BIOCHEMISTRY: BIOINFORMATICS (PH.D.)

Offered by: Biochemistry (Faculty of Medicine and Health Sciences)
Degree: Doctor of Philosophy

Program Description

The Ph.D. in Biochemistry; Bioinformatics involves the development of strategies for experimental design, the construction of computer science tools to analyze large datasets, the application of modelling techniques, the integration of biological databases, and the use of algorithms and statistics. Permission of the Graduate Program Director to enroll in this concentration is required to ensure that the proposed research thesis focusses on bioinformatics related to biochemistry.

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
BIOC 696D1	Seminars in Biochemistry.[1]	1.5
BIOC 696D2	Seminars in Biochemistry.[1]	1.5
BIOC 696N1	Seminars in Biochemistry.[1]	1.5
BIOC 696N2	Seminars in Biochemistry.[1]	1.5
BIOC 701	Research Seminar 1.[2]	0
BIOC 702	Ph.D. Thesis Proposal.[2]	0
BIOC 703	Ph.D. Seminar.[2]	0
QLSC 601D1	Quantitative Life Sciences Seminars 1.	0
QLSC 601D2	Quantitative Life Sciences Seminars 1.	0

[1] Students choose either BIOC 696D1/D2 or BIOC 696N1/N2. Students fast-tracking from the M.Sc. to the Ph.D. program, and who registered for and passed BIOC 696 at the M.Sc. level, do not register for BIOC 696 at the Ph.D. level. Likewise, students fast-tracking from the M.Sc. to the Ph.D. program, and who registered for and passed QLSC 601 at the M.Sc. level, do not register for QLSC 601 at the Ph.D. level.

[2] NOTE: Students DO NOT register for these courses until notified by the Student Affairs Officer.

Students must complete BIOC 701 Research Seminar 1. in the third term after admission to the program, BIOC 702 Ph.D. Thesis Proposal. in the fifth or sixth term, and BIOC 703 Ph.D. Seminar. approximately six months prior to submission of the Ph.D. thesis.

Complementary Courses[1] (9 credits)

[1] Complementary courses are chosen in consultation with the Research Director.

3 credits from the following:

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Course	Title	Credits
BIOC 600	Advanced Strategies in Genetics and Genomics.	3
BIOC 603	Genomics and Gene Expression.	3
BIOC 604	Macromolecular Structure.	3
BIOC 605	Protein Biology and Proteomics.	3
BIOC 670	Biochemistry of Lipoproteins.	3
EXMD 615	Essentials of Glycobiology.	3
EXMD 635D1	Experimental/Clinical Oncology.	3
EXMD 635D2	Experimental/Clinical Oncology.	3

6 credits from the following:

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Course	Title	Credits
BINF 621	Bioinformatics: Molecular Biology.	3
BMDE 652	Bioinformatics: Proteomics.	3
BTEC 555	Structural Bioinformatics.	3
COMP 618	Bioinformatics: Functional Genomics.	3
PHGY 603	Systems Biology and Biophysics.	3

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 Protein Structure and Function. and BIOC 454 Nucleic Acids. are additional requirements for those who have not previously completed equivalent courses in their prior training.