Computational Biology Major

www.biology.pitt.edu
Revised: 07/2024

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%  
  *Note: or equivalent or placement assessment exemption
- 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
- 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.

**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) *

**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.

- STAT 1221 Applied Regression

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](http://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](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)

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### 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)