

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 |

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|--|-------------------------------|------------|
| 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, SIDI, SSDI) (https://coursecatalog.plymouth.edu/general-education/) ³ | | 4-7 |
| IS 4220 | Signature Project (INCO,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 must total a minimum of 16 credits.

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, PPD, 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, PPD, 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.plymouth.edu/general-education/#INCP) | Integrated Capstone | 4 |
| Directions (choose from CTDI, PPD, 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 PPD 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.

- 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

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.