QUANTITATIVE BIOLOGY, DOCTORAL MINOR

REQUIREMENTS

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REQUIRED COURSES

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

Code	Title	Credits
Research Seminar		
Students must complete the following course.		
B M E 780	Methods in Quantitative Biology	1
Quantitative Courses		
Students must complete one of the following courses.		3-4
CBE 660	Intermediate Problems in Chemical Engineering	
COMP SCI/E C E/ I SY E 524	Introduction to Optimization	
COMP SCI/ E C E 760	Machine Learning	
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 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 571	Statistical Methods for Bioscience I	
STAT/ F&W ECOL 572	Statistical Methods for Bioscience II	
STAT 609	Mathematical Statistics I	
STAT 610	Introduction to Statistical Inference	
STAT/I SY E/ MATH/OTM 632	Introduction to Stochastic Processes	
STAT/MATH 709	Mathematical Statistics I	
STAT/MATH 710	Mathematical Statistics II	
Integrated Courses		
Students must complete one of the following courses.		3
B M E 556	Systems Biology: Mammalian Signaling Networks	
B M E/CBE 783	Design of Biological Molecules	
B M I/ COMP SCI 576	Introduction to Bioinformatics	
B M I/BIOCHEM/ BMOLCHEM/ MATH 609	Mathematical Methods for Systems Biology	
B M I/ COMP SCI 775	Computational Network Biology	
B M I/ COMP SCI 776	Advanced Bioinformatics	
B M I 826	Special Topics in Biostatistics and Biomedical Informatics (Statistics in Human Genetics)	
or B M I/ STAT 620	Statistics in Human Genetics	
B M I/STAT 877	Statistical Methods for Molecular Biology	
BOTANY/ PL PATH 563	Phylogenetic Analysis of Molecular Data	
GENETICS 885	Advanced Genomic and Proteomic Analysis	
MICROBIO 657	Bioinformatics for Microbiologists	
ONCOLOGY 778	Bioinformatics for Biologists	
Biological Courses		
Students must complete one of the following courses.		2-3
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	

MICROBIO/ BMOLCHEM 668	Microbiology at Atomic Resolution	
ONCOLOGY/ M M & I/ PL PATH 640	General Virology-Multiplication of Viruses	
ONCOLOGY 703	Carcinogenesis and Tumor Cell Biology	
PATH 750 & PATH 752	Cellular and Molecular Biology/ Pathology and Cellular and Molecular Biology/ Pathology Seminar	
ZOOLOGY 570	Cell Biology	
Total Credits		**10**