



Molecular Biology Major

www.Biology.Pitt.edu

Revised: 06/2026

Molecular biology emphasizes the study of molecules that make up an organism and the forces operating among these molecules. Increasingly, molecular biologists can explore the genetic control of these molecules and thus define the developmental, cellular, and sub-cellular changes that occur during the dynamic processes of life. Virtually every question, whether in biochemistry, cell biology, developmental biology, or some other biological discipline, applies molecular biology, often as the prime approach, in its solution.

Molecular developments have revolutionized biological research, fueling the explosive growth in the biotechnology industry and the rapid increase of molecular medicine. The degree incorporates the requirements expected for admission to medical, dental, and other health professional schools and to graduate schools in cell and molecular biology, and related disciplines. Positions for molecular biologists at the BS, MS and PhD levels are available in the biotechnology industries as well as in universities, medical schools, hospitals, government laboratories, research institutes, and public health institutions.

Required Courses for the Molecular Biology major

Biological Sciences Required Courses

BIO SC 0150 Foundations of Biology 1
BIO SC 0157 Foundations of Biology Research Labs 1&2
BIO SC 0160 Foundations of Biology 2
BIO SC 0267 Intermediate Biology Research Lab
BIO SC 0350 Genetics
BIO SC 1000 Biochemistry*
BIO SC 1275 Genomics
BIO SC 1940 Molecular Biology
BIO SC 1943 Molecular Biology Lab for Molecular Biology Majors
BIO SC 1945 Adv. Molecular Biology

*Note: Students may alternatively choose both BIO SC 1810 (Macromolecular Structure and Function) and 1820 (Metabolic Pathways) in lieu of BIO SC 1000. In this case, BIO SC 1820 will count as an upper-level elective course.

Writing-Intensive (W) and Seminar Courses

BIO SC 1562 Molecular Biology Seminar

Choose of the following writing-intensive (W) courses:

BIO SC 1563 Molecular Biology Seminar Writing Practicum
BIO SC 1564 Molecular Biology Writing Practicum
BIO SC 1951 Molecular Biology Lab Writing Practicum

Molecular Biology Elective courses; 8 credits

Students must complete at least eight credits in elective courses by choosing two lecture courses and one lab course from the following lists.

Lecture courses

BIO SC 1120 Biostatistics
BIO SC 1130 Evolution

BIO SC 1250 Human Physiology or
NROSCI 1250 Human Physiology

BIO SC 1280 Microbial Genetics
BIO SC 1455 Human Endocrinology
BIO SC 1470 Biophysical Chemistry
BIO SC 1500 Cell Biology
BIO SC 1515 Cancer Biology
BIO SC 1520 Developmental Biology
BIO SC 1540 Computational Biology
BIO SC 1542 Computational Genomics
BIO SC 1730 Virology
BIO SC 1760 Immunology
BIO SC 1820 Metabolic Pathways and Regulation (with 1810)*
BIO SC 1850 Microbiology
BIO SC 1865 Microbial Physiology
CHEM 1830 Synthetic Biology

*Note: This course must be taken in conjunction with BIO SC 1810; the pair of courses are taken in lieu of BIO SC 1000

Lab courses

BIO SC 0353 Genetics Lab
BIO SC 0359 Genomics Lab
BIO SC 1003 Biochemistry Lab
BIO SC 1503 Cell Biology Laboratory
BIO SC 1523 Developmental Bio Lab
BIO SC 1853 Microbiology Laboratory
BIO SC 1857 Microbial Genetics Lab
BIO SC 1859 Virology Lab

Co-requisite courses

CHEM 0110 General Chemistry 1
CHEM 0120 General Chemistry 2
CHEM 0310 Organic Chemistry 1

or CHEM 0350 Principles of Organic Chemistry*
MATH 0220 Analytic Geometry and Calculus 1
STAT 1000 Applied Statistical Methods

*Note: Students planning to apply to medical, dental, optometry, or some veterinary schools or other pre-professional health programs, or who intend to pursue graduate study in certain scientific disciplines, should complete the two-semester organic chemistry lecture and laboratory sequence CHEM 0310/ 0320/ 0345 (8 credits). Students who need or want to take only one semester of organic chemistry should enroll in CHEM 0350.

STEM Co-requisite Lecture and Lab

Choose one STEM co-requisite lecture course (minimum 3 credits) and lab course (minimum 1 credit) from the following options:

CHEM 0250 Introduction to Analytical Chemistry **and**

CHEM 0260 Introduction to Analytical Chemistry Lab

CHEM 0320 Organic Chemistry 2 **and**

CHEM 0345 Organic Lab

CMPINF 0401 Intermediate Programming*

CS 0011 Introduction to Computing for Scientists*

PHYS 0110 Introduction to Physics 1 **and**

PHYS 0111 Introduction to Physics 2 **and**

PHYS 0219 Basic Laboratory Physics Science and Engineering

PHYS 0174 Basic Physics, Science & Engineering 1 (Integrated) **and**

PHYS 0175 Basic Physics, Science & Engineering 2 (Integrated) **and**

PHYS 0219 Basic Laboratory Physics Science & Engineering

Or choose:

CHEM 0330 Organic Chemistry Lab

and any other previously listed STEM co-requisite lecture course or any of the following stand-alone lecture courses:

MATH 0230 Analytic Geometry and Calculus 2

MATH 0280 Intro to Matrices and Linear Algebra

STAT 1201 Applied Nonparametric Statistics

STAT 1211 Applied Categorical Data Analysis

STAT 1221 Applied Regression

STAT 1231 Applied Sampling

STAT 1261 Principles of Data Science

STAT 1281 Data Science with Python

STAT 1301 Statistical Packages

*Satisfies lecture and lab

Note: Students planning to apply to medical, dental, optometry, or some veterinary schools or other pre-professional health programs, or who intend to pursue graduate study in certain scientific disciplines, should complete the two-semester organic

chemistry lecture and laboratory sequence CHEM 0310/ 0320/ 0345 (8 credits) and the two- semester introductory physics lecture and laboratory sequence, either PHYS 0110/ 0111/ 0212 (algebra-based; 8 credits) or PHYS 0174/ 0175/ 0219 (calculus-based; 10 credits).

Frederick Honors College equivalent courses may be substituted for required or elective courses.

Writing-Intensive (W) and Seminar Course Requirements

Students must complete at least one seminar (BIOSC 1562) and one writing course (BIOSC 1563 or 1564 or 1951).

Lab Course Requirements

Students must complete at least two upper-level BIOSC labs for the major, and at least one of them must be taken at the Pittsburgh campus. Online labs cannot be used for the Molecular Biology major.

Grade requirements

BIOSC courses: All biology core courses, seminar course, writing course, and electives must be completed with a grade of C or better. A minimum GPA of 2.0 in all departmental courses taken is required for graduation. If a C- or lower is earned in an elective course for the major but is not repeated, the course will be used to calculate the departmental GPA but will not be counted towards the 36-38 credits required for the major.

Co-Requisite Courses: Students must also earn a minimum GPA of 2.0 in the co-requisite courses. A passing grade of C- or lower in a co-requisite course can be accepted if balanced by a higher grade in another corequisite course so that the co-requisite GPA is 2.0 or higher.

Exceptions: CHEM 0110 and CHEM 0120 require a C or better to declare the major; PHYS 0110/0174 require a C or better to enroll in PHYS 0111/0175; MATH 0220 requires a C or better to enroll in MATH 0230.

Satisfactory/No Credit option

One BIOSC course can be taken on a Satisfactory/No Credit (S/NC) basis.

Restrictions

All BIOSC courses at the 0800-level are designed for non-majors and do not count toward the major. Undergraduate teaching assistant (BIOSC 1690), independent study (BIOSC 1901), and undergraduate research credits (e.g., BIOSC 1903) do not count toward the major, though the department encourages students to pursue these opportunities. Anatomy lecture and lab courses do not count toward the major.

The following courses are considered course repeats, and students cannot earn credit for both:

BIOSC 1000 and BIOSC 1810

Honors

A Dietrich School student may achieve honors in the Department of Biological Sciences by meeting academic and research requirements specified here:

<https://www.biology.pitt.edu/undergraduate/departmental-honors-program>

Advising

The Biological Sciences Departmental Advisors are happy to meet with undeclared students, please make an appointment using Navigate Student. Students will officially be advised by the Bio Advising Team after declaring a major offered in the department. After declaring, you will receive a welcome email with instructions by either late September or late January (depending on the declaration date).

Advising Email: BioAdv@Pitt.edu

The Bio Advising Team supports and enriches the academic experience of students by helping with curricular decisions, as well as providing information and guidance on extracurricular options, career paths, and post-graduate plans. Information about our advising team can be found:

<https://www.biology.pitt.edu/undergraduate/advising-how-guides>

Declaring the major

Before students can declare the major, they must have completed BIOSC 0150, BIOSC 0160, CHEM 0110, and CHEM 0120 with a grade of C (not C-) or better. Transfer students who have finished these requirements prior to admission to the University of Pittsburgh are asked to complete one term of course work, including at least one BIOSC course that counts toward the major, before declaring.

Checklist for the Molecular Biology major Biological Science Required Courses

- _____ BIOSC 0150
- _____ BIOSC 0157
- _____ BIOSC 0160
- _____ BIOSC 0267
- _____ BIOSC 0350
- _____ BIOSC 1000 **or** (BIOSC 1810 **and** 1820)
- _____ BIOSC 1275
- _____ BIOSC 1940
- _____ BIOSC 1943
- _____ BIOSC 1945

Writing-Intensive and Seminar Course

- _____ BIOSC 1562
- _____ BIOSC 1563 **or** 1564 **or** 1951

Elective Courses (2 lectures and 1 lab)

- _____ BIOSC _____
- _____ BIOSC _____
- _____ BIOSC _____ (Lab Course)

Co-Requisite Courses

- _____ CHEM 0110
- _____ CHEM 0120
- _____ CHEM 0310 **or** CHEM 0350
- _____ MATH 0220
- _____ STAT 1000

STEM Co-requisite Lecture/Lab

- _____ (Lecture) _____
- _____ (Lab) _____

Note: Students planning to apply to medical, dental, optometry, or some veterinary schools or pre-professional health programs, or who intend to pursue graduate study in certain scientific disciplines, should complete the two-semester organic chemistry lecture and laboratory sequence CHEM 0310/ 0320/ 0345 (8 credits) and the two-semester introductory physics lecture and laboratory sequence, either PHYS 0110/ 0111/ 0212 (algebra-based; 8 credits) or PHYS 0174/ 0175/ 0219 (calculus-based; 10 credits).

