QUANTITATIVE BIOLOGY & BIOINFORMATICS, MINOR

College of Biological Sciences

The interdisciplinary minor in Quantitative Biology & Bioinformatics is an integrative program that introduces students to the quantitative and computational approaches that are redefining all disciplines in the biological sciences, from molecular and cell biology, through genetics and physiology, to ecology and evolutionary biology. Students in this minor will learn research tools that apply mathematical and computational methods, increase their insight into the strengths and limitations of quantitative approaches, and develop the interdisciplinary perspective that is now the foundation of modern biological research and training.

The minor in Quantitative Biology & Bioinformatics is open to all undergraduates regardless of major and is sponsored by the College of Biological Sciences.

Faculty Advisor

Mark Goldman, Ph.D.

Advising

Biology Academic Success Center (BASC) (https://basc.biology.ucdavis.edu/) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410

Only one course used to satisfy a requirement for the minor may be applied toward a student's major.

Code	Title	Units
Core Courses		
Programming		
Choose one:		0-4
ECS 032A	Introduction to Programming	
or ECS 032AV	Introduction to Programming	
ECS 036A	Programming & Problem Solving	
OR the equivalent.		
The programming requirement may be satisfied by previous experience and therefore may not entail college course credit. Please see your minor advisor for this determination and its possible impact on your unit requirements for the minor.		
Quantitative Biology		*4*
BIS/MAT 107	Probability & Stochastic Processes with Applications to Biology [1]	
or MAT 124	Mathematical Biology	
NOTE: BIS 107 (same as MAT 107) has a prerequisite of BIS 027A/MAT 027A (preferred) or MAT 022A; MAT 124 has a prerequisite of MAT 027A & MAT 027B (preferred) or MAT 022A & MAT 022B.		
Bioinformatics		
ECS 124	Theory & Practice of Bioinformatics	4
or ECS 129	Computational Structural Bioinformatics	
Core Courses Subtotal		16-24
Quantitative & Computational Preparation		
Choose one:		4
BIS/MAT 107	Probability & Stochastic Processes with Applications to Biology [1]	
BIM 105	Probability & Data Science for Biomedical Engineers	
ECS 122A	Algorithm Design & Analysis	
ECS 130	Scientific Computation	
ECS 165A	Database Systems	
ECS 171	Machine Learning	
MAT 128A	Numerical Analysis	
MAT 128B	Numerical Analysis in Solution of Equations	
MAT 128C	Numerical Analysis in Differential Equations	
MAT 135A	Probability	
STA 101	Advanced Applied Statistics for the Biological Sciences	
STA 108	Applied Statistical Methods: Regression Analysis	
STA 130A	Mathematical Statistics: Brief Course	
STA 131A	Introduction to Probability Theory	
STA 141A	Fundamentals of Statistical Data Science	
NOTE: BIS 107 (same as MAT 107) has a prerequisite of BIS 027A/MAT 027A (preferred) or MAT 022A; MAT 124 has a prerequisite of MAT 027A & MAT 027B (preferred) or MAT 022A & MAT 022B.		
Quantitative & Computational Preparation Subtotal		4
Restricted Electives		
Complete two or more from the following list to achieve a total of 18-26 units:		5-10
BIS 134	(Discontinued for winter 2024) [2,**]	
BIS 180L	Genomics Laboratory	
BIS 181	Comparative Genomics	
BIS 183	Functional Genomics	
BIM 102	Cellular Dynamics	
BIM 140	Protein Engineering	
BIM 141	Cell & Tissue Mechanics	
BIT 150	Applied Bioinformatics	
EVE 102	Population & Quantitative Genetics	
EVE 103	Phylogeny, Speciation & Macroevolution	
EVE 104	Community Ecology	
EVE 175	Computational Genetics	
MIC 105	Microbial Diversity	
MIC 117	(Discontinued for spring 2024) [**]	
MCB 123	Behavior & Analysis of Enzyme & Receptor Systems	
MCB 143	Cell & Molecular Biophysics	
MCB 182	Principles of Genomics	
NPB 166	Math Tools for Neuroscience	
NPB 167	Computational Neuroscience	
ESP 121	Population Ecology	
or WFC 122	Population Dynamics & Estimation	
Restricted Electives Subtotal		5-10
Total Units		18-26

1

BIS 107 can only be used to fulfill either the Quantitative Biology Core requirement or the Quantitative & Computational Preparation requirement, not both.

2

BIS 134 has been discontinued; course is now listed as SSB 134.

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Course(s) discontinued; see your advisor for course options.