

BIOCHEMISTRY (BIOC)

Department of Molecular and Cellular Biology, College of Biological Science

A B.Sc. in Biochemistry offers a multidisciplinary curriculum that gives students broad exposure to the life sciences with specific attention paid to the physical and chemical nature of biomolecular systems. The lab-intensive experience in this program prepares students to pursue post-graduate research opportunities in many different life science related fields. Graduates are also positioned to be successful in obtaining entrance to a number of professional programs, as well as employment in industry and government.

Major (Honours Program)

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. The major will require the completion of at least 20.00 credits as indicated below:

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at https://www.uoguelph.ca/bsc/revised_SS (https://www.uoguelph.ca/bsc/revised_SS/)

Code	Title	Credits
Semester 1		
BIOL*1090	Introduction to Molecular and Cellular Biology	0.50
CHEM*1040	General Chemistry I	0.50
MATH*1080	Elements of Calculus I	0.50
PHYS*1080	Physics for Life Sciences	0.50
0.50 Liberal Education electives		0.50
Semester 2		
BIOL*1070	Discovering Biodiversity	0.50
BIOL*1080	Biological Concepts of Health	0.50
CHEM*1050	General Chemistry II	0.50
MATH*1090	Elements of Calculus II	0.50
PHYS*1070	Physics for Life Sciences II	0.50
Semester 3		
BIOC*2580	Introduction to Biochemistry	0.50
MBG*2040	Foundations in Molecular Biology and Genetics	0.50
MICR*2420	Introduction to Microbiology	0.50
STAT*2040	Statistics I	0.50
0.50 Liberal Education electives		0.50
Semester 4		
BIOC*3560	Structure and Function in Biochemistry	0.50
CHEM*2480	Analytical Chemistry I	0.50
CHEM*2700	Organic Chemistry I	0.50
MCB*2050	Molecular Biology of the Cell	0.50
MICR*2430	Methods in Microbial Culture and Physiology	0.50
Semester 5		
BIOC*3570	Analytical Biochemistry	0.75
CHEM*2880	Physical Chemistry	0.50

CHEM*3750	Organic Chemistry II	0.50
Electives or Restricted Electives to a maximum of 2.75 total credits		1.00

Semester 6

MBG*3350	Laboratory Methods in Molecular Biology	0.75
Electives or Restricted Electives to a maximum of 2.75 total credits		2.00

Semester 7

2.50 electives or restricted electives		2.50
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Semester 8

BIOC*4540	Enzymology	0.75
Electives or Restricted Electives to a maximum of 2.75 total credits		2.00

Restricted Electives

Code	Title	Credits
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1. Students must take as part of their program: 4.00 credits from the following:¹

BIOC*4050	Protein and Nucleic Acid Structure	0.50
BIOC*4520	Metabolic Processes	0.50
BIOC*4580	Membrane Biochemistry	0.50
BIOL*3300	Applied Bioinformatics	0.50
BIOM*3200	Biomedical Physiology	1.00
MBG*3040	Molecular Biology of the Gene	0.50
MCB*3010	Dynamics of Cell Function and Signaling	0.50
MCB*4010	Advanced Cell Biology	0.50
MCB*4500	Research Project in Molecular and Cellular Biology I	1.00
MCB*4510	Research Project in Molecular and Cellular Biology	1.00
MCB*4600	Topics in Molecular and Cellular Biology	0.50
MICR*3230	Immunology	0.50
MICR*3240	Microbial Physiology and Genetics	0.50
MICR*3330	World of Viruses	0.50
MICR*4330	Molecular Virology	0.50
MICR*4530	Immunology II	0.50
PBIO*3110	Crop Physiology	0.50
PBIO*4750	Genetic Engineering of Plants	0.50
STAT*2050	Statistics II	0.50
TOX*4590	Biochemical Toxicology	0.50

2. Students must take as part of their program: 0.50 credits from the following:

PHYS*2030	Biophysics of Excitable Cells	0.50
PHYS*2240	Thermal Physics	0.50
PHYS*2330	Electricity and Magnetism I	0.50
PHYS*2600	General Astronomy	0.50
PHYS*3080	Energy	0.50

¹

At least 1.00 of these credits from BIOC*4050 Protein and Nucleic Acid Structure, BIOC*4520 Metabolic Processes, BIOC*4580 Membrane Biochemistry

Credit Summary

(20.00 Total Credits)

Code	Title	Credits
	First year science credits	4.50
	Required science courses semesters 3 - 8	7.75
	Restricted elective (# 1 and # 2 in restricted elective list)	4.50
	Liberal Education electives	1.00
	Free electives – any approved electives for B.Sc. students	2.25
Total Credits		20

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.

Minor (Honours Program)

A minor in Biochemistry consists of at least 5.00 course credits.

Code	Title	Credits
Required Courses		
BIOC*3560	Structure and Function in Biochemistry	0.50
BIOC*3570	Analytical Biochemistry	0.75
BIOC*4540	Enzymology	0.75
CHEM*2480	Analytical Chemistry I	0.50
CHEM*2700	Organic Chemistry I	0.50
MBG*2040	Foundations in Molecular Biology and Genetics	0.50
or MICR*2420	Introduction to Microbiology	
Other Courses		
Select 1.50 credits from the following: ²		
BIOC*4050	Protein and Nucleic Acid Structure	0.50
BIOC*4520	Metabolic Processes	0.50
BIOC*4580	Membrane Biochemistry	0.50
MBG*3350	Laboratory Methods in Molecular Biology	0.75
MICR*3230	Immunology	0.50
MICR*3330	World of Viruses	0.50
TOX*4590	Biochemical Toxicology	0.50

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At least 1.00 of these credits from BIOC*4050 Protein and Nucleic Acid Structure, BIOC*4520 Metabolic Processes, BIOC*4580 Membrane Biochemistry