COMPUTATIONAL BIOLOGY, MINOR

College of Engineering

The minor in Computational Biology will provide to students with engineering, physical science or biological science majors the foundations necessary to build efficient computational models and algorithms, use state-of-the-art techniques for scientific analysis and create scalable infrastructure environments for biological and biotechnological applications.

Minor Advisors

Faculty Advisors: V. Filkov, D. Gusfield, P. Koehl, I. Tagkopoulos
Academic Advisors: A. Abrahamson, K. Gage, J. Sison

Students must take a total of 19-24 upper division units, with two required courses and 11-12 units of upper division electives, as specified below. A minimum GPA of 2.000 is required for coursework in the minor. Students should note that most of the courses listed below have lower division prerequisites. In particular, required course ECS 122A has a prerequisite chain of ECS 020, ECS 036A, ECS 036B, and ECS 036C. No more than one course of upper division work will be permitted for overlap between any major and the minor.

Code	Title	Units
Required Courses		
ECS 122A	Algorithm Design & Analysis	4
ECS 124	Theory & Practice of Bioinformatics	4
Electives		
Choose 12-15 units:		12-15
Choose at least one biology course; 4 units minimum:		
MCB 121	Advanced Molecular Biology	
MCB 124	Macromolecular Structure & Function	
MCB 182	Principles of Genomics	
EVE 100	Introduction to Evolution	
EVE 101	Introduction to Ecology	
EVE 102	Population & Quantitative Genetics	
EVE 103	Phylogeny, Speciation & Macroevolution	
EVE 131	Human Genetic Variation & Evolution	
BIS 101	Genes & Gene Expression	
BIS 104	Cell Biology	
BIS 122	Population Biology & Ecology	
Choose at least one computational or statistics course:		
ECS 130	Scientific Computation	
ECS 132	Probability & Statistical Modeling for Computer Science	
ECS 140A	Programming Languages	
ECS 145	Scripting Languages & Their Applications	
ECS 158	Programming on Parallel Architectures	
ECS 160	Software Engineering	
ECS 165A	Database Systems	
ECS 170	Introduction to Artificial Intelligence	
ECS 171	Machine Learning	
ECS 177	Scientific Visualization	
STA 130A	Mathematical Statistics: Brief Course	
STA 141A	Fundamentals of Statistical Data Science	
STA 141B	Data & Web Technologies for Data Analysis	
STA 141C	Big Data & High Performance Statistical Computing	
BIT 150	Applied Bioinformatics	
BIS 132	(Discontinued)	
Choose at least one computational biology and bioinformatics course:		
ECS 129	Computational Structural Bioinformatics	
BIS 132	(Discontinued)	
BIM 117	Modeling Strategies for Biomedical Engineering	
BIT 150	Applied Bioinformatics	
Total Units		**20-23**