



Molecular Biology Major

www.biology.pitt.edu

Revised: 09/2022

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 Science courses

BIOSC 0150 Foundations of Biology 1
BIOSC 005X Foundations of Biology Lab 1
BIOSC 0160 Foundations of Biology 2
BIOSC 006X Foundations of Biology Lab 2
BIOSC 0350 Genetics
BIOSC 1000 Biochemistry*
BIOSC 1275 Genomics
BIOSC 1562 Molecular Biology Seminar
BIOSC 1940 Molecular Biology
BIOSC 1945 Adv. Molecular Biology
BIOSC 1950 Molecular Genetics Lab

*Note: Students may alternately choose BIOSC 1810 (Macromolecular Structure and Function) **and** 1820 (Metabolic Pathways) in lieu of BIOSC 1000. In this case, students take four elective credits rather than seven as specified in *elective courses*.

One of the following writing-intensive courses

BIOSC 1563 Molecular Biology Seminar Writing Practicum
BIOSC 1951 Molecular Genetics Lab Writing Practicum

Elective courses; 7 credits

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

Lecture courses

BIOSC 1120 Biostatistics
BIOSC 1130 Evolution
BIOSC 1250 Human Physiology
BIOSC 1280 Microbial Genetics
BIOSC 1455 Human Endocrinology
BIOSC 1470 Biophysical Chemistry
BIOSC 1500 Cell Biology
BIOSC 1520 Developmental Biology
BIOSC 1540 Computational Biology
BIOSC 1543 Computational Genomics

BIOSC 1730 Virology
BIOSC 1760 Immunology
BIOSC 1820 Metabolic Pathways and Regulation (with 1810) *
BIOSC 1850 Microbiology
BIOSC 1865 Microbial Physiology
CHEM 1830 Synthetic Biology

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

Lab courses

BIOSC 0351 Genetics Lab
BIOSC 1005 Intro to Biochemistry Lab
BIOSC 1285 Genomics Lab
BIOSC 1510 Cell Biology Lab
BIOSC 1530 Developmental Bio Lab
BIOSC 1740 Virology Lab
BIOSC 1855 Intro to Microbiology Lab

Co-requisite courses

Chemistry courses

CHEM 0110 General Chemistry 1
CHEM 0120 General Chemistry 2
CHEM 0310 Organic Chemistry 1
CHEM 0320 Organic Chemistry 2
CHEM 0345 Organic Chemistry Lab

Mathematics courses

MATH 0220 Analytic Geometry and Calculus 1
STAT 1000 Applied Statistical Methods

Physics courses

Choose one of the following pairs

PHYS 0110, PHYS 0111 Introduction to Physics 1, 2 **OR**
PHYS 0174, PHYS 0175 Basic Physics for Sci. & Engineering 1, 2

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

Writing (W) requirement

Students must complete at least one W-course in the major. BIOSC 1563 and BIOSC 1951 meet this requirement.

Grade requirements

BIOSC courses: Each required BIOSC course for the major must be completed with a grade of C or better. The elective courses for the major must also 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 toward the 32 credits required for the major.

Co-Requisite courses: Students must earn a minimum GPA of 2.0 in their 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 co-requisite course so that the co-requisite GPA is 2.0 or higher.

Exceptions: CHEM 0110 and CHEM 0120 must be C or better to declare the major; PHYS 0110/0174 has to be C or better to enroll in PHYS 0111/0175.

Satisfactory/No Credit option

One BIOSC course can be taken on an S/NC basis.

Restrictions

All BIOSC courses at the 0800-level are designed for non-majors. These courses 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.

Note about biochemistry options: BIOSC 1000 and 1810 are considered course repeats, and you cannot take both for credit.

Honors

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

www.biology.pitt.edu/undergraduate/advising-and-support/honors

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 declaration date). Advising e-mail: 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:

Declaring the major: Before students officially declare the major, they must have completed BIOSC 0150, 0160 and CHEM 0110, 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 courses

_____ BIOSC 0150 **or** 0155 (UHC)
_____ BIOSC 005X
_____ BIOSC 0160 **or** 0165 (UHC)
_____ BIOSC 006X
_____ BIOSC 0350
_____ BIOSC 1000 **or** (1810 **and** 1820)
_____ BIOSC 1275
_____ BIOSC 1562
_____ BIOSC 1940
_____ BIOSC 1945
_____ BIOSC 1950

Writing Course

_____ BIOSC 1531 **or** 1951

Elective courses (7 credits)

_____ BIOSC _____
_____ BIOSC _____
_____ BIOSC _____ (Lab course)

Co-Requisite courses

Chemistry courses

_____ CHEM 0110 **or** 0710 (UHC)
_____ CHEM 0120 **or** 0720 (UHC)
_____ CHEM 0310 **or** 0730 (UHC)
_____ CHEM 0320 **or** 0740 (UHC)
_____ CHEM 0345

Mathematics courses

_____ MATH 0220
_____ STAT 1000

Physics courses

_____ PHYS 0110 **or** 0174 **or** 0475
_____ PHYS 0111 **or** 0175 **or** 0476

Note: While not required for the major, PHYS 0212 Introduction to Laboratory Physics or PHYS 0219 Basic Laboratory Physics for Science & Engineering are useful for graduate study in certain sciences and is required for admission to many medical and dental schools.