



Computational Biology Major

www.biology.pitt.edu

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Computational biology is a growing field of study in the life sciences. This major trains students in computer programming, laboratory techniques, and other skills they will need to succeed in graduate school and in the workforce. This program is administered by the Department of Biological Sciences in the Dietrich School and the Department of Computer Science in the School of Computing and Information.

Requirements for the Computational Biology major

Biological Science courses

BIOSC 0150 Foundations of Biology 1
BIOSC 0160 Foundations of Biology 2
BIOSC 0350 Genetics
BIOSC 1000 Biochemistry*

*Students may alternately choose BIOSC 1810 MACROMOLECULAR STRUCTURE AND FUNCTION and BIOSC 1820 METABOLIC PATHWAYS AND REGULATION in lieu of BIOSC 1000. BIOSC 1820 can then serve as an elective course.

Computer Science courses

CS 0011 Introduction to Computing for Scientists%
CMPINF 0401 Intermediate Programming
CS 0441 Discrete Structures
CS 0445 Algorithms Data Structures 1
CS 1501 Algorithm Data Structures 2
CS 1656 Introduction to Data Science
%Note: or equivalent or placement assessment exemption

Computational Biology courses

BIOSC 1540 Computational Biology
BIOSC 1542 Computational Genomics **OR** BIOSC 1544 Simulation and Modeling
BIOSC 1630 Computational Biology Seminar
BIOSC 1640 Computational Biology Research Course **OR** CS 1640 Bioinformatics Software Design

Elective courses; 3 credits

Students must complete at least three credits in elective courses by choosing from the following list.

BIOSC 0351 Genetics Lab
BIOSC 0370 Ecology
BIOSC 1005 Introduction to Biochemistry Lab
BIOSC 1130 Evolution
BIOSC 1285 Genomics Lab
BIOSC 1320 Population Biology
BIOSC 1470 – Biophysical Chemistry
BIOSC 1500 Cell Biology
BIOSC 1520 Developmental Biology
BIOSC 1545 Mathematics of Biology
BIOSC 1760 Immunology
BIOSC 1820 Metabolic Pathways and Regulation (with 1810) *

BIOSC 1850 Microbiology
BIOSC 1940 Molecular Biology
CHEM 0250 Analytical Chemistry
CHEM 0320 Organic Chemistry 2
CHEM 1460 Introduction to Modern Computational Science
CHEM 1830 Synthetic Biology
CS 1502 Formal Methods in Computer Science
CS 1520 Programming Languages for Web Applications
CS 1555 Database Management Systems
CS 1566 Introduction to Computer Graphics
CS 1675 Introduction to Machine Learning
MATH 0230 Analytical Geometry and Calculus 2
MATH 0280 Introduction to Matrices and Linear Algebra
NROSCI 1000 Introduction to Neuroscience
PHYS 0174 Basic Physics for Science and Engineering 1
STAT 1221 Applied Regression
*Note: This course must be taken in conjunction with BIOSC 1810; the pair of courses are in lieu of BIOSC 1000.

Co-requisite courses

Chemistry courses

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

Mathematics and Statistics courses

MATH 0220 Analytic Geometry and Calculus 1
STAT 1000 Applied Statistical Methods
*Students may alternately choose CS 1503 MATHEMATICAL FOUNDATIONS OF MACHINE LEARNING, which also requires MATH 0280 INTRO TO MATRICES & LINEAR ALG or MATH 1180 LINEAR ALGEBRA I as a prerequisite. MATH 0280 can then serve as an elective course.

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 1630 meets this requirement.

Grade requirements

BIOSC/CS courses: All courses offered by the Departments of Biological Sciences and Computer Science plus the elective course must be completed with a letter grade of C or better.

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; MATH 0220 has to be C or better to enroll in MATH 0230.

Satisfactory/No Credit option

Only one core course required for the major (BIOSC/CS courses and the elective) may be taken on an S/NC basis. Co-requisite courses may be taken on an S/NC basis subject to School limitations. Please check with your School for specific information on S/NC grades.

Restrictions

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 Departments of Biological Sciences and Computer Science encourage 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 – DSAS Students

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:

<https://www.biology.pitt.edu/undergraduate/advising-and-support/advisors>.

Advising – SCI Students

Students completing the Computational Biology major through the School of Computing and Information need to contact SCIAdvising@Pitt.edu.

Declaring the major: Before students officially declare the Computational Biology major, they must have completed BIOSC 0150, BIOSC 0160, CHEM 0110, CHEM 0120, and CS 0011 with a grade of C (not C-) or better and cannot be in violation of [DSAS repeat rules](#). 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.

Other Biological Sciences Department major options

Biological Sciences	Biochemistry
Ecology and Evolution	Microbiology
Molecular Biology	

Checklist for the Computational Biology major

Biological Science courses

_____ BIOSC 0150 **or** 0155 (UHC)
_____ BIOSC 0160 **or** 0165 (UHC)
_____ BIOSC 0350
_____ BIOSC 1000 **or** (1810 **and** 1820)

Computer Science courses

_____ CS 0011	_____ CS 0445
_____ CMPINF 0401	_____ CS 1501
_____ CS 0441	_____ CS 1656

Computational Biology courses

_____ BIOSC 1540
_____ BIOSC 1542 **or** BIOSC 1544
_____ BIOSC 1640 **or** CS 1640

Elective course (3 credits)

Writing Course

_____ BIOSC 1630

Electives (3 credits)

_____ BIOSC 0351	_____ CHEM 0320
_____ BIOSC 0370	_____ CHEM 1460
_____ BIOSC 1005	_____ CHEM 1830
_____ BIOSC 1130	_____ CS 1502
_____ BIOSC 1285	_____ CS 1520
_____ BIOSC 1320	_____ CS 1555
_____ BIOSC 1470	_____ CS 1566
_____ BIOSC 1500	_____ CS 1675
_____ BIOSC 1520	_____ MATH 0230
_____ BIOSC 1545	_____ MATH 0280
_____ BIOSC 1760	_____ NROSCI 1000
_____ BIOSC 1820	_____ PHYS 0174
_____ BIOSC 1850	_____ STAT 1221
_____ BIOSC 1940	
_____ CHEM 0250	

Co-requisite courses

Chemistry

_____ CHEM 0110 **or** 0710
_____ CHEM 0120 **or** 0720
_____ CHEM 0310 **or** 0730

Mathematics and Statistics courses

_____ MATH 0220
_____ STAT 1000
_____ *Alternate Approved Course (CS 1503)