QUANTITATIVE LIFE SCIENCES (PH.D.)

Offered by: Quantitative Life Sciences
Degree: Doctor of Philosophy

Note: For information about Fall 2025 and Winter 2026 course offerings, please check back on May 8, 2025. Until then, the "Terms offered" field will appear blank for most courses while the class schedule is being finalized.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (6 credits)

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Course	Title	Credits
QLSC 600D1	Foundations of Quantitative Life Sciences.	3
QLSC 600D2	Foundations of Quantitative Life Sciences.	3
QLSC 601D1	Quantitative Life Sciences Seminars 1.	0
QLSC 601D2	Quantitative Life Sciences Seminars 1.	0
QLSC 602D1	Quantitative Life Sciences Seminars 2.	0
QLSC 602D2	Quantitative Life Sciences Seminars 2.	0
QLSC 603D1	Quantitative Life Sciences Seminars 3.	0
QLSC 603D2	Quantitative Life Sciences Seminars 3.	0
QLSC 701	Ph.D. Comprehensive Exam.	0

Complementary Courses (9-11 credits)

Students will be required to take one or two courses from each of the Quantitative and Life Science Blocks for a total of three, stream-specific courses.

Biophysics Stream

Quantitative

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Course	Title	Credits
BIEN 530	Imaging and Bioanalytical Instrumentation.	3
BMDE 512	Finite-Element Modelling in Biomedical Engineering.	3
BMDE 519	Biomedical Signals and Systems.	3
CHEM 514	Biophysical Chemistry.	3
CHEM 520	Methods in Chemical Biology.	3
COMP 551	Applied Machine Learning.	4
MATH 682	Statistical Inference.	4
PHYS 519	Advanced Biophysics.	3
PHYS 559	Advanced Statistical Mechanics.	3
QLSC 611	Directed Readings.	3

Life Sciences

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Course	Title	Credits
BIOC 605	Protein Biology and Proteomics.	3
BIOL 551	Principles of Cellular Control.	3
PHGY 518	Artificial Cells.	3
QLSC 611	Directed Readings.	3

Computational and Statistical Molecular Biology Stream

Quantitative

Expand allContract all

Course	Title	Credits
BIOS 601	Epidemiology: Introduction and Statistical Models.	4
BMDE 502	BME Modelling and Identification.	3
COMP 551	Applied Machine Learning.	4
COMP 561	Computational Biology Methods and Research.	4
COMP 598	Topics in CS: Applications 1	4
HGEN 677	Statistical Concepts in Genetic and Genomic Analysis.	3
MATH 523	Generalized Linear Models.	4
MATH 533	Regression and Analysis of Variance.	4
MATH 680	Computation Intensive Statistics.	4
MATH 682	Statistical Inference.	4
QLSC 611	Directed Readings.	3

Life Sciences

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Course	Title	Credits
BIOC 603	Genomics and Gene Expression.	3
BIOL 551	Principles of Cellular Control.	3
EXMD 602	Techniques in Molecular Genetics.	3
HGEN 661	Population Genetics.	3
HGEN 692	Human Genetics.	3
PHAR 503	Drug Discovery and Development 1.	3
PHAR 505	Structural Pharmacology.	3
QLSC 611	Directed Readings.	3

Ecosystems Stream

Quantitative

Expand allContract all

Course	Title	Credits
ENVB 506	Quantitative Methods: Ecology.	3
MATH 523	Generalized Linear Models.	4
MATH 525	Sampling Theory and Applications.	4
MATH 533	Regression and Analysis of Variance.	4
MATH 537	Honours Mathematical Models in Biology.	4
MATH 547	Stochastic Processes.	4
MATH 556	Mathematical Statistics 1.	4
MATH 682	Statistical Inference.	4
QLSC 611	Directed Readings.	3

Life Sciences

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Course	Title	Credits
BIOL 509	Methods in Molecular Ecology.	3
BIOL 510	Advances in Community Ecology.	3
BIOL 540	Ecology of Species Invasions.[1]	3
BIOL 594	Advanced Evolutionary Ecology.	3
ENVR 540	Ecology of Species Invasions.[1]	3
QLSC 611	Directed Readings.	3

[1] Students either choose BIOL 540 Ecology of Species Invasions. or ENVR 540 Ecology of Species Invasions. but not both