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 labintensive 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 Requirements (Honours)

This is a major within the degree: Bachelor of Science (calendar.uoguelph.ca/undergraduate-calendar/degree-programs/bachelor-science-bsc/).

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/.

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	n 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	n 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

BIOC*3570	Analytical Biochemistry	0.75
CHEM*2880	Physical Chemistry	0.50
CHEM*3750	Organic Chemistry II	0.50
Electives or restricted credits	l electives to a maximum of 2.75 total	1.00
Semester 6		
MBG*3350	Laboratory Methods in Molecular Biology	0.75
Electives or restricted credits	l electives to a maximum of 2.75 total	2.00
Semester 7		
2.50 electives or restr	icted electives	2.50
Semester 8		
BIOC*4540	Enzymology	0.75
Electives or restricted credits	l electives to a maximum of 2.75 total	2.00
Restricted Electi	ves	
Code	Title	Credits
1. Students must take the following: ¹	e as part of their program: 4.00 credits fom	
BIOC*4050	Protein and Nucleic Acid Structure	0.50
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Title	Credits
e as part of their program: 4.00 credits fom	
Protein and Nucleic Acid Structure	0.50
Metabolic Processes	0.50
Membrane Biochemistry	0.50
Applied Bioinformatics	0.50
Biomedical Physiology	1.00
Molecular Biology of the Gene	0.50
Dynamics of Cell Function and Signaling	0.50
Advanced Cell Biology	0.50
Communication in Molecular and Cellular Biology	0.50
Research Project in Molecular and Cellular Biology I	1.00
Research Project in Molecular and Cellular Biology	1.00
Topics in Molecular and Cellular Biology	0.50
Immunology	0.50
Microbial Physiology and Genetics	0.50
World of Viruses	0.50
Molecular Virology	0.50
Immunology II	0.50
Crop Physiology	0.50
Genetic Engineering of Plants	0.50
Statistics II	0.50
Biochemical Toxicology	0.50
e as part of their program: 0.50 credits from	
Biophysics of Excitable Cells	0.50
Thermal Physics	0.50
Electricity and Magnetism I	0.50
General Astronomy	0.50
Energy	0.50
	Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Communication in Molecular and Cellular Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics World of Viruses Molecular Virology Immunology II Crop Physiology Genetic Engineering of Plants Statistics II Biochemical Toxicology as part of their program: 0.50 credits from Biophysics of Excitable Cells Thermal Physics Electricity and Magnetism I General Astronomy

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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

Credit Summary

(20.00 Total Credits)

Code	Title	Credits
First year science cr	redits	4.50
Required science co	urses semesters 3 - 8	7.75
Restricted electives	(# 1 and # 2 in restricted elective list)	4.50
Liberal Education ele	ectives	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.

Co-op Requirements (Honours)

This is a major within the degree: Bachelor of Science (calendar.uoguelph.ca/undergraduate-calendar/degree-programs/bachelor-science-bsc/).

The Co-op program in Biochemistry is a four and a half year program, including four work terms. Students must complete a Fall (Sequence B only), Winter and Summer work term, and must follow the academic work schedule as outlined below (also found on the Co-operative Education website: https://www.recruitguelph.ca/cecs/).

Academic and Co-op Work Term Schedule - Sequence A

	•		•
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	COOP*2000 Work Term II	COOP*3000 Work Term III
4	Academic Semester 6	Academic Semester 7	COOP*4000 Work Term IV
5	Academic Semester 8	N/A	N/A

Academic and Co-op Work Term Schedule – Sequence B

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

5	Academic	N/A	N/A
	Semester 8		

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	e credits	4.50
Required science	courses semesters 3 - 8	7.75
Restricted elective	ve (# 1 and #2 in restricted elective list)	4.50
Liberal Education	n electives	1.00
Free electives – a	any approved electives for B.Sc. students	2.25
Co-op Work Term	s	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.

Recommended Program Sequence

Sequence A

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/.

Code	Title	Credits
Semester 1 - Fall		
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	n electives	0.50
Semester 2 - Winter		
BIOL*1070	Discovering Biodiversity	0.50
BIOL*1080	Biological Concepts of Health	0.50
CHEM*1050	General Chemistry II	0.50
COOP*1100	Introduction to Co-operative Education	0.00
MATH*1090	Elements of Calculus II	0.50
PHYS*1070	Physics for Life Sciences II	0.50
Summer Semester		
No academic semest	er or work term	
Semester 3 - Fall		
BIOC*2580	Introduction to Biochemistry	0.50
CHEM*2480	Analytical Chemistry I	0.50
CHEM*2880	Physical Chemistry	0.50
MBG*2040	Foundations in Molecular Biology and Genetics	0.50

0.50 Liberal Education	on electives	0.50
Winter Semester		
COOP*1000	Co-op Work Term I	0.50
Semester 4 - Summe	er	
BIOC*3560	Structure and Function in Biochemistry	0.50
CHEM*2700	Organic Chemistry I	0.50
MICR*2420	Introduction to Microbiology	0.50
STAT*2040	Statistics I	0.50
Electives or Restrictoredits	ed Electives to a maximum of 2.75 total	0.75
Semester 5 - Fall		
CHEM*3750	Organic Chemistry II	0.50
BIOC*3570	Analytical Biochemistry	0.75
MCB*2050	Molecular Biology of the Cell	0.50
MICR*2430	Methods in Microbial Culture and Physiology	0.50
0.50 electives or res	tricted electives	0.50
Winter Semester		
COOP*2000	Co-op Work Term II	0.50
Summer Semester		
COOP*3000	Co-op Work Term III	0.50
Semester 6 - Fall		
MBG*3350	Laboratory Methods in Molecular Biology	0.75
Electives or Restrictoredits	ed Electives to a maximum of 2.75 total	2.00
Semester 7 - Winter		
BIOC*4540	Enzymology	0.75
Electives or Restrictoredits	ed Electives to a maximum of 2.75 total	2.00
Summer Semester		
COOP*4000	Co-op Work Term IV	0.50
Semester 8 - Fall		
2.50 electives or res	tricted electives	2.50
Restricted Electives		
Code	Title	Credits
1. Students must tal the following: ²	ke as part of their program: 4.00 credits from	
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*4020	Communication in Molecular and Cellular 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 tak the following:	e as part of their program: 0.50 credits from	
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

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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.

Sequence B

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/.

Code	Title	Credits
Semester 1 - Fall		
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	n electives	0.50
Semester 2 - Winter		
BIOL*1070	Discovering Biodiversity	0.50
BIOL*1080	Biological Concepts of Health	0.50
CHEM*1050	General Chemistry II	0.50
COOP*1100	Introduction to Co-operative Education	0.00
MATH*1090	Elements of Calculus II	0.50
PHYS*1070	Physics for Life Sciences II	0.50
Summer Semester		
No academic semeste	er or work term	
Semester 3 - Fall		
BIOC*2580	Introduction to Biochemistry	0.50
CHEM*2480	Analytical Chemistry I	0.50
CHEM*2880	Physical Chemistry	0.50
MBG*2040	Foundations in Molecular Biology and Genetics	0.50
0.50 Liberal Education	n electives	0.50
Winter Semester		
COOP*1000	Co-op Work Term I	0.50
Semester 4 - Summer		
CHEM*2700	Organic Chemistry I	0.50
BIOC*3560	Structure and Function in Biochemistry	0.50

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MICR*2420	Introduction to Microbiology	0.50
STAT*2040	Statistics I	0.50
Electives or Restricte credits	d Electives to a maximum of 2.75 total	0.75
Fall Semester		
COOP*2000	Co-op Work Term II	0.50
Semester 5 - Winter		
MCB*2050	Molecular Biology of the Cell	0.50
MICR*2430	Methods in Microbial Culture and Physiology	0.50
1.50 electives or restr	ricted electives	1.50
Summer Semester		
COOP*3000	Co-op Work Term III	0.50
Semester 6 - Fall		
CHEM*3750	Organic Chemistry II	0.50
BIOC*3570	Analytical Biochemistry	0.75
2.00 electives or restr		2.00
Semester 7 - Winter		
BIOC*4540	Enzymology	0.75
MBG*3350	Laboratory Methods in Molecular Biology	0.75
1.00 electives or restu		1.00
Summer Semester	noted electives	1.00
COOP*4000	Co-op Work Term IV	0.50
Semester 8 - Fall	GO OF WORK TERRITY	0.50
2.50 electives or resti	riated electives	2.50
	nicted electives	2.30
Restricted Electives		
Codo	Tial a	Cuadita
Code	Title	Credits
	Title e as part of their program: 4.00 credits from	Credits
Students must take		O.50
1. Students must take the following: ³	e as part of their program: 4.00 credits from	
1. Students must take the following: ³ BIOC*4050	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure	0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes	0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry	0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics	0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology	0.50 0.50 0.50 0.50 1.00
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene	0.50 0.50 0.50 0.50 1.00 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*3010	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling	0.50 0.50 0.50 0.50 1.00 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*3010 MCB*4010	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular	0.50 0.50 0.50 0.50 1.00 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*3010 MCB*4010 MCB*4500	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology	0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*4010 MCB*4510 MCB*4500 MCB*4500 MCB*4500	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology	0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*4010 MCB*4510 MCB*4510 MCB*4600 MICR*3230	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*4010 MCB*4010 MCB*4500 MCB*4510 MCB*4500 MICR*3230 MICR*3240	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*3010 MCB*4510 MCB*4500 MCB*4510 MCB*4530 MICR*3230 MICR*3230 MICR*3230 MICR*3330	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics World of Viruses	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00 0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*4010 MCB*4510 MCB*4510 MCB*4510 MCB*4530 MICR*3230 MICR*3230 MICR*3230 MICR*3330 MICR*3330 MICR*3330 MICR*4330	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics World of Viruses Molecular Virology	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00 0.50 0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*4010 MCB*4510 MCB*4510 MCB*4510 MCB*4530 MICR*3230 MICR*3230 MICR*3330 MICR*4330 MICR*4530 MICR*4530	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics World of Viruses Molecular Virology Immunology II	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00 0.50 0.50 0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*3010 MCB*4510 MCB*4510 MCB*4530 MICR*3230 MICR*3230 MICR*3230 MICR*4530 PBIO*3110	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics World of Viruses Molecular Virology Immunology II Crop Physiology	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00 0.50 0.50 0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*3010 MCB*4510 MCB*4510 MCB*4530 MICR*3230 MICR*3230 MICR*3230 MICR*3330 MICR*4530 PBIO*3110 PBIO*4750	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics World of Viruses Molecular Virology Immunology II Crop Physiology Genetic Engineering of Plants	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00 0.50 0.50 0.50 0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*4010 MCB*4510 MCB*4510 MCB*4510 MCB*4510 MCB*4510 MCR*3230 MICR*3230 MICR*3230 MICR*3230 MICR*3240 MICR*3330 MICR*4530 PBIO*3110 PBIO*4750 STAT*2050	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics World of Viruses Molecular Virology Immunology II Crop Physiology Genetic Engineering of Plants Statistics II	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00 1.00 0.50 0.50 0.50 0.50 0.50 0.50 0.50
1. Students must take the following: ³ BIOC*4050 BIOC*4520 BIOC*4580 BIOL*3300 BIOM*3200 MBG*3040 MCB*3010 MCB*4510 MCB*4510 MCB*4510 MCB*4510 MICR*3230 MICR*3230 MICR*3240 MICR*3330 MICR*4330 MICR*4530 PBIO*3110 PBIO*4750 STAT*2050 TOX*4590	e as part of their program: 4.00 credits from Protein and Nucleic Acid Structure Metabolic Processes Membrane Biochemistry Applied Bioinformatics Biomedical Physiology Molecular Biology of the Gene Dynamics of Cell Function and Signaling Advanced Cell Biology Research Project in Molecular and Cellular Biology I Research Project in Molecular and Cellular Biology Topics in Molecular and Cellular Biology Immunology Microbial Physiology and Genetics World of Viruses Molecular Virology Immunology II Crop Physiology Genetic Engineering of Plants	0.50 0.50 0.50 0.50 1.00 0.50 0.50 1.00 1.00 1.00 0.50 0.50 0.50 0.50 0.50 0.50

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

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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.

Minor Requirements (Honours)

This minor cannot be combined with a major in Biochemistry.

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