

BIOCHEMISTRY: CHEMICAL BIOLOGY (PH.D.)

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

Degree: Doctor of Philosophy

Program Description

The Ph.D. in Biochemistry; Chemical Biology is overseen by the Chemical Biology Thematic Group, and it engages in research topics that span structural biology, enzymology, nucleic acid research, signaling pathways, single molecule biophysics, biophysical chemistry of living tissues, and new chemistry and physics from biological systems to develop pharmaceutical applications. The thesis must focus on chemical biology 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 (7 credits)

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Course	Title	Credits
BIOC 610	Seminars in Chemical Biology 1.	1.5
BIOC 611	Seminars in Chemical Biology 2	1.5
BIOC 696D1	Seminars in Biochemistry.	1.5
BIOC 696D2	Seminars in Biochemistry.	1.5
BIOC 696N1	Seminars in Biochemistry.	1.5
BIOC 696N2	Seminars in Biochemistry.	1.5
BIOC 701	Research Seminar 1.	0
BIOC 702	Ph.D. Thesis Proposal.	0
BIOC 703	Ph.D. Seminar.	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 BIOC 610 and 611 at the M.Sc. level, do not register for BIOC 610 and 611 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
CHEM 502	Advanced Bio-Organic Chemistry.	3
CHEM 503	Drug Discovery.	3
PHAR 503	Drug Discovery and Development 1.	3

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

Plus additional credits to a total of at least 9 complementary course credits from the following list:

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Course	Title	Credits
CHEM 522	Stereochemistry.	3
CHEM 582	Supramolecular Chemistry.	3
CHEM 591	Bioinorganic Chemistry.	3
CHEM 621	Reaction Mechanisms in Organic Chemistry.	5
CHEM 629	Organic Synthesis.	5
EXMD 510	Bioanalytical Separation Methods.	3
EXMD 602	Techniques in Molecular Genetics.	3
PHAR 504	Drug Discovery and Development 2.	3
PHAR 562	Neuropharmacology.	3
PHAR 563	Endocrine Pharmacology.	3
PHAR 707	Topics in Pharmacology 6.	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.