biological Sciences Electives</i>	
BIOL 1064	Plants and Civilization
BIOL 1074	How Animals Think
BIOL 2404	Biotechnology in A Global Society ³
BIOL 4454	Invertebrate Zoology ³
BIOL 3014	Insect Biology ³
BIOL 3024	Insect Biology Laboratory ³
BIOL 3104	Cell and Molecular Biology Laboratory ³
BIOL 3114	Field and Laboratory Ecology ³
BIOL 3134	Human Genetics ³
BIOL 3204	Plant Taxonomy ³
BIOL 3254	Medical and Veterinary Entomology ³
BIOL 3264	Medical and Veterinary Entomology Laboratory ³
BIOL 3404	Introductory Animal Physiology ³
BIOL 3454	Introductory Parasitology ³
BIOL 3604	Food Microbiology ³
BIOL 3774	Molecular Biology ³
BIOL 3954	Study Abroad (var. credit)
BIOL 4004	Freshwater Ecology ³
BIOL 4014	Environmental Toxicology ³
BIOL 4104	Developmental Biology ³
BIOL 4114	Global Change Ecology ³
BIOL 4134	Evolutionary Genetics ³
BIOL 4164	Environmental Microbiology ³
BIOL 4314	Plant Ecology ³
BIOL 4354	Aquatic Entomology ³
BIOL 4404	Ornithology ³
BIOL 4474	Ethology ³
BIOL 4484	Freshwater Biomonitoring ³
BIOL 4554	Neurochemical Regulation ³
BIOL 4564	Infectious Disease Ecology ³
BIOL 4574	Social Behavior of Birds and Mammals ³
BIOL 4594	Ecology, Evolution, and Behavior Senior Seminar ³
BIOL 4624	Microbial Genetics ³
BIOL 4634	Microbial Physiology ³

BIOL 4644	Microbial Molecular Genetics and Physiology Laboratory ³	
BIOL 4664	Virology ³	
BIOL 4674	Pathogenic Bacteriology ³	
BIOL 4704	Immunology ³	
BIOL 4714	Immunology Laboratory ³	
BIOL 4724	Pathogenic Bacteriology Lab ³	
BIOL 4734	Inflammation Biology ³	
BIOL 4824	Bioinformatics Methods ³	
BIOL 4844	Proteomics and Biological Mass Spectrometry ³	
BIOL 4854	Cytogenetics ³	
BIOL 4864	Clinical Biology ³	
BIOL 4874	Cancer Biology ³	
BIOL 4884	Cell Biology ³	
BIOL 4974	Independent Study (var. credit) ⁴	
BIOL 4994	Undergraduate Research (var. credit) ⁴	
Subtotal		8
Free Electives		
Select 11-12 credits		11-12
Subtotal		11-12
Pathways to General Education		
<i>Pathways Concept 1 - Discourse</i>		
ENGL 1105	First-Year Writing (1F)	3
ENGL 1106	First-Year Writing (1F)	3
Select 3 credits in Pathway 1a (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G01A)		3
<i>Pathways Concept 2 - Critical Thinking in the Humanities</i>		
Select 6 credits in Pathway 2 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G02)		6
<i>Pathways Concept 3 - Reasoning in the Social Sciences</i>		
Select 6 credits in Pathway 3 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G03)		6
<i>Pathways Concept 4 - Reasoning in the Natural Sciences</i>		
BIOL 1105	Principles of Biology ^{1,2}	3
BIOL 1106	Principles of Biology ^{1,2}	3
<i>Pathways Concept 5 - Quantitative and Computational Thinking</i>		
MATH 1025	Elementary Calculus (5F) ²	3
MATH 1026	Elementary Calculus (5F) ²	3
STAT 3615	Biological Statistics (5A) ³	3
<i>Pathways Concept 6 - Critique and Practice in Design and the Arts</i>		
Select 6 credits = 3 design + 3 arts, or 6 integrated design/arts		6
<i>Pathways Concept 7 - Critical Analysis of Identity and Equity in the United States</i>		
Select 3 credits in Pathway 7 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G07)		3
Subtotal		45
Total Credits		119-121

¹ Students must earn a grade of "C" or better in BIOL 1105 Principles of Biology, BIOL 1106 Principles of Biology, BIOL 1115 Principles of Biology Laboratory, BIOL 1116 Principles of Biology Laboratory, CHEM 1035 General Chemistry, CHEM 1036 General Chemistry, or the equivalent. Only two attempts, including course withdrawals with grade of "W", are allowed for each course.

² Courses have acceptable substitutions.

³ Some courses listed on this checksheet may have prerequisites, please consult the University Course Catalog, or check with your advisor.

⁴ A combined maximum of 4 credits of BIOL 4974 Independent Study and/or BIOL 4994 Undergraduate Research taken as A-F can be used toward Biological Sciences elective credit.

⁵ BIOL 1004 Biology Orientation Seminar is required but will not count as major elective credit or be used to calculate in-major GPA.

Degree Core Requirements: 20 Credits

Biological Science Major Requirements: 19 Credits

Biological Science Option Requirements: 16-17 Credits

Biological Science Option Electives: 8 Credits

Total Pathways to General Education Requirements: 45 Credits

Total Free Electives: 11-12 Credits

Total Credits Required for Graduation: 120 Credits

Notes:

Students must have an in-major and overall GPA of 2.0 to graduate.

All BIOL courses (except BIOL 1004 Biology Orientation Seminar), any course taken to fulfill Biomedical Option elective credit, and all required CHEM, MATH, PHYS and STAT courses will be used to calculate in-major GPA.

Acceptable Substitutions

Required Course: Acceptable Substitution(s)

- BIOL 1004 Biology Orientation Seminar: Any approved First-Year Experience (FYE) course
- BIOL 1105 Principles of Biology, BIOL 1115 Principles of Biology Laboratory: BIOL 1205H Honors Biology
- BIOL 1106 Principles of Biology, BIOL 1116 Principles of Biology Laboratory: BIOL 1206H Honors Biology
- BIOL 2604 General Microbiology: BIOL 2604H
- BIOL 2704 Evolutionary Biology: BIOL 2704H Evolutionary Biology
- BIOL 2804 Ecology: BIOL 2804H Honors Ecology
- BIOL 4994 Undergraduate Research: BIOL 2994 Undergraduate Research
- CHEM 1035 General Chemistry-CHEM 1036 General Chemistry: CHEM 1055 General Chemistry for Chemistry Majors -CHEM 1056 General Chemistry for Chemistry Majors
- CHEM 1045 General Chemistry Laboratory-CHEM 1046 General Chemistry Laboratory: CHEM 1065 General Chemistry for Chemistry Majors Lab-CHEM 1066 General Chemistry for Chemistry Majors Lab
- CHEM 2535 Organic Chemistry-CHEM 2536 Organic Chemistry: CHEM 2565 Principles of Organic Chemistry-CHEM 2566 Principles of Organic Chemistry
- CHEM 2545 Organic Chemistry Laboratory-CHEM 2546 Organic Chemistry Laboratory: CHEM 2555 Organic Synthesis and Techniques Lab-CHEM 2556 Organic Synthesis and Techniques Lab
- PHYS 2205 General Physics, PHYS 2215 General Physics Laboratory: PHYS 2305 Foundations of Physics
- PHYS 2206 General Physics, PHYS 2216 General Physics Laboratory: PHYS 2306 Foundations of Physics
- MATH 1025 Elementary Calculus: MATH 1225 Calculus of a Single Variable

- MATH 1026 Elementary Calculus: MATH 1226 Calculus of a Single Variable

complete six semester hours of a single foreign, classical, or sign language at the college level. Courses taken to meet this requirement do not count toward the hours required for graduation. Please consult the Undergraduate Catalog for details.

Cross-listed Courses on this Checksheet

- BIOL 2304 Plant Biology/HORT 2304 Plant Biology
- ALS 2404 Biotechnology in A Global Society/BIOL 2404 Biotechnology in A Global Society
- ENT 3014 Insect Biology/BIOL 3014 Insect Biology
- ENT 3024 Insect Biology Laboratory/BIOL 3024 Insect Biology Laboratory
- ENT 3254 Medical and Veterinary Entomology/BIOL 3254 Medical and Veterinary Entomology
- ENT 3264 Medical and Veterinary Entomology Laboratory/BIOL 3264 Medical and Veterinary Entomology Laboratory
- FST 3604 Food Microbiology/BIOL 3604 Food Microbiology
- CSES 4164 /ENSC 4164 Environmental Microbiology/BIOL 4164 Environmental Microbiology
- ENT 4354 Aquatic Entomology/BIOL 4354 Aquatic Entomology
- ENT 4484 Freshwater Biomonitoring/FIW 4484 Freshwater Biomonitoring/BIOL 4484 Freshwater Biomonitoring
- ALS 4554 Neurochemical Regulation/BIOL 4554 Neurochemical Regulation
- ALS 4574 Social Behavior of Birds and Mammals/BIOL 4574 Social Behavior of Birds and Mammals

Satisfactory Progress Toward Degree

1. Students must earn a grade of "C" or better in BIOL 1105 Principles of Biology, BIOL 1106 Principles of Biology, BIOL 1115 Principles of Biology Laboratory, BIOL 1116 Principles of Biology Laboratory, CHEM 1035 General Chemistry, CHEM 1036 General Chemistry or equivalent upon attempting 45 credit hours (including transfer credit, advance placement or IB credit, advance standing credit, credit by examination, courses taken P/F, and courses completed with a grade of "W"). Only two attempts are allowed for each course.
2. Students must achieve an overall GPA of 2.0 and in-major GPA of 2.2 upon attempting 45 credit hours (including transfer credit, advanced placement or IB credit, advance standing credit, credit by examination, courses taken P/F, and courses completed with a grade of "W").
3. All BIOL courses (except BIOL 1004 Biology Orientation Seminar), any course taken to fulfill Biological Sciences elective credit, and all required CHEM, MATH, PHYS, and STAT courses will be used to calculate in-major GPA.
4. The following courses must be completed by the time the student has attempted 72 hours.
 - BIOL 1105 Principles of Biology, BIOL 1106 Principles of Biology, BIOL 1115 Principles of Biology Laboratory, BIOL 1116 Principles of Biology Laboratory or equivalent
 - CHEM 1035 General Chemistry, CHEM 1036 General Chemistry, CHEM 1045 General Chemistry Laboratory, CHEM 1046 General Chemistry Laboratory or equivalent
 - MATH 1025 Elementary Calculus, MATH 1026 Elementary Calculus or equivalent

College of Science Foreign Language Requirement

Students who did not successfully complete at least two years of a single foreign, classical, or sign language during high school must successfully