

BIOLOGICAL AND PHARMACEUTICAL CHEMISTRY CO-OP (BPCH:C)

Department of Chemistry, College of Engineering and Physical Sciences

Program Requirements

The Co-op program in Biological and Pharmaceutical Chemistry is a four and a half year program, including four work terms. Students must follow the academic work schedule as outlined below (also found on the Co-operative Education website: <https://www.recruitguelph.ca/cecs/>).

Biological and Pharmaceutical Chemistry Academic and Co-op Work Term Schedule

Year	Fall	Winter	Summer
1	Academic Semester 1	Academic Semester 2 COOP*1100	Off
2	Academic Semester 3	COOP*1000 Work Term I	Academic Semester 4
3	Academic Semester 5	Academic Semester 6	COOP*2000 Work Term II
4	COOP*3000 Work Term III	Academic Semester 7	COOP*4000 Work Term IV
5	Academic Semester 8	N/A	N/A

To be eligible to continue in the Co-op program, students must meet a minimum 70% cumulative average requirement after second semester, as well as meet all work term requirements. Please refer to the Co-operative Education program policy with respect to work term performance grading, work term report grading and program completion requirements.

For additional program information students should consult with their Co-op Co-ordinator and Co-op Faculty Advisor, listed on the Co-operative Education web site.

Credit Summary

(22.00 Total Credits)

Code	Title	Credits
	First year science credits	4.00
	Required science courses semesters 3 – 8	6.00
	Restricted electives (#1 and #2 in restricted electives list)	5.50
	Approved Science electives	0.50
	Liberal Education electives	1.00
	Free electives - any approved elective for B.Sc. students. (could be less if restricted electives do not count as science)	3.00
	Co-op Work Terms	2.00
	Total Credits	22

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

The recommended program sequence is outlined below.

Major (Honours Program)

Students who are lacking one 4U /grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: https://www.uoguelph.ca/bsc/revised_SS (https://www.uoguelph.ca/bsc/revised_SS/)

Code	Title	Credits
Semester 1 - Fall		
BIOL*1090	Introduction to Molecular and Cellular Biology	0.50
CHEM*1040	General Chemistry I	0.50
IPS*1500	Integrated Mathematics and Physics I	1.00
	0.50 Liberal Education electives	0.50
Semester 2 - Winter		
CHEM*1050	General Chemistry II	0.50
COOP*1100	Introduction to Co-operative Education	0.00
IPS*1510	Integrated Mathematics and Physics II	1.00
BIOL*1070	Discovering Biodiversity	0.50
	or BIOL*1080 Biological Concepts of Health	
	0.50 Liberal Education electives	0.50
Semester 3 - Fall		
BIOC*2580	Introduction to Biochemistry	0.50
CHEM*2060	Structure and Bonding	0.50
CHEM*2400	Analytical Chemistry I	0.75
CHEM*2880	Physical Chemistry	0.50
	Electives or Restricted Electives to a maximum of 2.75 total credits in this semester	0.50
Winter Semester		
COOP*1000	Co-op Work Term I	0.50
Semester 4 - Summer		
CHEM*2070	Structure and Spectroscopy	0.50
CHEM*2700	Organic Chemistry I	0.50
CHEM*3430	Analytical Chemistry II: Instrumental Analysis	0.50
STAT*2040	Statistics I	0.50
	0.50 electives or restricted electives	0.50
Semester 5 - Fall		
BIOC*3570	Analytical Biochemistry	0.75
CHEM*3750	Organic Chemistry II	0.50
CHEM*3640	Chemistry of the Elements I (or 0.50 Electives or Restricted Electives) ²	0.50
	Electives or Restricted Electives to a maximum of 2.75 total credits in this semester	1.00
Semester 6 - Winter		
	Select either Option A or Option B	
	<i>Option A (at Guelph)</i>	
BIOC*3560	Structure and Function in Biochemistry	0.50
CHEM*3650	Chemistry of the Elements II	0.50
CHEM*3760	Organic Chemistry III	0.50
	1.00 electives or restricted electives	1.00

Option B (at Seneca)Select 2.50 credits from the following: ³

XSEN*3030	Pharmacology and Applied Toxicology	0.50
XSEN*3040	Occupational Health and Chemistry	0.50
XSEN*3060	Pharmaceutical Analysis - Advanced	0.50
XSEN*3070	Pharmaceutical Product Formulations	0.50
XSEN*3090	Biopharmaceuticals	0.50
XSEN*3200	Pharmaceutical Organic Chemistry	0.50
XSEN*3210	Introduction to Pharmaceutical Manufacturing	0.50

Summer Semester

COOP*2000	Co-op Work Term II	0.50
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Fall Semester

COOP*3000	Co-op Work Term III	0.50
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Semester 7 - Winter

2.50 electives or restricted electives	2.50
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Summer Semester

COOP*4000	Co-op Work Term IV	0.50
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Semester 8 - Fall

CHEM*4730	Synthetic Organic Chemistry	0.50
or CHEM*4740	Topics in Bio-Organic Chemistry	
2.00 electives or restricted electives	2.00	

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CHEM*3640 Chemistry of the Elements I is a prerequisite for CHEM*3650 Chemistry of the Elements II

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All XSEN courses are taught at the Seneca@York campus of Seneca College in Toronto.

Restricted Electives

Code	Title	Credits
MICR*2420	Introduction to Microbiology	0.50

Select 1.00 credits from the following:

MBG*2040	Foundations in Molecular Biology and Genetics	0.50
MCB*2050	Molecular Biology of the Cell	0.50
MICR*2430	Methods in Microbial Culture and Physiology	0.50
TOX*2000	Principles of Toxicology	0.50

Select a minimum of 1.50 credits at the 4000 level and 2.50 credits at the 3000/4000 level from the following:

BIOC*3560	Structure and Function in Biochemistry	0.50
BIOC*4050	Protein and Nucleic Acid Structure ⁴	0.50
BIOC*4520	Metabolic Processes	0.50
BIOC*4540	Enzymology ⁴	0.75
BIOC*4580	Membrane Biochemistry	0.50
BIOM*3090	Principles of Pharmacology ⁴	0.50
BIOM*3200	Biomedical Physiology	1.00
BIOM*4090	Pharmacology ⁴	0.50
CHEM*3360	Environmental Chemistry and Toxicology	0.50
CHEM*3440	Analytical Chemistry III: Analytical Instrumentation	0.50
CHEM*3640	Chemistry of the Elements I	0.50

CHEM*3650	Chemistry of the Elements II ⁴	0.50
CHEM*3760	Organic Chemistry III	0.50
CHEM*4010	Chemistry and Industry	0.50
CHEM*4400	Advanced Topics in Analytical Chemistry	0.50
CHEM*4630	Bioinorganic Chemistry ⁴	0.50
CHEM*4720	Organic Reactivity ⁴	0.50
CHEM*4730	Synthetic Organic Chemistry ⁴	0.50
CHEM*4740	Topics in Bio-Organic Chemistry	0.50
CHEM*4900	Chemistry Research Project I ⁴	1.00
CHEM*4910	Chemistry Research Project II ⁴	1.00
MBG*3040	Molecular Biology of the Gene ⁴	0.50
MBG*3350	Laboratory Methods in Molecular Biology ⁴	0.75
MICR*3230	Immunology	0.50
NUTR*3210	Fundamentals of Nutrition	0.50
PATH*3610	Principles of Disease	0.50
TOX*4590	Biochemical Toxicology ⁴	0.50
XSEN*3030	Pharmacology and Applied Toxicology	0.50
XSEN*3040	Occupational Health and Chemistry	0.50
XSEN*3060	Pharmaceutical Analysis - Advanced	0.50
XSEN*3070	Pharmaceutical Product Formulations	0.50
XSEN*3090	Biopharmaceuticals	0.50
XSEN*3200	Pharmaceutical Organic Chemistry	0.50
XSEN*3210	Introduction to Pharmaceutical Manufacturing	0.50

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Students are advised to pay particular attention to pre-requisite requirements when choosing individual courses, and seek advice as needed.