

## **Bachelor of Science, Majors, Minors and Transfer**

# **Biology**

- **A Major and Minor are offered**
- **Program Fees: Domestic Students, International Students**
- **Apply for Admission**

*VIU also offers a Bachelor of Arts, Minor in Biology.*

## **General Description**

The Bachelor of Science Major and Minor in Biology emphasize a "hands-on," integrative approach to learning. Smaller class sizes allow one-on-one interaction, fostering development of the student-mentor relationship. Versatility is a key feature of the Biology program.

Whereas the Major has a traditional core program, which all students must take, students can also select courses to suit their interests. For example, strong faculty expertise in Organismal Biology, Ecology, Molecular/Cellular Biology and Microbiology/Virology enables students to emphasize one of these directions. Students can also select electives from other departments (e.g., Fisheries, Forestry, Geography, Anthropology) to satisfy their degree requirements. In the final year, students have the option, depending on availability, to complete a comprehensive undergraduate research project, under the supervision of a Biology faculty member.

The Major will be of interest to those looking towards teaching, graduate school, professional schools such as Medicine, Dentistry, Pharmacy, Veterinary Medicine and Law, or employment as scientists in the Biological and Environmental Sciences.

The Minor will be of particular interest to students proceeding towards a career in Primary and Secondary Education, with plans for teaching a science curriculum.

For additional information on the program, faculty, and undergraduate research, please visit the Biology home page at [viu.ca/biology](http://viu.ca/biology).

All B.Sc. students interested in the Biology Major or Minor must contact the Biology Degree Advisor.

## **Research and Teaching Interactions**

VIU Faculty and students enjoy interaction with two renowned marine facilities: the Pacific Biological Station (PBS) and the Bamfield Marine Sciences Centre. Both are among the most prominent, prestigious marine facilities on the west coast of North America and offer exciting experiences for students. Several VIU Faculty are engaged in collaborative research with scientists at PBS, located in Nanaimo. VIU Biology students are often involved in research projects, or are employed during summers for field and/or laboratory work at PBS. Several VIU Biology faculty are also involved with the Bamfield Marine Sciences Centre, situated on the rugged west coast of Vancouver Island. This remote, yet modern, field station is used by faculty members engaged in marine biological research who may either teach courses there, or use the excellent facilities for

field trips to supplement courses. In addition, students may take advanced, field-oriented summer courses at the Bamfield Marine Sciences Centre. For details of course offerings, visit the Bamfield Marine Sciences Centre web site at: [www.bms.bc.ca](http://www.bms.bc.ca).

## Tropical Biology Field School in Belize

Belize, in Central America, has the largest barrier reef in the western hemisphere, and about 70% of its rainforest remains intact. VIU's 6-week Tropical Biology Field School studies coral reef and rainforest ecosystems of Belize.

- Spend 2 of the 6 weeks on the Cayes to study fish, invertebrates, plankton, and water quality of coral reefs, mangrove forests, and sea grass meadows.
- Investigate the relationships among water, soil, plants and animals in three different habitats of the Sibun River watershed.
- Learn about the past and present cultures of this region.

For information, please check the Tropical Field School web page at: [web.viu.ca/belize](http://web.viu.ca/belize).

### Notes on Admission

- Courses in first year have different prerequisites. To satisfy *all* first year course prerequisites, students must complete all of the following B.C. Secondary School course requirements:
  - A minimum grade of "C" in English 12;
  - A minimum grade of "C+" in each of Biology 11 or 12, Chemistry 12 and Physics 11 (Principles of Physics 11); and,
  - A minimum grade of "B" in Mathematics 12 (Pre-calculus 12 or Principles of Mathematics 12).
  - Physics 12 is recommended but not required. Some seats are available for students who have only completed Chemistry 11 with a minimum "C+".
- Students who do not satisfy all of the first year course prerequisites will not likely be able to complete the full degree program in four years. Students who are lacking any or all of the first year course prerequisites should speak with a VIU Advisor about upgrading courses.
- Students with a two-year diploma in a field related to the Biological Sciences may receive advanced standing, depending upon their program.
- Students are encouraged to become computer literate in word processing, spreadsheets and databases by second year.
- Transcripts from other institutions for courses used towards the B.Sc., Major in Biology degree must be received by VIU's Records office by August 15 for the Fall semester, and November 30 for the Spring semester.

## Requirements for a Major

See Institutional B.Sc. Degree Requirements. The 126 credits required for graduation are as follows:

Program Component	Credits
Core courses	72
Upper-level Biology electives (including specialization courses)	21
Non-science electives	6
Upper-level electives	12
General electives	15

**Note:** Most core, specialization, and elective courses have prerequisites. Students should check prerequisites carefully, and consult the Biology Degree Advisor when planning their program.

## Core Courses

The Core component of the degree, combined with appropriate electives, gives students sufficient knowledge and experience in their field to facilitate entry into graduate or professional schools, or into employment in their field.

**Note:** Students are strongly encouraged to complete **all** Year 1 and Year 2 core requirements in the order listed to minimize potential scheduling conflicts later in their degree.

YEAR 1	Credits
BIOL 121 - (Introductory Zoology)	4
BIOL 123 - (Introduction to Cellular and Molecular Biology)	4
Select <i>one</i> of the following pairs: CHEM 140* - (Chemistry Fundamentals I) <i>and</i> , CHEM 141* - (Chemistry Fundamentals II) <i>or</i> CHEM 142* - (Chemistry Fundamentals II)	8
MATH 121 - (Calculus I) <i>and</i> , MATH 122 - (Calculus II)	6
PHYS 111 - (Physics for the Life Sciences I) <i>and</i> , PHYS 112 - (Physics for the Life Sciences II)	8
Degree English Requirements	6

\* Effective September 2011: **CHEM 140 will replace CHEM 122, CHEM 141 will replace CHEM 111, and CHEM 142 will replace CHEM 121.** Students who have already completed the old Chemistry courses can still use those courses to meet the **1st-year** chemistry requirements.

**Note:** At the end of first year or after completing a minimum of 24 credits, students need to declare their educational goals in consultation with the B.Sc. Advisor.

YEAR 2	Credits
BIOL 200 - (Principles of Cell Biology)	3
BIOL 201 - (Principles of Biochemistry I)	3
BIOL 202 - (Ecology)	3
BIOL 210 - (Microbiology I)	3
BIOL 212 - (Genetics)	3
BIOL 223 - (Botany)	3
CHEM 231/232 - (Organic Chemistry)	6
MATH 211 - (Statistics I)	3

**Note:** Students planning to transfer to Microbiology programs at UBC or UVic should also consider taking BIOL 211 - (Microbiology II).

YEARS 3 & 4	Credits
BIOL 305 - (Animal Physiology)	3
BIOL 402 - (Evolution)	3
BIOL 403 - (Current Topics in Biology)	3
Select <i>twelve</i> upper-level BIOL credits numbered 300* and above.	12
Specialization Options	
Students must complete at least <b>one</b> of the following specialization options:	
Microbial Biology	
Select <i>nine</i> credits chosen from: BIOL 332 - (Microbial Ecology) BIOL 334 - (Virology) BIOL 336 - (Bacterial Genetics) BIOL 337 - (Biochemistry and Physiology of Microbes) BIOL 432 - (Applied Microbiology) BIOL 436 - (Pathogenic Microbiology)	9
Molecular and Cellular Biology	
Select <i>nine</i> credits chosen from: BIOL 341 - (Molecular Cell Biology) BIOL 342 - (Advanced Biochemistry) BIOL 435 - (Immunology) BIOL 443 - (Developmental Biology) BIOL 445 - (Molecular Genetics) BIOL 465 - (Endocrinology)	9
Aquatic and Terrestrial Ecology	
Select <i>nine</i> credits chosen from: BIOL 310 - (Invertebrate Zoology) BIOL 315 - (Parasitology) BIOL 320 - (Aquatic Ecosystems) BIOL 322 - (Terrestrial Ecosystems) BIOL 351 - (Population and Community Ecology) BIOL 360 - (Intro to Animal Behaviour)	9

\* Check individual course prerequisites.

## Undergraduate Research Project

The Biology Department encourages education gained by participating in active research. Students have the option to complete a research project (BIOL 490 or 491) in their final year. For these courses, students carry out their research under the direction of a Research Advisor from the Biology Department (in some cases, faculty may be from another Department). Students interested in taking BIOL 490 or 491 should consult a faculty member as early as possible in their academic career. Details of the special registration process required for BIOL 490 and 491 may be obtained from the Biology Chair or B.Sc. Degree Advisor.

Further information on previous research projects performed by VIU Biology graduates is available at [viu.ca/biology](http://viu.ca/biology).

## Requirements for a Minor

Students must fulfill all Institutional B.Sc. Degree Requirements, including Degree English

Requirements and courses listed below:

Years 1 & 2	Credits
Minimum "C-" required for each of the following courses:	
BIOL 121 - (Introductory Zoology)	4
BIOL 123 - (Introduction to Cellular and Molecular Biology)	4
Select <i>one</i> of the following pairs: CHEM 140* - (Chemistry Fundamentals I) <i>and</i> , CHEM 141* - (Chemistry Fundamentals II) <i>or</i> CHEM 142* - (Chemistry Fundamentals II)	8
MATH 211 - (Statistics I)	3
BIOL 201 - (Principles of Biochemistry)	3
Select <i>two</i> ** courses from the following: BIOL 200 - (Introduction to Cell Biology), BIOL 202 - (Ecology), BIOL 210 - (Microbiology I), BIOL 212 - (Genetics), BIOL 223 - (Botany),	6
CHEM 231 - (Organic Chemistry I)	3

\* *Effective September 2011: CHEM 140 will replace CHEM 122, CHEM 141 will replace CHEM 111, and CHEM 142 will replace CHEM 121. Students who have already completed the old Chemistry courses can still use those courses to meet the 1st-year chemistry requirements.*

\*\* *Students should check upper-level course prerequisites to guide second year course choices.*

Years 3 & 4	Credits
Minimum of <i>eighteen</i> credits of Biology courses numbered 300 or above.*	18

\* *Check individual course prerequisites.*

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