

# GENETICS & GENOMICS, BACHELOR OF SCIENCE

## College of Biological Sciences

The Genetics & Genomics major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity, gene expression and evolution. The major is sufficiently flexible to accommodate students interested in the subject either as a basic discipline in the biological sciences or in terms of its applied aspects such as biotechnology, medicine, and agriculture.

## The Program

The upper division curriculum in the Genetics & Genomics program begins with the four-course, upper-division core curriculum that provides an introduction to the principles of genetics, biochemistry, and cell biology. Students then take additional upper-division courses in specialized areas of modern genetics including gene expression, evolution, development, human genetics, and genomics, as well as laboratory courses in the principles of genetics and genomics. Additional upper-division courses in biological sciences, as well as internship/research coursework, can be chosen to fulfill required elective units.

## Career Alternatives

The Genetics & Genomics degree provides suitable preparation for a wide variety of careers, including teaching, research, work with biotechnology companies, medicine, and all the health sciences. It is also an excellent background for students wishing to continue their education in a graduate program, a teacher-training program, medical school, veterinary school, or other professional schools.

## Faculty Advisor

Celina Juliano, (cejuliano@ucdavis.edu) Ph.D.

## Advising

Biology Academic Success Center (BASC) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410, cbsundergrads@ucdavis.edu.

## Graduate Study

See Integrative Genetics & Genomics (Graduate Group) (<https://catalog.ucdavis.edu/departments-programs-degrees/integrative-genetics-genomics-graduate-group/>).

The major requirements below are in addition to meeting University Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) & College Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/>); unless otherwise noted. The minimum number of units required for the Genetics & Genomics Bachelor of Science is 99.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		18

BIS 002A  
& BIS 002B  
& BIS 002C  
& BIS 002D

Introduction to Biology: Essentials of Life on Earth  
and Introduction to Biology: Principles of Ecology & Evolution  
and Introduction to Biology: Biodiversity & the Tree of Life  
and Introduction to Biology: Principles of Cell Biology & Physiology

## Chemistry

Choose CHE 002 series or CHE 004 series:<sup>1</sup> 15

CHE 002A  
& CHE 002B  
& CHE 002C

General Chemistry  
and General Chemistry  
and General Chemistry

## OR

CHE 004A  
& CHE 004B  
& CHE 004C

General Chemistry for the Physical Sciences & Engineering  
and General Chemistry for the Physical Sciences & Engineering  
and General Chemistry for the Physical Sciences & Engineering

Choose CHE 008 series or CHE 118 series or CHE 128 series & CHE 129A-CHE 129B: 6-13

CHE 008A  
& CHE 008B

Organic Chemistry: Brief Course  
and Organic Chemistry: Brief Course

## OR

CHE 118A  
& CHE 118B  
& CHE 118C

Organic Chemistry for Health & Life Sciences  
and Organic Chemistry for Health & Life Sciences  
and Organic Chemistry for Health & Life Sciences

## OR

CHE 128A  
& CHE 128B  
& CHE 128C

Organic Chemistry  
and Organic Chemistry  
and Organic Chemistry

CHE 129A  
& CHE 129B

Organic Chemistry Laboratory  
and Organic Chemistry Laboratory

## Mathematics

Choose MAT 017 series or MAT 021 series:<sup>3</sup> 8-12

MAT 017A  
& MAT 017B  
& MAT 017C

Calculus for Biology & Medicine  
and Calculus for Biology & Medicine  
and Calculus for Biology & Medicine

## OR

MAT 021A  
& MAT 021B  
& MAT 021C

Calculus  
and Calculus  
and Calculus (Recommended)

## Physics

Choose PHY 007 series or PHY 009 series:<sup>4</sup> 12-15

PHY 007A  
& PHY 007B  
& PHY 007C

General Physics  
and General Physics  
and General Physics

## OR

PHY 009A  
& PHY 009B  
& PHY 009C

Classical Physics  
and Classical Physics  
and Classical Physics

Preparatory Subject Matter Subtotal

59-73

## Depth Subject Matter

<b>Biological Science</b>		
BIS 101 or BIS 101V	Genes & Gene Expression Genes & Gene Expression	4
BIS 104	Cell Biology	3
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	3-6
<b>Molecular &amp; Cellular Biology</b>		
MCB 121	Advanced Molecular Biology	3
MCB 182	Principles of Genomics	3
Choose one:		3-4
EVE 100 or BIS 181	Introduction to Evolution Comparative Genomics	
Choose one:		3
BIS 183 or MCB 164 DISC	Functional Genomics	
MCB 160L or BIS 180L	Principles of Genetics Laboratory Genomics Laboratory	
Choose STA 100 or CHE 130A & CHE 130B:		4-8
STA 100 or STA 130A & STA 130B	Applied Statistics for Biological Sciences Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course	
<b>Restricted Electives</b>		
Choose at least 9 additional units:		9
BIS 181	Comparative Genomics	
BIS 183	Functional Genomics	
BIT 150	Applied Bioinformatics	
ECS 124	Theory & Practice of Bioinformatics	
EVE 100	Introduction to Evolution	
EVE 102	Population & Quantitative Genetics	
EVE 103	Phylogeny, Speciation & Macroevolution	
EVE 131	Human Genetic Variation & Evolution	
EVE 161	Microbial Phylogenomics; Genomic Perspectives on the Diversity & Diversification of Microbes	
MIC 105	Microbial Diversity	
MCB 150	Developmental Biology	
MCB 162	Human Genetics & Genomics	
MCB 163	Developmental Genetics	
MCB 164	(Discontinued for spring 2025) **	
MMG 170 or MIC 170 DISC	Yeast Molecular Genetics	
MMG 172 or MIC 172 DISCONTINUED FOR ALL 2025 **	Host-Parasite Interactions	
MMG 175 or MIC 175 DISC	Cancer Biology	
PLB 112	Plant Growth & Development	
PLB 113	Molecular & Cellular Biology of Plants	
PLS 154	Introduction to Plant Breeding	
<b>OR</b>		
Upper division courses in genetics or other fields relevant to the student's interest chosen in consultation with the GGN master and BASC advisor. No more than 4 units of 192, 193, 194H, 198, or 199 may be used for credit in this category.		
Depth	Subject Matter Subtotal	35-43
<b>Total Units</b>		
		<b>94-116</b>
1		
With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units with no lab)-CHE 002B-CHE 002C; CHE 004A-CHE 004B-CHE 002C.		
2		
With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 118A-CHE 008B; CHE 128A-CHE 128B-CHE 008B; CHE 128A-CHE 118B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C; CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128C-CHE 129B.		
3		
With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.		
4		
With BASC advisor approval, these combinations also satisfy the Physics requirement: PHY 007A-PHY 007C-PHY 009A-PHY 049*; PHY 009A-PHY 009B-PHY 049*. *PHY 049 requires approval from the PHY Department to enroll.		
** Course(s) discontinued; see your advisor for course options.		