CELL AND MOLECULAR BIOLOGY (BS)

Exploration and Discovery

The BS in Cell and Molecular Biology prepares students for graduate studies or work in biomedical fields. Laboratory experiences include opportunities for students to conduct original research working closely with a faculty mentor. This degree is also appropriate for professional schools including medical, dental, and veterinary schools. Note that some professional/graduate schools require a full year of physics. Students should work closely with their academic advisor to plan their coursework.

Degree Requirements

Course	Title	Credits
Major Requirements		
BI 1110	Biological Science I (TECO)	4
BI 1120	Biological Science II	4
BI 2270	Integrative Biology (WECO)	4
BI 3040	Microbiology	4
BI 3060	Genetics	4
BI 3130	Evolution	4
BI 3240	Conservation (DICO,GACO) (Remove INCO/INCP)	3
BI 4120	Cell Biology	4
BI 4188	Molecular Biology	4
BI 4980	Biology Seminar	2
CH 1050	Laboratory Safety	1
CH 2335	General Chemistry I (QRCO)	4
CH 2340	General Chemistry II	4
CH 3370	Organic Chemistry I	4
CH 3380	Organic Chemistry II	4
2000 Level BI Electives		
Complete 4 credits of 2000-level or above (cannot be BIDI)		4
Upper Level Cell and Molecular Biology Electives		
Complete two courses from the following: [1]		8
BI 3035	Biochemistry I (INCO)	
or CH 3030	Biochemistry I	
BI 4150	Developmental Biology (WRCO)	
BI 4770	Animal Physiology (WRCO)	
BI 4780	Neurobiology (WRCO)	
BI 4950	Undergraduate Research	
Physics		
PH 2110	College Physics I	4
or PH 2510	University Physics I	
Mathematics Foundations		
MA 1800	College Algebra (or equivalent Math Placement Score) [2]	0-3
MA 2550	Calculus I (QRCO)	3-4
or MA 2300	Statistics I (QRCO)	
General Education (https://coursecatalog.plymouth.edu/general-education/)		
EN 1400	Composition	4
IS 1115	Tackling a Wicked Problem	4
CTDI (https://coursecatalog.plymouth.edu/general-education/#CTDI)	Creative Thought Direction	3-4
PPDI (https://coursecatalog.plymouth.edu/general-education/#PPDI)	Past and Present Direction	3-4
SSDI (https://coursecatalog.plymouth.edu/general-education/#SSDI)	Self and Society Direction	3-4
Directions (choose from CTDI, PPDI, SSDI) (https://coursecatalog.plymouth.edu/general-education/) [3]		4-8
INCP (https://coursecatalog.plymouth.edu/general-education/#INCP)		4
Electives		15-19
Total Credits		**120**

1. One course must be a Writing in the Discipline Connection (WRCO) (Developmental Biology (BI 4150), Animal Physiology (BI 4770), or Neurobiology (BI 4780))
2. Math Placement Score can substitute such that only Calculus I or Statistics is required.
3. Directions should total 16 credits because SIDI is waived for BS Cell and Molecular Biology.

Recommended Course Sequence

Check all course descriptions for prerequisites before planning course schedule. Course sequence is suggested but not required.

To complete the bachelor's degree in 4 years, you must successfully complete a minimum of 15 credits each semester or have a plan to make up credits over the course of the 4 years. For example, if you take 14 credits one semester, you need to take 16 credits in another semester. Credits completed must count toward your program requirements (major, option, minor, certificate, general education or free electives).

Course	Title	Credits
Year One		
BI 1110	Biological Science I (TECO)	4
BI 1120	Biological Science II	4
EN 1400	Composition	4
IS 1115	Tackling a Wicked Problem	4
Mathematics Foundations Course:		
MA 1800	College Algebra	0-3
MA 2550	Calculus I (QRCO)	4
or MA 2300	or Statistics I (QRCO)	
Directions (choose from CTDI, PPDI, SSDI) (https://coursecatalog.plymouth.edu/general-education/) [2]		3-4
Elective		4
	Credits	**27-31**
Year Two		
BI 2270	Integrative Biology (WECO)	4
CH 2335	General Chemistry I (QRCO)	4

CH 2340	General Chemistry II	4
Physics Requirement:		
PH 2110 or PH 2510	College Physics I or University Physics I	
Complete 4 credits of 2000-level or above (cannot be BIDI)		4
Directions (choose from CTDI, PPDI, SSDI) (https://coursecatalog.plymouth.edu/general-education/) [2]		6-8
Electives		3
	Credits	**25-27**
Year Three		
BI 3040	Microbiology	4
BI 3060	Genetics	4
BI 3240	Conservation (DICO,GACO)	3
CH 3370	Organic Chemistry I	4
CH 3380	Organic Chemistry II	4
BI Upper Level 3000/4000 Biology elective [3]		4
Directions (choose from CTDI, PPDI, SSDI) 4-8 (https://coursecatalog.plymouth.edu/general-education/)		3-4
Electives		3-4
	Credits	**29-31**
Year Four		
BI 3130	Evolution	4
BI 4120	Cell Biology	4
BI 4188	Molecular Biology	4
BI 4980	Biology Seminar	2
BI Upper Level 3000/4000 Biology elective (WRCO) [3]		4
INCP (https://coursecatalog.plymou general-education/#INCP)	Integrated Capstone	4
Directions (choose from CTDI, PPDI, SSDI) 4-8 (https://coursecatalog.plymouth.edu/general-education/)		0-4
Electives		4-9
	Credits	**26-35**
	Total Credits	**120**

1 Math Placement Score can substitute such that only Precalculus or Statistics is required.

2 Required to take one each of CTDI, SSDI, and PPDI and then fulfill 16 credits total of Directions courses. SIDI courses are waived and do not count toward Directions course total for Biology majors.

3 Pick from BI 3030 (https://coursecatalog.plymouth.edu/search/?P=BI%203030)/CH 3030 (https://coursecatalog.plymouth.edu/search/?P=CH%203030)/ BI 3035/CH 3035 Biochemistry I, BI 4150 (https://coursecatalog.plymouth.edu/search/?P=BI%204150) Developmental Biology (WRCO), BI 4770 (https://coursecatalog.plymouth.edu/search/?P=BI%204770) Animal Physiology (WRCO), BI 4780 (https://coursecatalog.plymouth.edu/search/?P=BI%204780) Neurobiology (WRCO), BI 4950 (https://coursecatalog.plymouth.edu/search/?P=BI%204950) Undergraduate Research. One course taken must be a WRCO.

Learning Outcomes

- An understanding of the scientific method as the means to increase understanding of the natural world through hypothesis-testing.
- An aptitude for critically reading scientific literature, including primary research journals.
- Proficiency in writing, especially in scientific format.
- An ability to present scientific information orally with emphasis on clear interpretation of scientific data.
- Proficiency in techniques specific to a subdiscipline of biology, including but not limited to laboratory, field, and statistical techniques.
- An understanding of the critical issues facing the environment at local, regional, national, and global scales.
- Biological literacy allowing for the evaluation of new information and emerging issues.
- Readiness for post-graduate experiences in graduate school, professional school, or biology employment.

Career Pathways

Biologists study living organisms and their relationships to the environment from molecules, to cells, to ecosystems. Most specialize in a particular discipline within biology, sometimes by pursuing a specialized degree like Environmental Biology or Cell and Molecular Biology. Some go on to attain further education in graduate school or a health professional school for medicine, public health, or pharmacy. There are as many job opportunities as areas of study.

For more information, visit Career Services in the Global Education Office.

Sample Job Titles include: Biochemist, Botanist, Ecologist, Fishery Biologist, High School Science Teacher, Marine Biologist, Microbiologist, Zoologist, Veterinarian, Medical doctor, Physician Assistant, Nurse Practitioner, Doctor of Osteopathic Medicine, Research Scientist, Wildlife Biologist, Pharmacist, Dentist, Medical scientist, Virologist

See the U.S. Department of Labor Outlook for a complete list.

Useful Skills for Jobs in the Biology Fields:

- Research skills such as data collection, laboratory techniques, and working in teams
- Ability to problem-solve and think critically
- Written and verbal communication skills to convey technical and scientific data to both scientific and non-scientific communities