Quantitative Biology, Doctoral Minor

Requirements

PhD candidates in any department or program may obtain an interdisciplinary minor in Quantitative Biology by earning:

- A minimum of 10 credits from the courses listed below, including:
  - A required, 1-credit research seminar (students are advised to take during first year of graduate program)
  - One course from a quantitative science
  - One course from a biological science
  - One integrated course

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>B M E 780</td>
<td>Methods in Quantitative Biology</td>
<td>1</td>
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### Quantitative Courses 3-4

Students must complete one of the following courses.

- COMP SCI/E C E 760: Introduction to Optimization
- MATH 443: Applied Linear Algebra
- MATH/ COMP SCI 513: Numerical Linear Algebra
- MATH/ COMP SCI 514: Numerical Analysis
- MATH 519: Ordinary Differential Equations
- MATH 531: Probability Theory
- MATH 605: Stochastic Methods for Biology
- MATH 619: Analysis of Partial Differential Equations
- MATH/ COMP SCI 714: Methods of Computational Mathematics I
- STAT/MATH 431: Introduction to the Theory of Probability
- STAT/B M I 541: Introduction to Biostatistics
- STAT/F&W ECOL/ HORT 571: Statistical Methods for Bioscience I
- STAT/F&W ECOL/ HORT 572: Statistical Methods for Bioscience II
- STAT 609: Mathematical Statistics I
- STAT 610: Introduction to Statistical Inference
- STAT/I SY E/ MATH/OTM 632: Processes
- B M I 826: Special Topics in Biostatistics and Biomedical Informatics (Statistics in Human Genetics)

### Integrated Courses 3

Students must complete one of the following courses.

- B M I/CMP SCI 576: Introduction to Bioinformatics
- B M I/BIOCHEM/ BMOLCHEM/ MATH 609: Mathematical Methods for Systems Biology
- B M I/CMP SCI 775: Computational Network Biology
- or B M I/STAT 620: Special Topics in Biostatistics and Biomedical Informatics (Statistics in Human Genetics)

### Biological Courses 2-3

Students must complete one of the following courses.

- BIOCHEM 501: Introduction to Biochemistry
- BIOCHEM 601: Protein and Enzyme Structure and Function
- BIOCHEM/ GENETICS/ MICROBIO 612: Prokaryotic Molecular Biology
- BIOCHEM/ GENETICS/ MD GENET 620: Eukaryotic Molecular Biology
- BIOCHEM/ BOTANY 621: Plant Biochemistry
- BIOCHEM 625: Mechanisms of Action of Vitamins and Minerals
- BIOCHEM/ CHEM 704: Chemical Biology
- BIOCHEM 719: From Atoms to Molecules
- GENETICS 466: Principles of Genetics
- GENETICS/ BOTANY/M M & I/ PL PATH 655: Biology and Genetics of Fungi
- GENETICS 701: Advanced Genetics
- MICROBIO 526: Physiology of Microorganisms
<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>MICROBIO 607</td>
<td>Advanced Microbial Genetics</td>
</tr>
<tr>
<td>MICROBIO/ BMOLCHEM 668</td>
<td>Microbiology at Atomic Resolution</td>
</tr>
<tr>
<td>ONCOLOGY 703</td>
<td>Carcinogenesis and Tumor Cell Biology</td>
</tr>
<tr>
<td>PATH 750 &amp; PATH 752</td>
<td>Cellular and Molecular Biology/ Pathology and Cellular and Molecular Biology/ Pathology Seminar</td>
</tr>
<tr>
<td>ZOOLOGY 570</td>
<td>Cell Biology</td>
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| Total Credits | 10 |