

BIOMEDICAL TOXICOLOGY (BTOX)

Interdisciplinary Program, Departments of Biomedical Sciences, Chemistry, School of Environmental Sciences, Molecular and Cellular Biology

Major Requirements (Honours)

This is a major within the degree: Bachelor of Science.

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. A minimum of 20.00 credits are required for graduation.

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 electives		0.50
Semester 2		
BIOL*1080	Biological Concepts of Health	0.50
CHEM*1050	General Chemistry II	0.50
PHYS*1070	Physics for Life Sciences II	0.50
STAT*2040	Statistics I	0.50
0.50 Liberal Education electives		0.50
Semester 3		
BIOC*2580	Introduction to Biochemistry	0.50
MBG*2040	Foundations in Molecular Biology and Genetics	0.50
TOX*2000	Principles of Toxicology	0.50
1.00 elective or Liberal Education electives		1.00
Semester 4		
BIOM*3200	Biomedical Physiology	1.00
CHEM*2480	Analytical Chemistry I: Chemical Analysis	0.50
CHEM*2700	Organic Chemistry I: Fundamentals	0.50
0.50 electives or restricted electives		0.50
Semester 5		
BIOC*3560	Structure and Function in Biochemistry	0.50
CHEM*3430	Analytical Chemistry II: Instrumental Analysis	0.50
MCB*2050	Molecular Biology of the Cell	0.50
NUTR*3210	Fundamentals of Nutrition	0.50
0.50 electives or restricted electives		0.50
Semester 6		
BIOM*3090	Principles of Pharmacology	0.50
PATH*3610	Principles of Disease	0.50
TOX*3360	Environmental Chemistry and Toxicology	0.50

BIOM*3040	Medical Embryology	0.75
or MBG*3350	Laboratory Methods in Molecular Biology	
Electives or restricted electives to a maximum of 2.75 total credits in this semester		0.50

Semester 7

NUTR*4510	Toxicology, Nutrition and Food	0.50
TOX*4000	Medical Toxicology	0.50
TOX*4590	Biochemical Toxicology	0.50
TOX*4900	Toxicology Research Project I (or 1.00 Electives or Restricted Electives)	1.00

Semester 8

ENV*4000	Toxicological Risk Assessment	0.50
TOX*4100	Toxicological Pathology	0.50
TOX*4200	Topics in Toxicology	0.50
1.00 electives or restricted electives		1.00

Restricted Electives

At least 1.50 credits must be completed from the following list of allowable courses.

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

Code	Title	Credits
ANSC*4650	Comparative Immunology	0.50
BIOM*3040	Medical Embryology	0.75
BIOM*4050	Biomedical Aspects of Aging	0.50
BIOM*4070	Biomedical Histology	0.50
BIOM*4090	Pharmacology	0.50
BIOM*4150	Cancer Biology	0.50
CHEM*3750	Organic Chemistry II: Structure and Synthesis	0.50
CHEM*4020	Chemical Discovery	0.50
CHEM*4740	Bioorganic Chemistry	0.50
MBG*3040	Molecular Biology of the Gene	0.50
MBG*3350	Laboratory Methods in Molecular Biology	0.75
MCB*4010	Advanced Cell Biology	0.50
MICR*3230	Immunology	0.50
NUTR*4090	Functional Foods and Nutraceuticals	0.50
NUTR*4320	Nutrition and Metabolic Control of Disease	0.50
PATH*3040	Principles of Parasitology	0.50
POPM*3240	Epidemiology	0.50
POPM*4040	Epidemiology of Food-borne Diseases	0.50
STAT*2050	Statistics II	0.50
STAT*3510	Environmental Risk Assessment	0.50
TOX*4900	Toxicology Research Project I	1.00
TOX*4910	Toxicology Research Project II	1.00

Credit Summary

(20.00 Total Credits)

Code	Title	Credits
First year science credits		4.00
Required science courses semesters 3 – 8		10.75

Restricted electives	1.50
Liberal Education electives	1.50
Free electives - any approved elective 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 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.

The Co-op program in Biomedical Toxicology is a five 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/>).

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

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	10.75
	Restricted electives	1.50
	Liberal Education electives	1.50
	Free electives - any approved elective for B.Sc. students	2.25
	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.

Recommended Program Sequence

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 electives	0.50
Semester 2 - Winter		
BIOL*1080	Biological Concepts of Health	0.50
CHEM*1050	General Chemistry II	0.50
COOP*1100	Introduction to Co-operative Education	0.00
PHYS*1070	Physics for Life Sciences II	0.50
STAT*2040	Statistics I	0.50
	0.50 Liberal Education electives	0.50
Semester 3 - Fall		
BIOC*2580	Introduction to Biochemistry	0.50
CHEM*2480	Analytical Chemistry I: Chemical Analysis	0.50
MBG*2040	Foundations in Molecular Biology and Genetics	0.50
TOX*2000	Principles of Toxicology	0.50
	0.50 Liberal Education electives	0.50
Winter Semester		
COOP*1000	Co-op Work Term I	0.50
Summer Semester		
COOP*2000	Co-op Work Term II	0.50
Semester 4 - Fall		
BIOC*3560	Structure and Function in Biochemistry	0.50
CHEM*3430	Analytical Chemistry II: Instrumental Analysis	0.50
MCB*2050	Molecular Biology of the Cell	0.50
NUTR*3210	Fundamentals of Nutrition	0.50
	0.50 electives or restricted electives	0.50
Semester 5 - Winter		
CHEM*2700	Organic Chemistry I: Fundamentals	0.50
BIOM*3200	Biomedical Physiology	1.00
TOX*3360	Environmental Chemistry and Toxicology	0.50
	0.50 electives or restricted electives	0.50
Summer Semester		
COOP*3000	Co-op Work Term III	0.50
Fall Semester		
COOP*4000	Co-op Work Term IV	0.50
Semester 6 - Winter		
BIOM*3090	Principles of Pharmacology	0.50
PATH*3610	Principles of Disease	0.50
BIOM*3040	Medical Embryology	0.75
	or MBG*3350 Laboratory Methods in Molecular Biology	

Electives or restricted electives to a maximum of 2.75 total credits in this semester 0.50

Semester 7 - Fall

NUTR*4510	Toxicology, Nutrition and Food	0.50
TOX*4000	Medical Toxicology	0.50
TOX*4590	Biochemical Toxicology	0.50
TOX*4900	Toxicology Research Project I (or 1.00 Electives or Restricted Electives)	1.00

Semester 8 - Winter

ENVS*4000	Toxicological Risk Assessment	0.50
TOX*4100	Toxicological Pathology	0.50
TOX*4200	Topics in Toxicology	0.50
1.00 electives or restricted electives		1.00

Restricted Electives

At least 1.50 credits must be completed from the following list of allowable courses.

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

Code	Title	Credits
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BIOM*4090	Pharmacology	0.50
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CHEM*3750	Organic Chemistry II: Structure and Synthesis	0.50
CHEM*4020	Chemical Discovery	0.50
CHEM*4740	Bioorganic Chemistry	0.50
MBG*3040	Molecular Biology of the Gene	0.50
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MCB*4010	Advanced Cell Biology	0.50
MICR*3230	Immunology	0.50
NUTR*4090	Functional Foods and Nutraceuticals	0.50
NUTR*4320	Nutrition and Metabolic Control of Disease	0.50
PATH*3040	Principles of Parasitology	0.50
POPM*3240	Epidemiology	0.50
POPM*4040	Epidemiology of Food-borne Diseases	0.50
STAT*2050	Statistics II	0.50
STAT*3510	Environmental Risk Assessment	0.50
TOX*4900	Toxicology Research Project I	1.00
TOX*4910	Toxicology Research Project II	1.00