BIOLOGY (BIOL)


DEGREES/PROGRAMS OFFERED

3-Year BSc
3-Year BSc (Business Stream)
4-Year BSc
4-Year BSc (Business Stream)
Honours BSc
4-Year BSc (UW/RRC)
MSc in Bioscience, Technology & Public Policy (For more information, please see the Graduate Studies Academic Calendar.)

INTRODUCTION

The study of Biology encompasses any manifestation of life, from the DNA molecule to the interactions of organisms within the various ecosystems of the earth. This broad discipline includes the subject areas of Botany, Zoology, Microbiology, Ecology, Genetics and Molecular Biology.

The Biology Department offers the 3-Year BSc, 4-Year BSc, and BSc Honours degrees. Two additional degree options available are the University of Winnipeg/Red River College 4-Year BSc in Applied Biology, and a Co-operative Program that combines a 3-Year BSc Degree in Biology with a diploma in Chemical and Biosciences Technology.

Students pursuing a 3-year or 4-year BSc in Biology have the opportunity to take a Business Stream – a set of core courses in the Faculty of Business that will provide them with the skills needed to enter and succeed in industry and business. See the "Science with a Business Stream" section of this Course Calendar.

In addition, courses in Biology constitute the core of the Environmental Studies Forest Ecology Program, the Forest Policy and Management Program, the Biochemistry Program, the Biopsychology Program and the Bioanthropology Program.

A BSc in Biology can lead to employment in Conservation or other government departments, work as a technologist in a research or industrial laboratory, as well as a career in education. It also provides the preparation necessary for those entering several professional programs including Dentistry, Medicine, Veterinary Medicine, Pharmacy and Optometry.

Many Biology graduates also pursue post-graduate education. The necessary academic preparation for post-graduate studies is only provided by the 4-Year and Honours degrees in Biology. The 3-Year BSc and the Applied Biology degrees are not recognized as adequate preparation by most Graduate Studies Programs in Canada or internationally.

REQUIREDS FOR A 3-YEAR BSc IN BIOLOGY

ADMISSION REQUIREMENT
Students should consult with a member of the Department in planning their course of study.

GRADUATION REQUIREMENT
90 credit hours

RESIDENCE REQUIREMENT
Degree: Minimum 30 credit hours
Major: Minimum 18 credit hours

GENERAL DEGREE REQUIREMENT
Humanities: 12 credit hours in Humanities
Writing: Minimum 3 credit hours of Academic Writing.
Indigenous: 3 credit hours in designated Indigenous requirement courses
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution: Minimum three (3) credit hours from each of five (5) different subjects.

MAJOR REQUIREMENT
Single Major: Minimum 30 credit hours/Maximum 48 credit hours in the Major subject.
Double Major: 30 credit hours in Biology and specified number of credit hours in the other department/program.

Required courses:
1. Mandatory courses
- Minimum 24 credit hours in other Biology courses at or above the 2000 level, not including BIOL-4111(6) Biology Honours Thesis.

2. Statistics Requirement - 3 credit hours of statistics chosen from the following courses:
   - STAT-1301(3) Statistical Analysis I
   - STAT-1501(3) Elementary Biological Statistics I
   - GEOG-2309(3) Statistical Techniques in Environmental Analysis
   - PSYC-2101(3) Introduction to Data Analysis
   - The former STAT-1201(6) Introduction to Statistical Analysis

3. At least 15 additional credit hours of ancillary science (non-Biology) courses at or above the 1000 level selected from the following departments/courses, for a total of at least 18 credit hours of non-Biology science. At least one other department must be represented, in addition to that chosen from the above statistics options list.

   ANTHROPOLOGY – ONLY:
   - ANTH-2300(3) Methods and Theory in Biological Anthropology
   - ANTH-2304(3) Introduction to Forensic Anthropology
   - ANTH-3207(3) Zooarchaeology
   - ANTH-3302/4302(3) Primate Adaptation, Biology, and Evolution
   - ANTH-3306(3) Human Osteology
   - ANTH-3308/4308(3) Human Evolution
   - ANTH-3309/4309(3) Primate Behaviour
   - ANTH-4212(3) Advanced Zooarchaeology
   - ANTH-4303(3) Problems in Human and Primate Evolution
   - ANTH-4305(3) Problems in Biological Anthropology
   - ANTH-4307(3) Advanced Human Osteology
   - ANTH-4311(3) Human Paleopathology

   CHEMISTRY – ALL courses EXCEPT:
   - CHEM-2801(3) Environmental Issues: A Chemistry Perspective (formerly Chemistry and Society)

   GEOGRAPHY – ONLY:
   - Physical Geography courses (second digit in the course number is “2”)
   - Geomatics courses (second digit in the course number is “3”)

   KINESIOLOGY – ONLY:
   - KIN-2204(3) Introduction to Human Physiology
   - KIN-2301(3) Human Anatomy
   - KIN-3106 (3) Exercise Physiology
   - KIN-3201(3) Biomechanics

   MATHEMATICS – ALL courses EXCEPT:
   - MATH-2305(3) Philosophy and Mathematics

   PHYSICS – ALL courses EXCEPT:
   - PHYS-1005(6) Concepts in Science
   - PHYS-1701(6) Astronomy
   - PHYS-2705(6) Cosmology: Science Fact to Science Fiction

   PSYCHOLOGY – ONLY:
   - PSYC-2101(3) Introduction to Data Analysis
   - PSYC-2900(3) Physiological Psychology I
   - PSYC-3900(3) Physiological Psychology II

   STATISTICS – All courses

   Combined Major:
   - Minimum 48 credit hours from two (2) different majors with not less than 18 credit hours from each major subject.

   Prescribed courses:
   - BIOL-1115(3) Cells and Cellular Processes
   - BIOL-1116(3) Evolution, Ecology and Biodiversity

   Restrictions:
   - Only 6 credit hours at the 1000 level will be credited towards the combined major. Any other 1000-level course would be considered as an elective.

### REQUIREMENTS FOR THE 3-YEAR BSc IN BIOLOGY WITH A BUSINESS STREAM

Students must complete the requirements of the 3-year BSc in Biology degree (see previous section) and the set of core courses indicated in the "Science with a Business Stream" section of the Calendar.
REQUIREMENTS FOR A 4-YEAR BSc IN BIOLOGY

ADMISSION REQUIREMENT
Students must consult with the Department Advisor in planning their studies.

GRADUATION REQUIREMENT
120 credit hours, that is, 90 credit hours meeting the requirements for the 3-Year BSc plus an additional 30 credit hours.

RESIDENCE REQUIREMENT
Degree: Minimum 60 credit hours
Major: Minimum 30 credit hours

GENERAL DEGREE REQUIREMENT
Humanities: 12 credit hours
Writing: Minimum 3 credit hours of Academic Writing.
Indigenous: 3 credit hours in designated Indigenous requirement courses
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution: Minimum three (3) credit hours from each of five (5) different subjects.

MAJOR REQUIREMENT
Single Major: Minimum 48 credit hours/Maximum 78 credit hours in the Major subject.
Double Major: Minimum 48 credit hours in Biology and specified number of courses in other Major.

Required courses:

1. Mandatory Courses

   BIOL-1115(3) Cells and Cellular Processes
   BIOL-1116(3) Evolution, Ecology and Biodiversity
   BIOL-2301(3) Genetics
   BIOL-2403(3) Principles of Ecology or BIOL-3902(3) Microbial Ecology
   BIOL-3221(3) Cell Biology

   In addition to the above prescribed courses, students must complete an additional minimum of 33 credit hours in Biology at or above the 2000 level.

   Students taking the 4-Year BSc in preparation for graduate studies are strongly advised to enrol in the BSc Honours program (see below).

2. Statistics Requirement - 6 credit hours of statistics chosen from the following course pairings:
   - STAT-1301(3) Statistical Analysis I and STAT-1302(3) Statistical Analysis II or the former STAT-1201(6) Introduction to Statistical Analysis
     OR
   - STAT-1501(3) Elementary Biological Statistics I AND ONE OF STAT-2001(3) Elementary Biological Statistics II or BIOL-3492(3) Quantitative & Theoretical Biology or BIOL-4471(3) Ecological Methods or the former STAT-1601(3) Elementary Biological Statistics II
     OR
   - GEOG-2309(3) Statistical Techniques in Environmental Analysis AND ONE OF BIOL-3492(3) Quantitative & Theoretical Biology or BIOL-4471(3) Ecological Methods
     OR
   - PSYC-2101(3) Introduction to Data Analysis AND ONE OF PSYC-2102(3) Introduction to Research Methods or BIOL-3492(3) Quantitative & Theoretical Biology or BIOL-4471(3) Ecological Methods

3. At least 18 additional credit hours of ancillary science (non-Biology) courses at or above the 1000 level selected from the following departments/courses, for a total of at least 24 credit hours of non-Biology science (or 21 credit hours if a Biology course is selected as part of the statistics requirement). At least one other department must be represented in addition to that chosen from the above statistics options list.

   ANTHROPOLOGY – ONLY:
   ANTH-2300(3) Methods and Theory in Biological Anthropology
   ANTH-2304(3) Introduction to Forensic Anthropology
   ANTH-3207(3) Zooarchaeology
   ANTH-3302/4302(3) Primate Adaptation, Biology, and Evolution
   ANTH-3306(3) Human Osteology
   ANTH-3308/4308(3) Human Evolution
   ANTH-3309/4309(3) Primate Behaviour
   ANTH-4212(3) Advanced Zooarchaeology
   ANTH-4303(3) Problems in Human and Primate Evolution
   ANTH-4305(3) Problems in Biological Anthropology
   ANTH-4307(3) Advanced Human Osteology
   ANTH-4311(3) Human Paleopathology

   CHEMISTRY – ALL courses EXCEPT:
   CHEM-2801(3) Environmental Issues: A Chemistry Perspective (formerly Chemistry and Society)
GEOGRAPHY – ONLY:
Physical Geography courses (second digit in the course number is “2”)
Geomatics courses (second digit in the course number is “3”)

KINESIOLOGY – ONLY:
KIN-2204(3) Introduction to Human Physiology
KIN-2301(3) Human Anatomy
KIN-3106 (3) Exercise Physiology
KIN-3201(3) Biomechanics

MATHEMATICS – ALL courses EXCEPT:
MATH-2305(3) Philosophy and Mathematics

PHYSICS – ALL courses EXCEPT:
PHYS-1005(6) Concepts in Science
PHYS-1701(6) Astronomy
PHYS-2705(6) Cosmology: Science Fact to Science Fiction

PSYCHOLOGY – ONLY:
PSYC-2101(3) Introduction to Data Analysis
PSYC-2900(3) Physiological Psychology I
PSYC-3900(3) Physiological Psychology II

MATHEMATICS – ALL courses EXCEPT:
MATH-2305(3) Philosophy and Mathematics

Combined Major: Minimum 60 credit hours from two (2) different majors with not less than 24 credit hours from each major subject.

Prescribed courses:
BIOL-1115(3) Cells and Cellular Processes
BIOL-1116(3) Evolution, Ecology and Biodiversity

Restrictions: Only 6 credit hours at the 1000 level will be credited towards the combined major. Any other 1000-level course would be considered as an elective.

REQUIREMENTS FOR THE 4-YEAR BSc IN BIOLOGY WITH A BUSINESS STREAM

Students must complete the requirements of the 4-year BSc in Biology degree (see previous section) and the set of core courses indicated in the “Science with a Business Stream” section of the Calendar.

REQUIREMENTS FOR AN HONOURS BSc IN BIOLOGY

ADMISSION REQUIREMENT
Students must consult with the Department Advisor in planning their studies.

GRADUATION REQUIREMENT
120 credit hours
Graduation G.P.A. Requirement
To graduate with a BSc Honours, students must have a minimum GPA of 3.0 on all major (Biology) courses which will be calculated on all course attempts in the major. A minimum 2.75 GPA on all non-major courses which will be calculated as for the General Degree (i.e., F’s are not included and, in the case of repeated courses, only the highest grade will be used).

RESIDENCE REQUIREMENT
Degree: Minimum 60 credit hours
Honours: Minimum 30 credit hours, including minimum 18 credit hours at upper level (3000/4000) of which a minimum of 9 credit hours at 4000 level

GENERAL DEGREE REQUIREMENT
Humanities: 12 credit hours in Humanities
Writing: Minimum 3 credit hours of Academic Writing.
Indigenous: 3 credit hours in designated Indigenous requirement courses
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution: Minimum three (3) credit hours from each of five (5) different subjects.

HONOURS REQUIREMENT
Single Honours: Minimum 54 credit hours in the Major subject.
Minimum 30 credit hours in upper-level (3000 and 4000) courses of which a minimum of 15 credit hours must be at the 4000 level.
Required Courses:

1. Mandatory courses:
   - BIOL-1115(3) Cells and Cellular Processes
   - BIOL-1116(3) Evolution, Ecology and Biodiversity
   - BIOL-2301(3) Genetics
   - BIOL-2403(3) Principles of Ecology or BIOL-3902(3) Microbial Ecology
   - BIOL-3221(3) Cell Biology
   - BIOL-4111(6) Biology Honours Thesis Note: This course has admission restrictions, see course description.
   - CHEM-1111(3) Introduction to Chemical Properties of Matter
   - CHEM-1112(3) Basic Principles of Chemical Reactivity

2. In addition to the above courses students must select a minimum of 33 credit hours from the Biology course offerings at or above the 2000 level including:
   - 9 credit hours selected from:
     - BIOL-2115(3) Biology of the Invertebrates OR BIOL-2116(3) Biology of the Vertebrates OR the former BIOL-2111(6) Comparative Chordate Zoology
     - BIOL-2152(3) Biology of Algae, Fungi, and Mosses
     - BIOL-2153(3) Biology of Vascular Plants
     - BIOL-2902(3) Biology of Bacteria and Archaea
   - 9 credit hours selected from the 4000-level courses in addition to BIOL-4111(6) Biology Honours Thesis.

3. Statistics Requirement - 6 credit hours of statistics chosen from the following course pairings:
   - STAT-1301(3) Statistical Analysis I and STAT-1302(3) Statistical Analysis II or the former STAT-1201(6) Introduction to Statistical Analysis
   - OR
   - STAT-1501(3) Elementary Biological Statistics I AND ONE OF STAT-2001(3) Elementary Biological Statistics II or BIOL-3492(3) Quantitative & Theoretical Biology or BIOL-4471(3) Ecological Methods of the former STAT-1601(3) Elementary Biological Statistics II
   - OR
   - GEOG-2309(3) Statistical Techniques in Environmental Analysis AND ONE OF BIOL-3492(3) Quantitative & Theoretical Biology or BIOL-4471(3) Ecological Methods
   - OR
   - PSYC-2101(3) Introduction to Data Analysis AND ONE OF PSYC-2102(3) Introduction to Research Methods or BIOL-3492(3) Quantitative & Theoretical Biology or BIOL-4471(3) Ecological Methods

4. At least 12 credit hours of ancillary science (non-Biology) courses at or above the 1000 level selected from the following departments/courses. At least one other department must be represented in addition to that chosen from the above statistics options list.

   **ANTHROPOLOGY – ONLY:**
   - ANTH-2300(3) Methods and Theory in Biological Anthropology
   - ANTH-2304(3) Introduction to Forensic Anthropology
   - ANTH-3207(3) Zooarchaeology
   - ANTH-3302/4302(3) Primate Adaptation, Biology, and Evolution
   - ANTH-3306(3) Human Osteology
   - ANTH-3308/4308(3) Human Evolution
   - ANTH-3309/4309(3) Primate Behaviour
   - ANTH-4212(3) Advanced Zooarchaeology
   - ANTH-4303(3) Problems in Human and Primate Evolution
   - ANTH-4305(3) Problems in Biological Anthropology
   - ANTH-4307(3) Advanced Human Osteology
   - ANTH-4311(3) Human Paleopathology

   **CHEMISTRY – ALL courses EXCEPT:**
   - CHEM-2801(3) Environmental Issues: A Chemistry Perspective (formerly Chemistry and Society)

   **GEOGRAPHY – ONLY:**
   - Physical Geography courses (second digit in the course number is “2”)
   - Geomatics courses (second digit in the course number is “3”)

   **KINESIOLOGY – ONLY:**
   - KIN-2204(3) Introduction to Human Physiology
   - KIN-2301(3) Human Anatomy
   - KIN-3106(3) Exercise Physiology
   - KIN-3201(3) Biomechanics

   **MATHEMATICS – ALL courses EXCEPT:**
   - MATH-2305(3) Philosophy and Mathematics
INTRODUCTION
This is a joint degree program whereby students take courses at both institutions in a prescribed sequence. The program has been specifically designed to address the human resource needs of the health and environmental-based industries of Manitoba. Biotechnology is the area of emphasis in the Applied Biology program and the degree requirements are outlined below.

Students are required to complete courses at both institutions. Students will begin their program of study by completing 60 credit hours of course work at The University of Winnipeg. The next 30 credit hours are completed at Red River College and then students return to The University of Winnipeg to complete the final 30 credit hours. Students successfully completing the entire program will receive a joint degree parchment from The University of Winnipeg and Red River College. **N.B. Transfer of courses between institutions applies only to students who are officially in the joint program.**

ADMISSION REQUIREMENT
Students must meet the entrance requirements for admission to The University of Winnipeg.
Application to the program in Applied Biology must be completed through the Admissions Office of The University of Winnipeg by March 1st in order to enter the program in September.

GRADUATION REQUIREMENT
120 credit hours, that is, 90 credit hours meeting the requirements for the BSc General plus 30 additional credit hours.

RESIDENCE REQUIREMENT
Degree: Minimum 60 credit hours
Major: Minimum 30 credit hours

GENERAL DEGREE REQUIREMENT
Humanities: 12 credit hours in Humanities
Writing: Minimum 3 credit hours of Academic Writing.
Indigenous: 3 credit hours in designated Indigenous requirement courses
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution: Minimum three (3) credit hours from each of five (5) different subjects.

4-Year Joint Program in Applied Biology

<table>
<thead>
<tr>
<th>Year 1 - UW</th>
<th>Year 2 - UW</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL-1115(3) Cells and Cellular Processes</td>
<td>CHEM-2302(3) Quantitative Chemical Analysis</td>
</tr>
<tr>
<td>BIOL-1116(3) Evolution, Ecology and Biodiversity</td>
<td>CHEM-3302(3) Methods of Chemical Analysis</td>
</tr>
<tr>
<td>CHEM-1111(3) Intro to the Chemical Properties of Matter</td>
<td>CHEM-2202(3) Organic Chemistry I</td>
</tr>
<tr>
<td>CHEM-1112(3) Basic Principles of Chemical Reactivity</td>
<td>CHEM-2203(3) Organic Chemistry II</td>
</tr>
<tr>
<td>ACS-1453(3) Intro to Computers OR</td>
<td>BIOL-2301(3) Genetics</td>
</tr>
<tr>
<td>ACS-1903(3) Programming Fundamentals 1</td>
<td>BIOL-2902(3) Biology of Bacteria and Archaea</td>
</tr>
<tr>
<td>STAT-1501(3) Elementary Biological Statistics I</td>
<td>(formerly &quot;Biology of the Prokaryotes and Viruses&quot;)</td>
</tr>
<tr>
<td>RHET-1103(3) Academic Writing: Sciences</td>
<td>BIOL-3901(3) Microorganisms &amp; Disease</td>
</tr>
<tr>
<td>3 credit hours Humanities</td>
<td>BIOL-3221(3) Cell biology - to be completed in Winter Term</td>
</tr>
<tr>
<td>3 credit hours Indigenous Course</td>
<td>3 credit hours Humanities</td>
</tr>
<tr>
<td>3 credit hours electives</td>
<td>3 credit hours electives</td>
</tr>
</tbody>
</table>
### REQUIREMENTS FOR THE 3-YEAR BSc DEGREE OF THE UW/RRC COOPERATIVE AGREEMENT IN CHEMICAL AND BIOSCIENCES TECHNOLOGY

In addition to the above program, The University of Winnipeg and Red River College (RRC) have a cooperative agreement for a program of studies designed to afford students the opportunity to obtain both the BSc General degree and the Diploma in Chemical and Biosciences Technology in four years, by allowing credit for work completed at the alternate institution.

#### ADMISSION REQUIREMENT
Students must consult with a member of the Department in planning their course of study.

#### GRADUATION REQUIREMENT
Minimum 60 credit hours

#### RESIDENCE REQUIREMENT
Degree: Minimum 60 credit hours

#### GENERAL DEGREE REQUIREMENT
- **Humanities:** 12 credit hours in Humanities
- **Indigenous:** 3 credit hours in designated Indigenous requirement courses

**Required courses:**
- 21 credit hours in Biology at the 2000 level or above, excluding BIOL-4111(6) Biology Honours Thesis.
- Minimum 18 credit hours of ancillary science (non-Biology) courses at or above the 1000 level selected from at least 2 Departments. See 3 year Biology Major for both courses which may be included in meeting this requirement, and courses which are excluded.

### COURSE LISTINGS

#### 1000 LEVEL COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL-1105(6)</td>
<td>Concepts in Science</td>
</tr>
<tr>
<td>BIOL-1106(6)</td>
<td>Biology and Human Concerns</td>
</tr>
<tr>
<td>BIOL-1107(6)</td>
<td>Human Biology</td>
</tr>
<tr>
<td>BIOL-1108(6)</td>
<td>Environmental Biology</td>
</tr>
<tr>
<td>BIOL-1112(6)</td>
<td>Human Anatomy and Physiology</td>
</tr>
<tr>
<td>BIOL-1115(3)</td>
<td>Cells and Cellular Processes</td>
</tr>
<tr>
<td>BIOL-1116(3)</td>
<td>Evolution, Ecology and Biodiversity</td>
</tr>
</tbody>
</table>

**Note 1:** Students must obtain credit in both BIOL-1115(3) and BIOL-1116(3) to satisfy the requirements for a major in Biology.

**Note 2:** Students can elect to take up to 6 additional credit hours in Biology at the 1000 level; however, these additional credit hours will not count towards the requirement for a major in Biology.

**Note 3:** Students who wish to use BIOL-1112(6) (Human Anatomy and Physiology) as a prerequisite for advanced courses in Biology must obtain the permission of the Department Chair.

#### 2000 LEVEL COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL-2115(3)</td>
<td>Biology of the Invertebrates</td>
</tr>
<tr>
<td>BIOL-2116(3)</td>
<td>Biology of the Vertebrates</td>
</tr>
<tr>
<td>BIOL-2152(3)</td>
<td>Introduction to Algae, Fungi and Mosses</td>
</tr>
<tr>
<td>BIOL-2153(3)</td>
<td>Biology of Vascular Plants</td>
</tr>
<tr>
<td>BIOL-2301(3)</td>
<td>Genetics</td>
</tr>
<tr>
<td>BIOL-2401(1)</td>
<td>Forest Ecology Field Skills Course</td>
</tr>
<tr>
<td>BIOL-2403(3)</td>
<td>Principles of Ecology</td>
</tr>
<tr>
<td>BIOL-2451(3)</td>
<td>Introduction to Animal Behaviour</td>
</tr>
<tr>
<td>BIOL-2477(3)</td>
<td>Forest Measurement</td>
</tr>
<tr>
<td>BIOL-2902(3)</td>
<td>Biology of Bacteria and Archaea (formerly &quot;Biology of the Prokaryotes and Viruses&quot;)</td>
</tr>
</tbody>
</table>

The former BIOL-3161(3) Vegetative Anatomy & Physiology of Seed Plants

NB: These courses have prerequisites that may not be included in the program. Consult a faculty advisor each year in planning your full program of study.

6 credit hours of Humanities
6 credit hours of Electives
3000 LEVEL COURSES

Note: 3000-level courses may not be offered every year.
Consult the current timetable for details.

- BIOL-3112(3) Ecology and Evolution of Mammals
- BIOL-3152(3) Flora of Manitoba
- BIOL-3163(3) Plant Anatomy & Physiology
- BIOL-3202(3) Histology
- BIOL-3221(3) Cell Biology
- BIOL-3303(3) Molecular Genetics and Genomics
- BIOL-3410(3) Freshwater Ecology
- BIOL-3452(3) Behavioural Ecology and the Prairie Grasslands: Field Course
- BIOL-3471(3) Forest Ecology
- BIOL-3473(3) Principles of Silviculture
- BIOL-3476(3) Forest Policy and Management
- BIOL-3492(3) Quantitative and Theoretical Biology
- BIOL-3562(3) Human Reproductive Biology
- BIOL-3563(3) Human Embryology
- BIOL-3602(3) Comparative Animal Physiology I
- BIOL-3603(3) Comparative Animal Physiology II
- BIOL-3702(3) Parasites and Disease
- BIOL-3703(3) Ectoparasitology
- BIOL-3801(3) General Entomology
- BIOL-3901(3) Microorganisms and Disease
- BIOL-3902(3) Microbial Ecology

4000 LEVEL COURSES

Note: 4000-level courses may not be offered every year.
Consult the current timetable for details.

- BIOL-4111(6) Biology Honours Thesis
- BIOL-4112(3) Fish Biology and Conservation
- BIOL-4191(3) Directed Studies in Biology
- BIOL-4303(3) Population Genetics
- BIOL-4331(3) Evolutionary Biology
- BIOL-4402(3) Current Topics in Ecology
- BIOL-4411(3) Water Quality and Health
- BIOL-4451(2) Forest Ecosystems Field Course
- BIOL-4453(3) Wetlands Ecosystems Field Course
- BIOL-4471(3) Ecological Methods
- BIOL-4473(3) Dendrochronology: Principles and Applications
- BIOL-4474(3) Forest Health and Protection
- BIOL-4475(3) Urban Forestry
- BIOL-4501(3) Developmental Biology
- BIOL-4502(3) Molecular Cell Biology
- BIOL-4601(3) Ecological Animal Physiology
- BIOL-4602(3) Field Research in Animal Ecology and Energetics
- BIOL-4902(3) Microbial Physiology
- BIOL-4904(3) Virology
- BIOL-4905(3) Microbial Biotechnology
- BIOL-4931(3) Immunology
- BIOL-4950(3) Human Neurobiology

THE FOLLOWING COURSES ARE NOT OFFERED EVERY YEAR:

- BIOL-2401(1) Forest Ecology Field Skills Course
- BIOL-2477(3) Forest Measurement
- BIOL-3112(3) Ecology and Evolution of Mammals
- BIOL-3152(3) Flora of Manitoba
- BIOL-3163(3) Seed Plant Anatomy & Physiology
- BIOL-3410(3) Freshwater Ecology
- BIOL-3452(3) Behavioural Ecology and the Prairie Grasslands: Field Course
- BIOL-3471(3) Forest Ecology
- BIOL-3473(3) Principles of Silviculture
- BIOL-3492(3) Quantitative and Theoretical Biology
- BIOL-3801(3) General Entomology
- BIOL-3902(3) Microbial Ecology

BIOL-4112(3) Fish Biology and Conservation
BIOL-4303(3) Population Genetics
BIOL-4331(3) Evolutionary Biology
BIOL-4411(3) Water Quality and Health
BIOL-4451(2) Forest Ecosystems Field Course
BIOL-4453(3) Wetlands Ecosystems Field Course
BIOL-4473(3) Dendrochronology: Principles and Applications
BIOL-4474(3) Forest Health and Protection
BIOL-4475(3) Urban Forestry
BIOL-4501(3) Developmental Biology
BIOL-4502(3) Molecular Cell Biology
BIOL-4601(3) Ecological Animal Physiology
BIOL-4602(3) Field Research in Animal Ecology and Energetics
BIOL-4902(3) Microbial Physiology
BIOL-4904(3) Virology
BIOL-4905(3) Microbial Biotechnology
BIOL-4931(3) Immunology
BIOL-4950(3) Human Neurobiology

COURSE DESCRIPTIONS

All course descriptions for all undergraduate programs can now be found in one large PDF called “All Course Descriptions” in the “Academic Calendar” section of the University website:
http://uwinnipeg.ca/academics/calendar/index.html