

Molecular Biology Major

www.biology.pitt.edu

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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. Biochemical and molecular developments have revolutionized biological research, fueling the explosive growth in the biotechnology industry and rapid increase of molecular medicine.

The molecular biology major, with its two tracks, provides a strong background for many science careers. Both the biochemistry and the cell and developmental biology track incorporate the requirements expected for admission to medical, dental, and other health professional schools, and to graduate schools in biochemistry, 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 0050 **or** 0058 Foundations of Biology Lab 1
BIOSC 0160 Foundations of Biology 2
BIOSC 0067 **or** 0068 Foundations of Biology Lab 2
BIOSC 0350 Genetics
BIOSC 0370 Ecology **or** any BIOSC course over 1010
BIOSC 1810 Macromolecular Structure and Function
BIOSC 1820 Metabolic Pathways
BIOSC 1940 Molecular Biology
BIOSC 1581 **or** 1831 **or** 1951 (W) – Biochemistry
BIOSC 1511 **or** 1531 **or** 1561 **or** 1831 **or** 1951 (W) - Cell/Dev.

Note: BIOSC 1000 may NOT be taken

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
MATH 0230 Analytic Geometry and Calculus 2

Optional

MATH 0240 Analytic Geometry and Calculus 3 *
* MATH 0240 is not required, but is necessary to take CHEM 1410/1420 (Physical Chemistry 1 and 2).

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 Science &
Engineering 1, 2

Note: While not required for the major, PHYS 0212 Introduction to Laboratory Physics or PHYS 0219 Basic Laboratory Physics for Science &

Engineering is useful for graduate study in certain sciences and is required for admission to many medical and dental schools.

Specialization courses

Students must choose either the Biochemistry track or the Cell and Developmental Biology track, as follows:

Biochemistry track

BIOSC 1470 Biophysical Chemistry *
BIOSC 1580 Biochemistry Seminar
BIOSC 1830 Biochemistry Lab
BIOSC 1950 Molecular Genetics Lab
* Students may choose the alternate sequence CHEM 1410 and CHEM 1420 Physical Chemistry 1 and 2 in lieu of BIOSC 1470.

OR

Cell and Developmental Biology track

BIOSC 1500 Cell Biology
BIOSC 1520 Developmental Biology
BIOSC 1560 Cell and Developmental Biology Seminar
+ *Two of the following*
BIOSC 1510 Cell Biology Lab
BIOSC 1530 Developmental Biology Lab
BIOSC 1830 Biochemistry Lab
BIOSC 1950 Molecular Genetics Lab

Note: Any University Honors College (UHC) equivalents to required courses or elective courses are acceptable.

Course requirements

Higher Level course requirement

Students **MUST** take one higher level BIOSC elective course as part of their BIOSC electives. The higher level course is automatically satisfied in this major by BIOSC 1820 and 1940.

Lab requirement: Students must complete at least two BIOSC labs for the major and at least one of them must be taken at the Pittsburgh Campus.

Writing (W) requirement: Students must complete at least one W-course in the major.

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 also earn a minimum GPA of 2.0 in the co-requisite Chemistry, Mathematics, and Physics courses. A passing grade of C- or lower in a co-requisite course can be accepted, **except** for CHEM 0110 and CHEM 0120, if balanced by a higher grade in another co-requisite course so that the co-requisite GPA is 2.0 or higher. Students **must** pass CHEM 0110 and CHEM 0120 with a grade of **C** (not C-) or better for the major.

Satisfactory/No Credit option: One BIOSC course can be taken on an S/NC basis.

Related area: The chemistry requirements satisfy the related area requirement for the molecular biology major and the chemistry minor as long as half of the chemistry credits are from the Univ. of Pittsburgh.

Advising: The Biological Sciences Departmental Advisors are located in A258 Langley Hall. You are encouraged to stop by to peruse handouts or meet with an advisor even before declaring a major. They love visitors! Students will officially be advised by the Biological Sciences Advising office after declaring a major offered in the department.

Advisors

Available year round

Christine Berliner	Kevin Wu
LANGY A258	LANGY A258
412-624-4819	412-624-4273
christin@pitt.edu	kevinwu@pitt.edu

Available during the academic year

Ellen Kelsey	Jessica Wandelt
LANGY A258	LANGY A258
412-624-0421	412-624-7192
kelseye@pitt.edu	jewandelt@pitt.edu

Declaring the major: Before students can declare the molecular biology major, they must complete BIOSC 0150, BIOSC 0160, CHEM 0110, and CHEM 0120 with a grade of C (not C-) or better. Transfer students who finish 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.

Other Biological Sciences major options

Bioinformatics Biological Sciences
Ecology and Evolution Microbiology
Information about these majors is available in the Biological Sciences Advising Office in Langley A258.

Checklist for the Molecular Biology major

Biological Science courses

_____ BIOSC 0150 **or** BIOSC 0715 (UHC)
_____ BIOSC 0050 **or** BIOSC 0058
_____ BIOSC 0160 **or** BIOSC 0716 (UHC)
_____ BIOSC 0067 **or** BIOSC 0068
_____ BIOSC 0350
_____ BIOSC 0370 **or** any BIOSC course over 1010
_____ BIOSC 1810
_____ BIOSC 1820
_____ BIOSC 1940

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
_____ MATH 0230 **or** MATH 0235
_____ MATH 0240 *

* Required only if taking CHEM 1410 and CHEM 1420

Physics courses

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

Specialization courses

Biochemistry track

_____ BIOSC 1470*
_____ BIOSC 1580
_____ BIOSC 1830
_____ BIOSC 1950
_____ BIOSC Writ

* Students may choose the alternate sequence CHEM 1410 and CHEM 1420 Physical Chemistry 1 and 2 in lieu of BIOSC 1470.

Cell and Developmental Biology track

_____ BIOSC 1500
_____ BIOSC 1520
_____ BIOSC 1560
_____ BIOSC Writ

Two of the following

_____ BIOSC 1510
_____ BIOSC 1530
_____ BIOSC 1830
_____ BIOSC 1950