

Computational Biology, Additional Major

Additional Major in Computational Biology

Overview

The Additional Major in Computational Biology is designed for undergraduate students wishing to study computational biology as a second field of study at Carnegie Mellon University in addition to their primary major.

The additional major is open to all students who complete the prerequisite coursework listed below, with the requirement that a student from outside SCS must have a 3.0 overall QPA when applying.

To prevent double-counting, students must complete at least seven courses of at least 9 units each as part of the additional major in computational biology (not including pre-requisites) that are unique to the additional major.

Students interested in the Additional Major in Computational Biology should contact the Computational Biology Undergraduate Program Director.

Curriculum

Prerequisite Courses

	Units
02-180 Great Ideas in Computational Biology I & 02-181 and Great Ideas in Computational Biology II or 02-250 Introduction to Computational Biology *02-251 is allowed if 02-180 and 02-181 are not offered	10-12
03-151 Honors Modern Biology or 03-121 Modern Biology	10
15-122 Principles of Imperative Computation	12
15-151 Mathematical Foundations for Computer Science or 21-127 Concepts of Mathematics or 21-128 Mathematical Concepts and Proofs	12
21-120 Differential and Integral Calculus	10
21-122 Integration and Approximation	10
02-120 Programming for Scientists or 15-112 Fundamentals of Programming and Computer Science	12
Total Units	76-78

Mathematics/Statistics Core

36-218 Probability Theory for Computer Scientists or 36-226 Introduction to Statistical Inference or 36-326 Mathematical Statistics (Honors) or 36-235 Probability and Statistical Inference I or 15-259 Probability and Computing	9
21-241 Matrices and Linear Transformations or 21-242 Matrix Theory	11
Total Units	20

General Science Core

09-105 Introduction to Modern Chemistry I or 09-107 Honors Chemistry: Fundamentals, Concepts and Applications	10
33-121 Physics I for Science Students or 33-141 Physics I for Engineering Students	12
Total Units	22

Biological Core

03-221 Genomes, Evolution, and Disease: Introduction to Quantitative Genetic Analysis or 03-220 Genetics	9
---	---

03-232 Biochemistry I (Students taking 03-231, including pre-med students, will take organic chemistry as a prerequisite, which will satisfy a biology elective requirement.) or 03-231 Honors Biochemistry	9
03-320 Cell Biology	9
Total Units	27

Computer Science Core

15-251 Great Ideas in Theoretical Computer Science	12
15-451 Algorithm Design and Analysis or 15-351 Algorithms and Advanced Data Structures	12
07-280 Artificial Intelligence and Machine Learning I or 10-301 Introduction to Machine Learning	12
Total Units	36

Computational Biology Core

02-135 Computational Biology and Society	3
02-261 Quantitative Cell and Molecular Biology Laboratory or 02-262 Computation and Biology Integrated Research Lab or 03-343 Experimental Techniques in Molecular Biology	12
02-402 Computational Biology Seminar	3
02-510 Computational Genomics	12
02-512 Computational Methods for Biological Modeling and Simulation	9
Total Units	39

Major Electives

02-3xx Computational Biology Electives at 300 level or above	18-24
03-3xx Biology Electives at 300 level or above (09-217 or 42-202 also count as biology electives)	9-12
xx-2xx School of Computer Science Electives at 200 level or above, at least 9 units each. 15-150 is an acceptable 100-level course counting in this category, but the following exceptions are not allowed in this category: 02-201, 02-223, 02-250, 02-261, 02-262, 11-423, 15-351, 16-223, 17-200, 17-333, 17-562.	18-24
Total Units	45-60

General Education (Humanities & Arts)

For specific courses that may be used to satisfy each elective, please consult the General Education Requirements for your primary major.