

MICROBIOLOGY, B.SC. HONOURS

Degree Requirements

Honours

Note¹

Course	Title	Hours
Year 1		
MBIO 1010	Microbiology I (B) ²	3
BIOL 1020	Biology 1: Principles and Themes	3
BIOL 1030	Biology 2: Biological Diversity, Function and Interactions	3
CHEM 1100	Introductory Chemistry 1: Atomic and Molecular Structure and Energetics	3
CHEM 1110	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties (C+)	3
CHEM 1120	Introduction to Chemistry Techniques ³	3
Hours		18

Years 1-2

In Year 1 or Year 2 the following must be completed:		
3 credit hours of Mathematics or Physics chosen from:		3
MATH 1240	Elementary Discrete Mathematics ⁴	
MATH 1300	Vector Geometry and Linear Algebra ⁴	
MATH 1500	Introduction to Calculus ⁴	
PHYS 1020 or PHYS 1050	General Physics 1 or Physics 1: Mechanics	
One of:		3
STAT 1150	Introduction to Statistics and Computing ⁵	
STAT 1000	Basic Statistical Analysis 1 ⁵	
6 credit hours from the Faculty of Arts, which should include the required "W" course		6
6 credit hours of electives		6
3 credit hours of Microbiology courses		3
Hours		21

Year 2

MBIO 2020	Microbiology II	3
MBIO/CHEM 2700	Biochemistry 1: Biomolecules and an Introduction to Metabolic Energy	3
MBIO/CHEM 2710	Biochemistry 2: Catabolism, Synthesis, and Information Pathways ⁶	3
CHEM 2720	Principles and Practices of the Modern Biochemistry Laboratory	3
BIOL 2500	Genetics 1	3
BIOL 2520	Cell Biology	3
CHEM 2100	Organic Chemistry 1: Foundations of Organic Chemistry	3
Hours		21

Year 3

MBIO 3010	Mechanisms of Microbial Disease	3
MBIO 3032	Microbiology III: Physiology and Metabolism	3

MBIO 3410	Molecular Biology	3
MBIO 3600	Molecular Microbiology Techniques	3
MBIO 3700	Experimental Microbiology Laboratory	3
Hours		15

Years 3-4

24 credit hours of Microbiology courses including (a single course may meet more than one of these requirements):

- One course from each of Lists A, B, C, D, and E (see below); ⁷	
- 12 credit hours at the 4000-level;	
- 3 credit hour course with a laboratory or tutorial (List F) ⁷	
12 credit hours from the Options List (see below)	12
3 credit hours of electives	3
Hours	
39	

Year 4

MBIO 4530	Project in Microbiology	6
Hours		6
Total Hours		120

- ¹ MBIO 1220 and MBIO 1410 cannot be used to satisfy course requirements in a Major or Honours program.
- ² MBIO 1010 may be completed in either year 1 or year 2. It is recommended that it be completed in first year.
- ³ CHEM 1126 may be taken in place of CHEM 1120.
- ⁴
 - MATH 1220 or MATH 1310 may be taken in place of MATH 1300;
 - MATH 1230, MATH 1510, MATH 1520 or MATH 1690 may be taken in place of MATH 1500.
 - MATH 1200 may be used in place of MATH 1240.
- ⁵ STAT 1150 is recommended over STAT 1000.
- ⁶ It is strongly recommended that MBIO 2710 (or CHEM 2710) and CHEM 2720 be completed prior to Year 3 as they are prerequisite to many upper level MBIO courses.
- ⁷
 - List A:** MBIO 2230, MBIO 3282, MBIO 3472, MBIO 4480, MBIO 4520;
 - List B:** MBIO 2420, MBIO 3000, MBIO 4020, MBIO 4410, MBIO 4520;
 - List C:** MBIO 3430, MBIO 4440, MBIO 4700;
 - List D:** MBIO 4602, MBIO 4612, MBIO 4672;
 - List E:** MBIO 3450, MBIO 3460, MBIO 4540;
 - List F:** MBIO 3460, MBIO 4440, MBIO 4480, MBIO 4520.

(Letters in brackets indicate minimum prerequisite standing for further study.)

Honours Co-operative Option

Note^{1,8}

Course	Title	Hours
Year 1		
MBIO 1010	Microbiology I (B) ²	3
BIOL 1020	Biology 1: Principles and Themes	3
BIOL 1030	Biology 2: Biological Diversity, Function and Interactions	3
CHEM 1100	Introductory Chemistry 1: Atomic and Molecular Structure and Energetics	3
CHEM 1110	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties (C+)	3

CHEM 1120	Introduction to Chemistry Techniques ³	3
Hours		18
Years 1-2		
In Year 1 or Year 2 the following must be completed:		
3 credit hours of Mathematics or Physics chosen from:		3
MATH 1240	Elementary Discrete Mathematics ⁴	
MATH 1300	Vector Geometry and Linear Algebra ⁴	
MATH 1500	Introduction to Calculus ⁴	
PHYS 1020 or PHYS 1050	General Physics 1 or Physics 1: Mechanics	
One of:		3
STAT 1150	Introduction to Statistics and Computing ⁵	
STAT 1000	Basic Statistical Analysis 1 ⁵	
6 credit hours from the Faculty of Arts, which should include the required "W" course		6
6 credit hours of electives		6
3 credit hours from Microbiology courses or from the Option List (see below)		3
Hours		21
Year 2		
MBIO 2020	Microbiology II	3
MBIO/CHEM 2700	Biochemistry 1: Biomolecules and an Introduction to Metabolic Energy	3
MBIO/CHEM 2710	Biochemistry 2: Catabolism, Synthesis, and Information Pathways ⁶	3
CHEM 2720	Principles and Practices of the Modern Biochemistry Laboratory	3
BIOL 2500	Genetics 1	3
BIOL 2520	Cell Biology	3
CHEM 2100	Organic Chemistry 1: Foundations of Organic Chemistry	3
Hours		21
Year 3		
MBIO 3010	Mechanisms of Microbial Disease ⁸	3
MBIO 3032	Microbiology III: Physiology and Metabolism	3
MBIO 3410	Molecular Biology ⁸	3
MBIO 3600	Molecular Microbiology Techniques	3
MBIO 3700	Experimental Microbiology Laboratory	3
Hours		15
Years 3-4		
27 credit hours of Microbiology courses including (a single course may meet more than one of these requirements):		27
- One course from each of Lists A, B, C, D, and E (see below); ⁷		
- 15 credit hours at the 4000-level;		
- 3 credit hour course with a laboratory or tutorial (List F). ⁷		
15 credit hours from the Option List (see below)		15
3 credit hours of electives		3
Co-op Requirements:		
SCI 3980	Co-operative Education Work Term 1	0
SCI 3990	Co-operative Education Work Term 2	0
SCI 4980	Co-operative Education Work Term 3	0

SCI 4990	Co-operative Education Work Term 4 (if a 4th work term is selected)	0
Hours		45
Total Hours		120

- MBIO 1220 and MBIO 1410 cannot be used to satisfy course requirements in a Major or Honours program.
- MBIO 1010 may be completed in either year 1 or year 2. It is recommended that it be completed in first year.
- CHEM 1126 may be taken in place of CHEM 1120.
- MATH 1220 or MATH 1310 may be taken in place of MATH 1300;
 - MATH 1230, MATH 1510, MATH 1520 or MATH 1690 may be taken in place of MATH 1500.
 - MATH 1200 may be used in place of MATH 1240.
- STAT 1150 is recommended over STAT 1000.
- It is strongly recommended that MBIO 2710 (or CHEM 2710) and CHEM 2720 be completed prior to Year 3 as they are prerequisite to many upper level MBIO courses.
- List A:** MBIO 2230, MBIO 3282, MBIO 3472, MBIO 4480, MBIO 4520;
 - List B:** MBIO 2420, MBIO 3000, MBIO 4020, MBIO 4410, MBIO 4520;
 - List C:** MBIO 3430, MBIO 4440, MBIO 4700;
 - List D:** MBIO 4602, MBIO 4612, MBIO 4672;
 - List E:** MBIO 3450, MBIO 3460, MBIO 4540;
 - List F:** MBIO 3460, MBIO 4440, MBIO 4480, MBIO 4520.
- Students in the Co-operative Option must complete MBIO 3010 and MBIO 3410 before their first employment term.

(Letters in brackets indicate minimum prerequisite standing for further study.)

Option List for All Microbiology Programs

Agroecology

Course	Title	Hours
AGEC 2370	Principles of Ecology	3

Biological Sciences

Course	Title	Hours
BIOL 2242	The Flowering Plants	3
BIOL 2260	Biology of Fungi and Lichens	3
BIOL 2300	Principles of Ecology	3
BIOL 2380	Introductory Toxicology	3
BIOL 2410	Human Physiology 1	3
BIOL 2420	Human Physiology 2	3
BIOL 3290	Medicinal and Hallucinogenic Plants	3
BIOL 3370	Limnology	3
BIOL 3400	Plant Physiology	3
BIOL 3452	Environmental Plant Physiology	3
BIOL 3470	Environmental Physiology of Animals 1	3
BIOL 3472	Environmental Physiology of Animals 2	3
BIOL 3500	Genetics 2	3
BIOL 3542	Developmental Biology	3
BIOL 3560	Comparative Animal Histology	3
BIOL 4480	Comparative Endocrinology	3
BIOL 4540	Developmental Molecular Biology	3
BIOL 4542	Genes and Development	3
BIOL 4544	Advanced Developmental and Cellular Biology	3

BIOL 4554	Molecular Biology Techniques for Eukaryotes - DNA	3
BIOL 4556	Molecular Biology Techniques for Eukaryotes - RNA	3
BIOL 4560	Microtechnique	3

Chemistry

Course	Title	Hours
CHEM 2110	Organic Chemistry 2: Foundations of Organic Synthesis	3
CHEM 2122	Experimental Organic Chemistry	3
CHEM 2600	Physical Chemistry 1	3
CHEM 3600	Physical Chemistry 2	3
CHEM 2300	Inorganic Chemistry 1: Structure and Applications	3
CHEM 2510	Introduction to Analytical Chemistry	3
CHEM 3100	Organic Chemistry 3: Advanced Organic Synthesis	3
CHEM 3500	Instrumental Analysis	3
CHEM 3700	Biophysical Chemistry	3
CHEM 4590	Bioanalytical Methods	3
CHEM 4360	Signalling and Regulation of Gene Expression	3
CHEM 4370	Glycobiology and Protein Activation	3
CHEM 4620	Biochemistry of Nucleic Acids	3
CHEM 4630	Biochemistry of Proteins	3
CHEM 4670	Drug Design and Drug Discovery	3

Environmental Science

Course	Title	Hours
ENVR 2180	Introductory Toxicology	3

Food Sciences

Course	Title	Hours
FOOD 4150	Food Microbiology 1	3

General Agriculture

Course	Title	Hours
AGRI 2180	Introductory Toxicology	3

Pharmacology

Course	Title	Hours
PHAC 4030	Drugs in Human Disease I	3
PHAC 4040	Drugs in Human Disease II	3

Plant Science

Course	Title	Hours
PLNT 3400	Plant Physiology	3

Statistics

Course	Title	Hours
STAT 2000 or STAT 2150	Basic Statistical Analysis 2 Statistics and Computing	3

Note: Other suitable options may be selected with permission of the department.