BIOLOGY MAJOR

Department of Biology (https://catalog.washcoll.edu/catalog/departments-programs/biology/)
Division of Natural Sciences and Mathematics

Overview of the Biology major:

A strong knowledge base is essential for a biologist, but it does not alone make the scientist. Therefore, the Biology major seeks to guide students to develop the skills to ensure that, for them, biology is an inquiry-based discipline. Through ample opportunities for practice, students learn to:

- read, understand, and analyze biological literature;
- design, perform, and analyze experiments to ask questions and test hypotheses; use up-to-date techniques and equipment common in the discipline; communicate their questions and findings both orally and in writing; and
- work collaboratively on experimentation with fellow students and faculty who share a love of inquiry.

Biology Major Requirements

Code	Title	Credits	Notes
Take 4 Foundational Biology Courses		**16**	_____
BIO 111 & BIO 113	General Biology I with Lab and General Biology I Lab		_____
BIO 112 & BIO 114	General Biology II with Lab and General Biology II Lab		_____
BIO 205	Cell & Molecular Biology with Lab		_____
BIO 206	Ecology with Lab		_____
Select 5 Advanced Biology Courses In At Least 3 categories. (See the "Categories of Study" list below for options)		**20**	_____
Complete courses in at least three categories: Ecology (Category I), Cellular Biology (Category II), and Organismal Biology (Category III).			_____
BIO Elective Category II [1]			_____
BIO Elective Category III			_____
BIO Elective Category I , II, III, IV [2]			_____
BIO Elective Two courses from either Category I, II, or III [2]			_____
Take 6 Ancillary Courses; see note on Recommended Ancillary Courses		**20**	_____
CHE 120	Chem Principles Org Molecules with Lab		_____
CHE 140	Reactions of Organic Molecules with Lab		_____
CHE 220	Quantitative Chemical Analysis with Lab		_____
CHE 240	Chemistry of the Elements with Lab		_____
MAT 111	Differential Calculus		_____
or MAT 106 & MAT 107	Stretch Differential Calculus I and Stretch Differential Calculus II		_____
BIO 392	Biology Junior Seminar (0 credits)		_____
Senior Capstone Experience (BIO SCE)		**2-4**	_____
Total Credits		**58-60**	_____

1 Not BIO 205 Cell & Molecular Biology with Lab.
2 Not BIO 205 Cell & Molecular Biology with Lab or BIO 206 Ecology with Lab.

Code	Title	Credits	Notes
Recommended Ancillary Courses (not required for graduation, but many medical and graduate schools require)			_____
PHY 101 & PHY 102	College Physics I with Lab and College Physics II with Lab		_____

or PHY 111 & PHY 112	General Physics I with Lab and General Physics II with Lab		_____
MAT 109	Statistical Inference & Data Analysis I		_____

Category I. Ecology

Code	Title	Credits	Notes
BIO 206	Ecology with Lab [EE]	4	_____
BIO 309	Marine & Estuarine Bio with Lab [EE]	4	_____
BIO 328	Behavioral Ecology with Lab [EE]	4	_____
BIO 351	Evolution with Lab [EE]	4	_____
ENV 302	Conservation & Wildlife Techniques [EE, 1]	4	_____
BIO 294	Special Topics	4	_____
BIO 394	Special Topics	4	_____
BIO 494	Special Topics	4	_____

[1] Note: only one ENV course may count toward Biology major.

Category II. Cellular Biology

Code	Title	Credits	Notes
BIO 202	Stem Cell Biology with Lab	4	_____
BIO 203	Microbiology with Lab [BMI, PO]	4	_____
BIO 205	Cell & Molecular Biology with Lab [BMI]	4	_____
BIO 209	Genetics with Lab [BMI]	4	_____
BIO 302	Developmental Biology with Lab [BMI]	4	_____
BIO 314	Biotechnology & Molecular Bio with Lab [BMI]	4	_____
BIO 404	Immunology with Lab [BMI, PO]	4	_____
BIO 409	Biochemistry with Lab [BMI]	4	_____
BIO 294	Special Topics	4	_____
BIO 394	Special Topics	4	_____
BIO 494	Special Topics	4	_____

Category III. Organismal Biology

Code	Title	Credits	Notes
BIO 208	General Zoology with Lab [PO]	4	_____
BIO 211	Plant Biology & Diversity with Lab [EE, PO]	4	_____
BIO 228	Ornithology with Lab [PO]	4	_____
BIO 301	Integrative Human Anatomy with Lab [PO]	4	_____
BIO 311	Neurobiology with Lab [PO]	4	_____
BIO 315	Ecophysiology with Lab [EE, PO]	4	_____
BIO 336	Fish Physiology and Behavior with Lab [PO]	4	_____
BIO 350	Introduction to Toxicology with Lab [BMI]	4	_____
BIO 424	Integrative Human Physiology with Lab [PO]	4	_____
BIO 294	Special Topics	4	_____
BIO 394	Special Topics	4	_____
BIO 494	Special Topics	4	_____

Category IV. Seminars

BIO X94 Special Topics in Biology (lab-bearing or non-lab bearing courses)

Category V. Research/Independent Study/Internship/Field Course

Code	Title	Credits	Notes
BIO 213	Tropical Ecology	4	_____
BIO 221	The Bermuda Environment	4	_____
BIO 294	Special Topics [EE]	4	_____
BIO 290	Biology Internship	4	_____
BIO 390	Biology Internship	4	_____
BIO 490	Biology Internship	4	_____
BIO 295	On Campus Research	4	_____
BIO 395	On-Campus Guided Research	4	_____
BIO 495	On-Campus Guided Research	4	_____
BIO 296	Off-Campus Research	4	_____
BIO 396	Off-Campus Research	4	_____
BIO 496	Off-Campus Research	4	_____
BIO 397	Independent Study	4	_____
BIO 497	Independent Study	4	_____

- BIO 100 Current Topics in Biology with Lab is a distribution course, and does not count toward the major or minor in biology.
- BIO 111 General Biology I with Lab and BIO 112 General Biology II with Lab count for distribution, and along with all upper-level courses (200-level and above) count toward the major and minor in biology.
- Introductory courses and many upper-level courses are offered annually, while other courses are offered on an alternate year basis. For planning purposes, information about the semester/year in which a course is to be offered is available on the departmental web page.

Students who successfully complete the Biology major typically have grades of C- or better in both semesters of General B Differential Calculus (MAT 111 Differential Calculus).

Biology (BIO 111 General Biology I with Lab, BIO 112 General Biology II with Lab). Students with grades below a C- in these classes and plan to major in Biology are encouraged to repeat General Biology before enrolling in upper-level biology courses. All upper-level courses for the major must be taken at Washington College or in Washington College- approved programs although exceptions may be made by the department chair for transfer students.

BIO 205 Cell & Molecular Biology with Lab must be taken within the subsequent two semesters after having completed the BIO 111 General Biology I with Lab, BIO 112 General Biology II with Lab sequence and their associated labs (BIO 113 General Biology I Lab, BIO 114 General Biology II Lab). One 200-level course must be completed before taking a 300- or a 400-level course.

Double majors in Biology and Environmental Science

Students who double major in Biology and Environmental Science can double count a maximum of 4 courses (3 Required Courses: BIO 111 General Biology I with Lab, BIO 112 General Biology II with Lab, BIO 206 Ecology with Lab or ENV 242 Applied Ecology and 1 upper-level elective) towards their double major.

Areas of Emphasis (AOE)

Students earning a B.S. in Biology may choose an Area of Emphasis providing more in-depth coursework in one of three areas listed below. Emphases are entered on transcripts.

1. Biochemistry, Molecular Biology, & Infectious Disease,
2. Ecology & Evolution or
3. Physiology & Organismal Biology.

To successfully complete one of three optional areas of emphasis, students must fulfill the requirements for the B.S. in Biology, design their Senior Capstone Experience with a focus on that particular AOE, and complete *three* of the courses within this area of emphasis as indicated in the superscripted list below ([BMI] = Biochemistry, Molecular Biology, & Infectious Disease; [EE] = Ecology & Evolution; [PO] = Physiology & Organismal Biology)

Advanced Placement and International Baccalaureate Credit

Students who earn a 4 on the biology AP exam can opt out of BIO 112 General Biology II with Lab but must take BIO 111 General Biology I with Lab. Students who earn a 5 on the biology AP exam can opt out of both BIO 111 General Biology I with Lab and BIO 112 General Biology II with Lab. Students who earn a 5 on the biology HL exam can opt out of BIO 112 General Biology II with Lab; but must take BIO 111 General Biology I with Lab.

Students who earn a 6,7 on the biology HL exam can opt out of both BIO 111 General Biology I with Lab and BIO 112 General Biology II with Lab. However, in either case, if the student plans to major in Biology the department strongly recommends taking both courses, or at the very least, BIO 111 General Biology I with Lab. In addition, BIO 112 General Biology II with Lab is a W2 (writing intensive) course and if students do not fulfill their W2 requirement by completing BIO 112 General Biology II with Lab, they will need to take another W2 course.

Writing In the Discipline

The Biology Department emphasizes the importance of effective writing in the discipline in the design of the curriculum for the biology major. Writing appropriate to the field of biology is a key component of all majors-level courses, from the introductory General Biology sequence (BIO 111 General Biology I with Lab, BIO 112 General Biology II with Lab) through the upper-level biology courses and the Senior Capstone Experience. Some introductory and upper-level courses are designed as W2 and W3, but all courses in the major emphasize the development of writing skills. Through a combination of required and elective courses, students learn how to maintain laboratory notebooks; write abstracts, lab reports and research papers; and prepare poster presentations and the written backdrop to oral presentations.

Transfer Credit

Biology majors cannot take biology courses that will be applied to the major off campus. The only exception being biology courses offered at Washington College sanctioned full-semester, study abroad program. These courses must be reviewed and pre-approved by the chair of the Biology Department. Other courses required for the Biology major (calculus and chemistry) can be taken off campus only if pre-approved by the chairs of the requisite department.

Suggested Schedule for Biology majors

First Year

Fall	Credits	Spring	Credits
BIO 111 & BIO 113	4	BIO 112 & BIO 114	4
CHE 120 & CHE 122	4	CHE 140 & CHE 142	4
FYS 101	4	General Education Course	4
General Education Course	4	Elective Course	4
	16		**16**

Second Year

Fall	Credits	Spring	Credits
BIO 206	4	BIO 205	4
CHE 220 & CHE 222	4	CHE 240/242	4
MAT 111/106[1]	4	MAT 107[1]	4
General Education Course	4	General Education Course	4
	16		**16**

Third Year

Fall	Credits	Spring	Credits
BIO Category II course	4	BIO Category III course	4
BIO Category I, II, II, IV course	4	BIO 392	0
BIO 392	0	General Education Course	4
General Education Course	4	Elective course	4
Elective Course	4	Elective course	4
	16		**16**

Fourth Year

Fall	Credits	Spring	Credits
BIO Category I, II or III course	4	BIO Category I, II or III course	4
BUS SCE	2-4	BIO SCE	2-4
General Education Course	4	General Education Course	4
Elective Course	4	Elective course	
		Elective Course	4
	14-16		**14-16**

Total Credits 124-128

1 Take either MAT 111 OR MAT 106 & 107

Major

- Biochemistry and Molecular Biology Major (https://catalog.washcoll.edu/catalog/interdisciplinary/biochemistry-molecular-biology-major/)
- Biology Major (p. 1)

- Chemistry ACS-certified Major (https://catalog.washcoll.edu/catalog/departments-programs/chemistry/chemistry-acs-certified-major/)
- Chemistry Non-ACS certified Major (https://catalog.washcoll.edu/catalog/departments-programs/chemistry/chemistry-non-acs-certified-major/)
- Environmental Science Major (BS) (https://catalog.washcoll.edu/catalog/departments-programs/environmental-science-studies/environmental-science-bs/)
- Environmental Studies Major (BA) (https://catalog.washcoll.edu/catalog/departments-programs/environmental-science-studies/environmental-studies-ba/)
- Neuroscience Major (https://catalog.washcoll.edu/catalog/interdisciplinary/neuroscience-major/)
- Psychology (Experimental) Major (https://catalog.washcoll.edu/catalog/departments-programs/psychology/experimental-psychology-major/)
- Psychology Major, Behavioral Neuroscience Concentration (https://catalog.washcoll.edu/catalog/departments-programs/psychology/psychology-behavioral-neuroscience-concentration-major/)
- Psychology Major, Clinical/Counseling Concentration (https://catalog.washcoll.edu/catalog/departments-programs/psychology/psychology-clinical-counseling-concentration-major/)

Minor

- Biology Minor (https://catalog.washcoll.edu/catalog/departments-programs/biology/biology-minor/)
- Chemistry Minor (https://catalog.washcoll.edu/catalog/departments-programs/chemistry/chemistry-minor/)
- Environmental Studies Minor (https://catalog.washcoll.edu/catalog/departments-programs/environmental-science-studies/environmental-science-studies-minor/)
- Psychology Minor (https://catalog.washcoll.edu/catalog/departments-programs/psychology/psychology-minor/)

Certificate

- Secondary Education Certification Program (https://catalog.washcoll.edu/catalog/departments-programs/education/secondary-education-certification-program/)