Honours

The Honours program is designed for students planning a professional career in Biological Sciences at the graduate level. Such students are strongly advised to enter the Honours program at the beginning of second year.

Appropriate courses will be arranged in consultation with the Program Advisor who may be contacted through the Biological Sciences Office, Z320 Duff Roblin. Students are encouraged to select a specific theme area of study as part of their Biological Sciences program. Should a student not opt for one of the five theme groups, they may design their own program by completing the core course requirements plus 30 credit hours of 3000 and/or 4000 level Biological Sciences courses. See the information below outlining the different theme areas offered by the Department of Biological Sciences.

To enter the Biological Sciences Honours program a student must have a "B" in either BIOL 1030 or CHEM 1310 and not less than a "C+" in the other course. In addition, a student is required to have a degree Grade Point Average of 2.50 on all courses completed at the end of Year 1 in order to enter Honours in Year 2. STAT 1000 and the 3 credit hours of specified Mathematics, Physics or Statistics courses can be completed in University 1 or Year 2.

To continue in the Honours program, i.e., to proceed from Year 2 to Year 3 and Year 3 to Year 4, a student must have a Degree Grade Point Average of 3.00, and in addition, must have a 3.00 average on all Biology courses during each session and a grade of "C+" or better in each Biology course.

In order to graduate with an Honours degree, a student must obtain a Degree Grade Point Average of 3.00 or better, a grade of "C+" or better in all Biology courses, and a grade of "C" or better on all remaining courses that contribute to the degree.

Four Year Honours Cooperative Option

Students interested in alternating academic terms and terms of paid employment as part of their Honours Biological Sciences program may enter the Cooperative Option after completion of their second year in Honours Biological Sciences. This program provides students with 12 months of paid employment by the time they graduate. It enables them to obtain work experience with participating firms, government agencies and University units.

There are several themes offered within the Biological Sciences Program and the Cooperative Option can be completed within any of these areas of study. See below for a description of the different themes and the course requirements of those themes offered by the Department of Biological Sciences.

Students may apply for openings in the Biological Sciences Honours Cooperative Option after completing at least two years (60 credit hours) in the Honours program, usually in the fall of their third year. Before the first employment term begins, the prerequisite courses listed below must be completed. Acceptance and continuation in the program is dependent upon the student receiving employment placements.

Prerequisite courses to be completed before employment terms begin: BIOL 1020 and BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000, 3 credit hours of specified Mathematics or Physics, **BIOL 2300, BIOL 2500, BIOL 2520, and BIOL 3100** *. **In addition, students must complete 9 credit hours from program core courses as follows: students must select one course from Group A (BIOL 2200, BIOL 2210), plus one course from Group B (BIOL 2240, BIOL 2242, BIOL 2260), plus one additional course from either Group A or Group B.** [* A Pre-Coop Workshop may be substituted for **BIOL 3100** only to permit an employment term in September of Year 3, but **BIOL 3100** must still be taken.]

Students should note that the course and grade requirements for the Biological Sciences Honours Cooperative Option are the same as those for the regular Honours program, with the addition of the Work Term courses (see above). To continue in the Biological Sciences Honours Cooperative program, a student must have a Degree Grade Point Average of 3.00, and in addition, must have a 3.00 Grade Point Average on all Biological Sciences courses during that term, a grade of "C+" or better in each Biological Sciences course, and a pass on all work term courses.

Students should refer to the general faculty regulations for B. Sc. (Honours) Cooperative Options in Section 3.6.

Employment term positions available to the students will be approved by the department and may include positions within Biological Sciences, other University departments or positions with employers outside the University**.** Employers will select the students they wish to employ. The first employment term will preferably be taken in January or May of the third year, but may under exceptional circumstances begin in the preceding September. Students are advised that satisfying the entrance requirements does not guarantee a place in the Cooperative Option if the demand for places exceeds the number of places available. The department reserves the right to determine and select the best qualified applicants.

The program will include three employment terms, each of 4-months duration, two of which may be consecutive. A fourth work term is optional. Students are required to register in and pay fees for each employment term prior to its commencement. Students will be required to submit an employment report upon the completion of each employment term. In order to stay in the Cooperative program, a student must obtain a grade of "pass" for each work term report.

Four Year Major

The four year Major program is also designed for students planning a professional career in the Biological Sciences, but who may not be considering graduate training. It will provide intensive training in all areas of Biology comparable to that of the Honours program, but has less demanding performance requirements. Students who so wish, and have appropriate standing and course selection, may transfer to the Honours program at any time up to the commencement of Year 4.

Appropriate courses will be arranged in consultation with the Program Advisor who may be contacted through the Biological Sciences Office, Z320 Duff Roblin. Students are encouraged to select a specific theme area of study as part of their Biological Sciences program. See the information below outlining the different theme areas offered by the Department of Biological Sciences.

Course BIOL 4100 is not available to students in this program.

To enter the Biological Sciences four-year Major program a student must have a "C+" in either BIOL 1030 or CHEM 1310 and not less than a "C" in the other course, and have satisfied the faculty requirements for entry to the four year Major program. STAT 1000 and the 3 credit hours of specified Mathematics, Physics or Statistics courses can be completed in University 1 or Year 2.

Four Year Major Cooperative Option

Students interested in alternating academic terms and terms of paid employment as part of their Major Biological Sciences program may enter the Cooperative Option after completion of their second year in the Biological Sciences Major. This program provides students with 12 months of paid employment by the time they graduate. It enables them to obtain work experience with participating firms, government agencies and University units.

There are several themes offered within the Biological Sciences Program and the Cooperative Option can be completed within any of these areas of study. See below for a description of the different themes and the course requirements of those themes offered by the Department of Biological Sciences.

Students may apply for openings in the Biological Sciences Major Cooperative Option after completing at least two years (60 credit hours) in the Major program, usually in the fall of their third year. Before the first employment term begins, the prerequisite courses listed below must be completed. Acceptance and continuation in the program is dependent upon the student receiving employment placements.

Prerequisite courses to be completed before employment terms begin: BIOL 1020 and BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000, 3 credit hours of specified Mathematics or Physics, **BIOL 2300, BIOL 2500, BIOL 2520 and BIOL 3100** *. **In addition, students must complete 9 credit hours from program core courses as follows: students must select one course from Group A (BIOL 2200, BIOL 2210), plus one course from Group B (BIOL 2240, BIOL 2242, BIOL 2260), plus one additional course from either Group A or Group B.** [* A Pre-Coop Workshop may be substituted for **BIOL 3100** only to permit an employment term in September of Year 3, but **BIOL 3100** must still be taken.]

Students should note that the course and grade requirements for the Biological Sciences Major Cooperative Option are the same as those for the regular Major program (see above), **with the addition of BIOL 3100** and the Work Term courses. To continue in the Biological Sciences Major Cooperative program, a student must have a Cumulative Grade Point Average of 2.00, a grade of "C" or better in each Biological Sciences course required in the program, and a pass on all work term courses.

Students should also refer to the general faculty regulations for B. Sc. (Major) Cooperative Options in Section 3.4.

Employment term positions available to the students will be approved by the department and may include positions within Biological Sciences, other University departments or positions with employers outside the University. Employers will select the students they wish to employ. The first employment term will preferably be taken in January or May of the third year, but may under exceptional circumstances begin in the preceding September. Students are advised that satisfying the entrance requirements does not guarantee a place in the Cooperative Option if the demand for places exceeds the number of places available. The department reserves the right to determine and select the best qualified applicants.

The program will include three employment terms, each of 4-months duration, two of which may be consecutive. A fourth work term is optional. Students are required to register in and pay fees for each employment term prior to its commencement. Students will be required to submit an employment report upon the completion of each employment term. In order to stay in the Cooperative program, a student must obtain a grade of "pass" for each work term report.

BIOLOGICAL SCIENCES THEME AREAS

I. Cell, Molecular and Developmental Biology: Students in the Department of Biological Sciences with an interest in the exciting field of cell and developmental biology can select the Cell, Molecular, and Developmental Biology theme for focus. This theme will provide students a selection of courses that highlight fundamental principles and many important advances in this rapidly growing area of contemporary biology. Students can concentrate on aspects that deal with the molecular structures and processes of cellular life and their roles in the function, reproduction, and development of living organisms. The theme is structured such that students can choose from a broad range of disciplines, including biochemistry, molecular biology, morphology, genetics, cell biology, and developmental biology. The organisms under study in this theme are equally diverse, ranging from microbes through to invertebrates, vertebrates, plants, and fungi. The Department collaborates with many other life sciences departments and this theme

allows student to develop a highly flexibly course portfolio that includes courses from the Departments of Biological Sciences, Chemistry, Microbiology, or Plant Science.
Specific courses required for the Cell, Molecular, and Developmental Biology Theme in addition to the core course requirements: BIOL 2540 (ZOOL 2150) Developmental Biology (3); *Plus a minimum of 6 Credit hours of Biochemistry:* CHEM 2770 (MBIO 2770) and CHEM 2780 (MBIO 2780); or CHEM 2210 and CHEM 2360 (MBIO 2360) and CHEM 2370 (MBIO 2370).

II. Ecology and Environmental Biology: Ecology is the study of interactions between organisms and their environment, both in natural settings and human-influenced habitats. In our society ecology and environmental biology provide a scientific link to the living world. Ecologists study the lives of many organisms including animals, plants, fungi, protists, and bacteria. Interactions among these organisms are investigated at many scales ranging from the microscopic to the global. At the individual level, ecology investigates the impact of environmental factors on organisms through their physiology and behaviour. Ultimately, ecologists link these factors to survival and reproduction in variable environments. At the population level, ecology examines the causes of fluctuations in numbers and changes in distribution of a single species. This work is often the focus of agencies concerned with exploitation, extinction, and rehabilitation of both commercially and esthetically important species. At the community and ecosystem level, ecology considers many coexisting species. It examines the interactions between species within the communities (competition, predation, parasitism, mutualism, etc.) as well as broader investigations of community structure and composition. Ultimately, the skills developed within this theme prepare students for future careers in academia, government agencies, private consulting companies, or NGOs whose mandates encompass ecological and environmental concerns.
Specific courses required for the Ecology and Environmental Biology Theme in addition to the core course requirements: BIOL 3310 (ZOOL 3680) Foundations of Population Ecology (3); BIOL 3312 (BOTN 3540) Community Ecology (3); BIOL 3314 (BOTN 3420/ZOOL 3460) Field Ecology (3); STAT 2000 Basic Statistical Analysis 2 (3).

III. Environmental and Integrative Physiology: The Environmental and Integrative Physiology theme will be of interest to a wide array of students interested in pursuing employment opportunities in the Environmental, Consulting, Pharmaceutical, Healthcare, and Professional job markets. Based on the suggested courses and sub themes within this program students will be able to graduate with an all inclusive degree or specialize in particular disciplines ranging from molecular physiology to whole organism physiology and eco/environmental physiology, a subject area that is at the interface between ecology and physiology. Students will be exposed to modern research techniques in lab classes and will be taught by instructors and faculty with active research programs within the Department of Biological Sciences.
Specific courses required for the Environmental and Integrative Physiology Theme in addition to the core course requirements*: 6 Credit hours of Biochemistry* CHEM 2770 (MBIO 2770) and CHEM 2780 (MBIO 2780); or CHEM 2210 and CHEM 2360 (MBIO 2360) and CHEM 2370 (MBIO 2370); *Plus: two of the following courses (one of which is already required in the four-year Biological Sciences Degree programs)*:BIOL 3460 (ZOOL 3530) Environmental Physiology of Animals 1 (3), BIOL 3462 (ZOOL 3540) Environmental Physiology of Animals 2 (3), BIOL 3450 (BOTN 2020) Plant Physiology (3), BIOL 3452 (BOTN 3010) Environmental Physiology of Plants (3).

IV. Evolution and Biodiversity: Evolution is broadly defined as "descent with modification" and is the process that generates the earth's biodiversity. The theory of evolution provides a unifying framework for biology because all organisms are descended from a common ancestor. As a result, evolutionary principles permeate research and teaching throughout biology.
Evolutionary biology addresses two overarching questions. (1) What was the history of life? (2) What processes account for adaptation and diversification? Systematics reconstructs the history of life by studying relationships among species, and involves comparisons of physical appearance, development, biochemistry, genetics, behaviour, ecology and biogeography. Evolutionary Genetics investigates how processes such as natural selection, mutation, and migration interact to cause evolutionary change within populations. Evolutionary history, genetics, and ecological context are required to fully understand the evolution of traits, for example body size, wing shape or leaf structure. Thus evolution integrates knowledge from a wide spectrum of sub-disciplines within biology.
Evolutionary biology has wide-ranging practical applications. Principles of evolution are required to understand: the evolution of pathogens such as HIV and avian influenza; domestication of wild species and consequences of genetic modifications; the identification of natural products; long-term responses to environmental change; and human biology. Courses from this theme will prepare students for academia, medicine, and government agencies or NGO's that emphasize the cataloguing and conservation of biological diversity.
There are no specific additional course requirements in the Evolution and Biodiversity theme; however courses emphasizing evolution and biodiversity should be selected from a given set of courses offered by the department.

V. Integrative Biology: The Integrative Biology theme will be of interest to students planning to pursue careers in the various biology sub disciplines and who wish an undergraduate degree that is "interdisciplinary" within the life science departments that cuts across the traditional boundaries. This program will suit students who are interested in the "after degree" program in Education or who are intending to apply to a professional program (e.g. Medicine, Dentistry, Pharmacy, Medical Rehabilitation) and who would like a broad background in the Life Sciences. With the appropriate choice of Biological Science courses it would be possible to indicate the Integrative Biology theme along with a second theme from the department.
Specific courses required for the Integrative Biology Theme in addition to the core course requirements: *All five of the following (three of which are already designated as core courses in the four-year Biological Sciences Degree programs):* BIOL 2200 The

Invertebrates (3), BIOL 2210 The Chordates (3), BIOL 2240 The Flowering Plants 1 (3), BIOL 2242 The Non-Flowering Plants (3), MBIO 2100 General Microbiology A (3); *One of the following (one of which is already required in the four-year Biological Sciences Degree programs):* BIOL 3450 Plant Physiology (3), BIOL 3460 Environmental Physiology of Animals; *Plus:* 18 credit hours in Biological Sciences (3000/4000 level courses) and 12 credit hours in Microbiology (3000/4000 level courses).
Note: a maximum of 15 credits of Biological Sciences and Microbiology courses at the 2000 level are permitted in year 3 and 4. For the Integrative Biology theme only, these 15 credit hours of 2000 level course may be used toward the 3000/4000 level requirements of the degree.

Three Year General

Courses taken as part of a General degree program provide an introduction to the major fields of study in the Biological Sciences. Commencing in Fall Term 2009, students will have two options for the General Degree under the Department of Biological Sciences.

Option A: 18 credit hours of 2000, 3000, and (or) 4000 level Biological Sciences courses (subject to the Faculty requirement that of the 36 credit hours in the two chosen advanced level Science areas, at least 6 credit hours must be at the 3000/4000 level);

Option B: Students may choose 36 credit hours from the Biological Sciences provided they select the following courses: each of BIOL 2300, BIOL 2500, BIOL 2520; one of BIOL 2200 or BIOL 2210; one of BIOL 2240, BIOL 2242, or BIOL 2260; plus 21 additional credit hours from the Biological Sciences including at least 6 credit hours at the 3000 or 4000 level.

Students anticipating a transfer to either the four year Major or Honours program at the end of their second or third year should consult with the Departmental Program Advisor before registering.

5.3.3.1 Biological Sciences

UNIVERSITY 1	YEAR 2	YEAR 3	YEAR 4
HONOURS: Cell, Molecular and Developmental Biology Theme (incl. Co-op) 120 CREDIT HOURS[2,7]			
BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 One additional course from either Group A or Group B Either both of CHEM 2770 and CHEM 2780; or all three of CHEM 2210, CHEM 2360, and CHEM 2370 (theme courses)	BIOL 3100, BIOL 3300 BIOL 2540 (theme course) Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):** BIOL 3980, BIOL 3990	BIOL 4100 (6) **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)
In University 1 or Year 2 the following must be completed: 3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050 Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course		In addition to the core courses, students require 30 credit hours of 3000 or 4000 level Biology courses[6] to graduate. Courses from outside Biology may be approved by the department. Students completing the above prescribed courses will satisfy the Cell, Molecular and Developmental Biology Theme.	
HONOURS: Ecology and Environmental Biology Theme (incl. Co-op) 120 CREDIT HOURS[2,7]			
BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000 STAT 2000 (theme course)	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 One additional course from either Group A or Group B	BIOL 3100, BIOL 3300 BIOL 3310, BIOL 3312, BIOL 3314 (theme courses). Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):**	BIOL 4100 (6) **Co-op requirements (if enrolled):**

		BIOL 3980, BIOL 3990	BIOL 4980, BIOL 4990 (if necessary)
In University 1 or Year 2 the following must be completed: 3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050 Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course		In addition to the core courses, students require 21 credit hours of 3000 or 4000 level Biology courses[6] to graduate. Courses from outside Biology may be approved by the department. Students completing the above prescribed courses will satisfy the Ecology and Environmental Biology Theme.	
30 Hours	30 Hours	30 Hours	30 Hours

HONOURS: Environmental and Integrative Physiology Theme (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 Plus one additional course from either Group A or Group B Either both of CHEM 2770 and CHEM 2780; or all three of CHEM 2210, CHEM 2360, and CHEM 2370 (theme courses).	BIOL 3100, BIOL 3300 Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 Choose two of: BIOL 3460, BIOL 3462, BIOL 3450 (if not already taken), or BIOL 3420 (theme courses). **Co-op requirements (if enrolled):** BIOL 3980, BIOL 3990	BIOL 4100 (6) **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)
In University 1 or Year 2 the following must be completed: 3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050 Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course		In addition to the core courses, students require 24 credit hours of 3000 or 4000 level Biology courses[6] to graduate. Courses from outside Biology may be approved by the department.	
30 Hours	30 Hours	30 Hours	30 Hours

HONOURS: Evolution and Biodiversity Theme (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 Plus one additional course from either Group A or Group B	BIOL 3100, BIOL 3300 Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):** BIOL 3980, BIOL 3990	BIOL 4100 (6) **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)
In University 1 or Year 2 the following must be completed: 3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050 Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course		In addition to the core courses, students require 30 credit hours of 3000 or 4000 level Biology courses[6] to graduate. No additional theme courses are required in this program; however, courses emphasizing evolution and biodiversity should be selected from a given set of courses offered by the department.	
30 Hours	30 Hours	30 Hours	30 Hours

HONOURS: Integrative Biology Theme (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 BIOL 2200, BIOL 2210, BIOL 2240, BIOL 2242, MBIO 2100 (theme courses)	BIOL 3100, BIOL 3300 Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirement (if enrolled):** BIOL 3980, BIOL 3990	BIO 4100 (6) **Co-op requirement (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)

In University 1 or Year 2 the following must be completed:

3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050

Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course

In addition to the core courses, students require 18 credit hours of 3000 or 4000 level Biology courses[6] and 12 credit hours of Microbiology courses to graduate[4] (theme courses).

Students completing the above prescribed courses will satisfy the Integrative Biology Theme.

HONOURS: No Theme Selected (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 Plus one additional course from either Group A or Group B	BIOL 3100, BIOL 3300 Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):** BIOL 3980, BIOL 3990	BIOL 4100 (6) **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)

In University 1 or Year 2 the following must be completed:

3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050

Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course

In addition to the core courses, students require 30 credit hours of 3000 or 4000 level Biology courses[6] to graduate.

30 Hours	30 Hours	30 Hours	30 Hours
UNIVERSITY 1	YEAR 2	YEAR 3	YEAR 4

4-YEAR MAJOR: Cell, Molecular, and Developmental Biology Theme (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 One additional course from either Group A or Group B Either both of CHEM 2770 and CHEM 2780; or all three of CHEM 2210, CHEM 2360, and CHEM 2370 (theme courses)	BIOL 3300 BIOL 2540 (theme course) Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):** BIOL 3100, BIOL 3980, BIOL 3990	The remaining 3000/4000 level Biological Sciences requirements[6]; plus any elective courses required to total 120 credit hours for the program. **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)

In University 1 or Year 2 the following must be completed:

3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050

Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course

In addition to the core and theme courses, students require 30 credit hours of 3000 or 4000 level Biology courses[6] to graduate. Courses from outside Biology may be approved by the department.

Students completing the above prescribed courses will satisfy the Cell, Molecular, and Developmental Biology Theme.

30 Hours	30 Hours	30 Hours	30 Hours

4-YEAR MAJOR: Ecology and Environmental Biology Theme (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000 STAT 2000 (theme course)	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 Plus one additional course from either Group A or Group B	BIOL 3300 BIOL 3310, BIOL 3312, BIOL 3314 (theme courses) Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):** BIOL 3100, BIOL 3980, BIOL 3990	The remaining 3000/4000 level Biological Sciences requirements[6]; plus any elective courses required to total 120 credit hours for the program. **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)

In University 1 or Year 2 the following must be completed:

3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050

Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course

In addition to the core courses, students require 21 credit hours of 3000 or 4000 level Biology courses[6] to graduate. Courses from outside Biology may be approved by the department.

Students completing the above prescribed courses will satisfy the Ecology and Environmental Biology Theme.

30 Hours	30 Hours	30 Hours	30 Hours

4-YEAR MAJOR: Environmental and Integrative Physiology Theme (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 One additional course from either Group A or Group B Either both of CHEM 2770 and CHEM 2780; or all three of CHEM 2210, CHEM 2360, and CHEM 2370 (theme courses)	BIOL 3300 Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 Choose two of: BIOL 3450, BIOL 3460, BIOL 3462 (if not already taken), or BIOL 3420 (theme courses). **Co-op requirements (if enrolled):** BIOL 3100, BIOL 3980, BIOL 3990	The remaining 3000/4000 level Biological Sciences requirements[6]; plus any elective courses required to total 120 credit hours for the program. **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)

In University 1 or Year 2 the following must be completed:

3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050

Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course

In addition to the core and theme courses, students require 24 credit hours of 3000 or 4000 level Biology courses[6] to graduate.

Students completing the above prescribed courses will satisfy the Environmental and Integrative Physiology Theme.

30 Hours	30 Hours	30 Hours	30 Hours

4-YEAR MAJOR: Evolution and Biodiversity Theme (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 Plus one additional course from either Group A or Group B	BIOL 3300 Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):** BIOL 3100, BIOL 3980, BIOL 3990	The remaining 3000/4000 level Biological Sciences requirements[6]; plus any elective courses required to total 120 credit hours for the program. **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)
In University 1 or Year 2 the following must be completed: 3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050 Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course		In addition to the core courses, students require 30 credit hours of 3000 or 4000 level Biology courses[6] to graduate. There are no additional sub-core courses required in this program; however, courses emphasizing evolution and biodiversity should be selected from a given set of courses offered by the department.	
30 Hours	30 Hours	30 Hours	30 Hours

4-YEAR MAJOR: Integrative Biology Theme (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 BIOL 2200, BIOL 2210, BIOL 2242, BIOL 2240, MBIO 2100 (theme courses)	BIOL 3300 Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):** BIOL 3100, BIOL 3980, BIOL 3990	The remaining 3000/4000[4] level Biological Sciences requirements[6]; plus any elective courses required to total 120 credit hours for the program. **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)
In University 1 or Year 2 the following must be completed: 3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050 Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course		In addition to the core courses, students require 18 credit hours of 3000 or 4000 level Biology courses[6] and 12 credit hours of Microbiology courses to graduate[4] (theme courses) Students completing the above prescribed courses will satisfy the Integrative Biology Theme.	
30 Hours	30 Hours	30 Hours	30 hours

4-YEAR MAJOR: No Theme Selected (incl. Co-op) 120 CREDIT HOURS[2,7]

BIOL 1020, BIOL 1030, CHEM 1300, CHEM 1310, STAT 1000	BIOL 2300, BIOL 2500, BIOL 2520 Choose one course from each of: Group A: BIOL 2200, BIOL 2210 Group B: BIOL 2240, BIOL 2242, BIOL 2260 Plus one additional course from either Group A or Group B	BIOL 3300 Choose one of the following: BIOL 3450, BIOL 3460, BIOL 3462 **Co-op requirements (if enrolled):** BIOL 3100, BIOL 3980, BIOL 3990	The remaining 3000/4000 level Biological Sciences requirements[6]; plus any elective courses required to total 120 credit hours for the program. **Co-op requirements (if enrolled):** BIOL 4980, BIOL 4990 (if necessary)
In University 1 or Year 2 the following must be completed:		In addition to the core courses, students require 30 credit hours of 3000	

3 credit hours from Mathematics or Physics from: MATH 1200, MATH 1300[1] or MATH 1500[1], PHYS 1020 or PHYS 1050 Plus 6 credit hours from the Faculty of Arts, which should include the required "W" course	or 4000 level Biology courses to graduate[6].
THREE YEAR GENERAL	
	18 credit hours of 2000, 3000, and (or) 4000 level Biological Sciences courses (subject to the Faculty requirement that of the 36 credit hours in the two advanced level Science areas, at least 6 credit hours must be at the 3000/4000 level.); **or** Students may choose 36 credit hours from the Department of Biological Sciences provided they select courses as prescribed below: Each of BIOL 2300, BIOL 2500, BIOL 2520; one of BIOL 2200 or BIOL 2210; one of BIOL 2242, BIOL 2240 or BIOL 2260; plus 21 additional credit hours from the Biological Sciences including at least 6 credit hours at the 3000 or 4000 level[5].
MINOR	
BIOL 1020 and BIOL 1030	12 credit hours from 2000, 3000, and/or 4000 level Biology courses.

NOTES:

1. MATH 1510, MATH 1520, or MATH 1690 may be taken in place of MATH 1500; MATH 1310 may be taken in place of MATH 1300.

2. The courses in this program will satisfy the university mathematics requirement.

3. IMPORTANT**:** The Honours and Major programs need not be completed in the manner prescribed in the chart above. The charts indicate one possible arrangement of the required courses and are meant to be a guide around which students can plan their programs with a view to satisfying the prerequisites of the required courses.

4. For the Integrative Biology Theme only, a maximum of 15 credit hours of 2000 level Microbiology and Biological Sciences courses may be used towards the 30 hours of 3000/4000 level requirements.

5. Students should confirm the new regulations of the B.Sc. General Degree with a Faculty of Science Student Advisor if they wish to choose 36 hours of advanced level study from the Department of Biological Sciences.

6. Courses from other departments or faculties my be acceptable for use towards the 30 credit hours of 3000/4000 level Biological Sciences courses required in the Honours and Major Degree programs. Please consult with the department for permission to use alternate courses.

7. The Four-year programs in Biological Sciences require students to complete 120 credit Hours. These hours are a combination of the courses outlined in the charts above and elective courses chosen by the student in consultation with the program advisors.