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 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) 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/).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CHE 002A &amp; CHE 002B &amp; CHE 002C</td>
<td>General Chemistry and General Chemistry</td>
<td>6-13</td>
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<tr>
<td>CHE 004A &amp; CHE 004B &amp; CHE 004C</td>
<td>General Chemistry for the Physical Sciences &amp; Engineering and General Chemistry for the Physical Sciences &amp; Engineering and General Chemistry for the Physical Sciences &amp; Engineering</td>
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<tr>
<td>CHE 008A &amp; CHE 008B</td>
<td>Organic Chemistry: Brief Course and Organic Chemistry: Brief Course</td>
<td>6-13</td>
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<tr>
<td>CHE 118A &amp; CHE 118B &amp; CHE 118C</td>
<td>Organic Chemistry for Health &amp; Life Sciences and Organic Chemistry for Health &amp; Life Sciences and Organic Chemistry for Health &amp; Life Sciences</td>
<td>6-13</td>
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<tr>
<td>CHE 129A &amp; CHE 129B</td>
<td>Organic Chemistry Laboratory and Organic Chemistry Laboratory</td>
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<tr>
<td>MAT 017A &amp; MAT 017B &amp; MAT 017C</td>
<td>Calculus for Biology &amp; Medicine and Calculus for Biology &amp; Medicine and Calculus for Biology &amp; Medicine</td>
<td>8-12</td>
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<tr>
<td>MAT 021A &amp; MAT 021B &amp; MAT 021C</td>
<td>Calculus and Calculus and Calculus</td>
<td>8-12</td>
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<tr>
<td>PHY 007A &amp; PHY 007B &amp; PHY 007C</td>
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<tr>
<td>PHY 009A &amp; PHY 009B &amp; PHY 009C</td>
<td>Classical Physics and Classical Physics and Classical Physics</td>
<td>8-12</td>
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Preparatory Subject Matter Subtotal: 59-73

Depth Subject Matter

Biological Science

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<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<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 or BIS 102 or BIS 103</td>
<td>Biomolecules &amp; Metabolism or Structure &amp; Function of Biomolecules or Bioenergetics &amp; Metabolism</td>
<td>3-6</td>
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Molecular & Cellular Biology

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<tr>
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<th>Units</th>
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<tr>
<td>MCB 121</td>
<td>Advanced Molecular Biology</td>
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</tr>
<tr>
<td>MCB 182</td>
<td>Principles of Genomics</td>
<td>3</td>
</tr>
</tbody>
</table>
Choose one: 3-4
- EVE 100 Introduction to Evolution
  or BIS 181 Comparative Genomics

Choose one: 3
- MCB 164 Advanced Eukaryotic Genetics
  or BIS 183 Functional Genomics

Choose MCB 160L or BIS 180L: 5
- MCB 160L Principles of Genetics Laboratory
  or BIS 180L Genomics Laboratory

Choose STA 100 or CHE 130A & CHE 130B: 4-8
- STA 100 Applied Statistics for Biological Sciences
  or 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 Developmental 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 128B-CHE 128C-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128B-CHE 129B.

2 With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 118A-CHE 128B-CHE 128B-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C;

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 009A-PHY 049*-PHY 007C; PHY 009A-PHY 009B-PHY 049*-PHY 007C. *PHY 049 requires approval from the PHY Department to enroll.