

# MICROBIOLOGY, B.SC. MAJOR

## Degree Requirements

### Four Year Major (Including Co-operative Option if Selected) <sup>1,2,3</sup>

Course	Title	Hours
<b>Year 1</b>		
MBIO 1010	Microbiology I (C+) <sup>4</sup>	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 <sup>5</sup>	3
<b>Hours</b>		<b>18</b>

#### 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 <sup>6</sup>	
MATH 1300	Vector Geometry and Linear Algebra <sup>6</sup>	
MATH 1500	Introduction to Calculus <sup>6</sup>	
PHYS 1020	General Physics 1	
or PHYS 1050	or Physics 1: Mechanics	
One of:		3
STAT 1150	Introduction to Statistics and Computing <sup>7</sup>	
STAT 1000	Basic Statistical Analysis 1 <sup>7</sup>	
6 credit hours from the Faculty of Arts, which should include the required "W" course		6
9 credit hours of electives <sup>8</sup>		9
<b>Hours</b>		<b>21</b>

#### Year 2

MBIO 2020	Microbiology II	3
MBIO/CHEM 2700	Biochemistry 1: Biomolecules and an Introduction to Metabolic Energy <sup>9</sup>	3
MBIO/CHEM 2710	Biochemistry 2: Catabolism, Synthesis, and Information Pathways <sup>2,9</sup>	3
CHEM 2720	Principles and Practices of the Modern Biochemistry Laboratory <sup>2,9</sup>	3
BIOL 2500	Genetics 1	3
BIOL 2520	Cell Biology	3
CHEM 2100	Organic Chemistry 1: Foundations of Organic Chemistry <sup>9</sup>	3
<b>Hours</b>		<b>21</b>

#### Years 3-4

MBIO 3010	Mechanisms of Microbial Disease <sup>2</sup>	3
MBIO 3032	Microbiology III: Physiology and Metabolism	3
MBIO 3410	Molecular Biology <sup>2</sup>	3
MBIO 3600	Molecular Microbiology Techniques	3
MBIO 3700	Experimental Microbiology Laboratory	3

24 credit hours of Microbiology courses including 15 credit hours at the 4000 level <sup>8,10</sup> 24

9 credit hours of Microbiology courses or courses chosen from the Option List (see below) <sup>8,10</sup> 9

12 credit hours of electives <sup>8</sup> 12

<b>Co-op Requirements (if selected): <sup>2</sup></b>		
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
<b>Hours</b>		<b>60</b>

**Total Hours 120**

- MBIO 1220 and MBIO 1410 cannot be used to satisfy course requirements in a Major or Honours program.
- Students in the Co-operative Option are required to complete MBIO 2710 (CHEM 2710), CHEM 2720, MBIO 3010 and MBIO 3410 before their first employment term.
- IMPORTANT: The four year Major program need not be completed in the manner prescribed in the grid above. The grid indicates one possible arrangement of the required courses and is meant to be a guide around which students can plan their program.
- MBIO 1010 may be completed in either Year 1 or Year 2. It is recommended that it be completed in the first year.
- CHEM 1122 and CHEM 1126 may be used in place of CHEM 1120. Note: CHEM 1122 and CHEM 1126 are restricted to Price Faculty of Engineering students.
- MATH 1210, MATH 1220, or MATH 1310 may be taken in place of MATH 1300;
  - MATH 1230, MATH 1510, the former MATH 1520, or MATH 1524 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.
- By careful choice of electives, programs may be selected giving emphasis to various areas of Microbiology, e.g., Biochemistry and Molecular Biology or Environmental and Ecological Microbiology. The listed requirements are minimum requirements. Students are reminded that should they wish to take further courses in Microbiology, they are at liberty to do so within the degree regulations. Students must be aware of course and grade prerequisites when selecting 3000 and 4000 level Microbiology courses as well as specific options courses from other departments.
- CHEM 2100 must be taken before MBIO 2710 (CHEM 2710). Courses (MBIO 2700 and CHEM 2700) and (MBIO 2710 and CHEM 2710) are the same and credit cannot be held for both. 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.
- MBIO 4530 may be selected only by special permission.

(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 2300	Inorganic Chemistry 1: Structure and Applications	3
CHEM 2510	Introduction to Analytical Chemistry	3
CHEM 2600	Physical Chemistry 1	3
CHEM 3100	Organic Chemistry 3: Advanced Organic Synthesis	3
CHEM 3500	Instrumental Analysis	3
CHEM 3600	Physical Chemistry 2	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	Basic Statistical Analysis 2	3
or STAT 2150	Statistics and Computing	

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