GENETICS & GENOMICS, BACHELOR OF SCIENCE

College of Biological Sciences

The Genetics & Genomics Major Program

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 a 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

Ted Powers, (erpowers@ucdavis.edu) Ph.D.

Advising

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

Graduate Study

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td><strong>Preparatory Subject Matter</strong></td>
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<tr>
<td><strong>Biological Science</strong></td>
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<td>18</td>
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<tr>
<td><strong>Chemistry</strong></td>
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<td>Choose the 002 or 004 series.</td>
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<tr>
<td><strong>Depth Subject Matter</strong></td>
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<tr>
<td><strong>Biological Science</strong></td>
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<tr>
<td>BIS 101</td>
<td>Genes &amp; Gene Expression</td>
<td>4</td>
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<tr>
<td>BIS 104</td>
<td>Cell Biology</td>
<td>3</td>
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<tr>
<td>BIS 105</td>
<td>Biomolecules &amp; Metabolism</td>
<td>3-6</td>
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<tr>
<td>or BIS 102 &amp; BIS 103</td>
<td>Structure &amp; Function of Biomolecules &amp; Bioenergetics &amp; Metabolism</td>
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<tr>
<td><strong>Molecular &amp; Cellular Biology</strong></td>
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<td>MCB 121</td>
<td>Advanced Molecular Biology</td>
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<td>MCB 182</td>
<td>Principles of Genomics</td>
<td>3</td>
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<tr>
<td>Choose one:</td>
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<td>3-4</td>
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1. Choose the 002 or 004 series.
2. Choose the 008 series or 118 series or 128 series & 129A-B.
3. Choose the 017 series or 021 series.
4. Choose the 007 series or 009 series.
EVE 100 or BIS 181
Choose one:
- MCB 164 Advanced Eukaryotic Genetics
- BIS 183 Functional Genomics

Choose MCB 160L or BIS 180L:
- MCB 160L Principles of Genetics Laboratory
- BIS 180L Genomics Laboratory

Choose STA 100 or 130A & 130B:
- STA 100 Applied Statistics for Biological Sciences
- STA 130A Mathematical Statistics: Brief Course
- STA 130B and Mathematical Statistics: Brief Course

Restricted Electives
Choose at least 9 additional units:
- 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
- MIC 170 Yeast Molecular Genetics
- MIC 172 Host-Parasite Interactions
- MIC 175 Cancer Biology
- MCB 150 Developmental Biology
- MCB 162 Human Genetics & Genomics
- MCB 163 Developmental Genetics
- MCB 164 Advanced Eukaryotic Genetics
- PLB 112 Plant Growth & Development
- PLB 113 Molecular & Cellular Biology of Plants
- PLS 154 Introduction to Plant Breeding

or

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 40-48

Total Units 99-121

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 128B; 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 Students may be able to complete their Physics requirement by blending the PHY 007 & PHY 009 series. For more details about how to do so and course placement, students will need to follow up with the PHY department. Students will also need to follow up with a BASC advisor to discuss their plans.