

## Bachelor's Degree Programs

# Bachelor of Science in Fisheries & Aquaculture

- **4-year Degree Program**
- **Program Fees: Domestic Students, International Students**
- **Apply for Admission: Forms and Information**

**Note:** VIU also offers a Fisheries and Aquaculture Technology Diploma and a Post-Degree Diploma in Fisheries & Aquaculture. Our Centre for Continuing Studies offers Natural Resource Extension programs.

## The Program

Fisheries and Aquaculture has long been an area of specialization at Vancouver Island University. VIU has an international reputation in fisheries and aquaculture applied research, technology transfer, training, and education. VIU boasts an extensive array of facilities and equipment: three cool-water hatchery complexes; a warm-water hatchery; salt-water system; fish disease laboratory; lake study field station; oyster farm; sturgeon, trout, and wild and cultured salmon research programs. The proximity of VIU to fresh-water lakes and streams, as well as to the ocean and estuaries allows fieldwork in these habitats to be a central part of the students' education.

The new Centre for Shellfish Research (CSR), located beside the Department of Fisheries & Aquaculture, was created to facilitate the emergence of the B.C. shellfish aquaculture industry as a sustainable economic engine for healthy, vibrant coastal communities. CSR faculty teach upper-level courses in fisheries and aquaculture, and there are many opportunities for students to participate in CSR research projects.

Furthermore, the federal government's Pacific Biological Station in Nanaimo provides access to numerous acclaimed fisheries scientists and one of Canada's best libraries in this field. Fisheries (sports and commercial) and aquaculture are immensely important throughout the world and are key to the economy (and employment) in British Columbia.

The B.Sc. in Fisheries & Aquaculture has been designed to offer students a great deal of flexibility, and there are several routes through this program. Students may begin in year one and complete the program at the end of year four, or they may enter at year two or three from Vancouver Island University or from other institutions. They may also complete the two-year Fisheries & Aquaculture Technology diploma program and then proceed to the B.Sc. with up to two years (60 credits) of advance credit. Some students elect this pathway after completing the Technology program and then working in industry for a few years.

**Note:** *institutional B.Sc. requirements are undergoing changes; please check the website or contact the Advising Centre for details.*

## Applied Technology

The Bachelor of Science in Fisheries & Aquaculture is an applied technology degree program. In association with the two-year Fisheries & Aquaculture diploma program and the Bachelor of Science, Major in Biology degree program, the B.Sc. in Fisheries & Aquaculture degree provides a

mix of a broad science background and applied, hands-on, technical skills. Graduates will be well schooled in scientific principles, have an understanding of the philosophical and ethical underpinnings of science, and will be trained in the practical skills required to enter employment in industry or government.

## **Program Format and Courses**

The Bachelor of Science in Fisheries & Aquaculture degree program is a four-year degree program requiring 130 credits of study. Of these 130 credits, a minimum of 42 must be upper-level. Students will take the Core program (109 credits), a minimum of six credits of Fisheries or Aquaculture electives, plus a minimum of six non-Science elective credits.

A variety of elective courses allow students to create a program suitable to their particular interests.

This degree is closely tied to the Bachelor of Science, Major in Biology. Students take core courses in Biology and are encouraged to take upper-level electives in Biology. Students may switch between the two degrees if their areas of interest change.

## **Undergraduate Research Project**

In fourth year, students may choose to complete an Undergraduate Research Project in FISH 491. For this course, students will have a Faculty Project Advisor (in some cases faculty may be from another institution) and will carry out their research under the direction of this Advisor. Students not wishing to pursue a research career may take a Directed Study FISH 490 and one upper-level Science elective or two upper-level Science electives.

## **Electives**

Students are encouraged to augment their program by selecting relevant electives from a variety of disciplines (see list of suggested electives below).

## **Admission Requirements**

Admission to the Bachelor of Science in Fisheries & Aquaculture takes place at the first, second or third-year level.

Admission to third year requires completion of a minimum of 54 credits of university study, see Program Outline. In addition, admission to the B.Sc. program (including the practicum courses, FISH 371/372) will require an interview with the faculty that can be arranged during the second year. The interview will determine the student's understanding of the current fisheries and aquaculture industry. This interview is necessary, as these two courses involve considerable work with institutions or companies outside VIU. Advanced standing may be granted for previous course work.

Courses in first year have prerequisites. To satisfy all first-year course prerequisites, students must complete the following B.C. Secondary School courses, or equivalent:

- English 12 with a minimum grade of "C."
- Biology 11, Chemistry 12, and Principles of Physics 11, all with a minimum grade of "C+."; Mathematics 12 with a minimum grade of "B".
- Biology 12 and Physics 12 are recommended but not required.
- Some seats are available for students who have completed Chemistry 11 with a "C+" but have not completed Chemistry 12.

Students who are lacking any or all of the above-noted prerequisites for first-year courses should speak with a VIU Advisor about upgrading courses.

**Note:** *Enrolment in this program is limited. Students who meet or exceed the minimum admission requirements may not necessarily be admitted to the program.*

## **Admission following completion of VIU's Fisheries & Aquaculture Diploma program**

Students who successfully complete the Diploma in Fisheries & Aquaculture program at VIU will be given third-year standing in the B.Sc. in Fisheries & Aquaculture. Several courses in the Diploma program are similar to those in the B.Sc. program and will receive direct transfer credit. Several other courses in the Diploma program are transferable; students may opt for Diploma (first or second year) credit, but with additional assignments may be able to receive upper-level credit (third year) for courses.

Students admitted in this manner will likely complete first-year Science courses as per Program Outline, then go on to complete the remainder of the program in an additional two or three semesters. Admittance to the B.Sc. in Fisheries & Aquaculture program through this route requires an interview. Students will be assessed by the interview results and their GPA score.

## **Entry with Advanced Placement**

Entry into other years of the program will be based on the individual's academic record. Students holding a two-year diploma in a field related to the biological sciences may receive advanced standing, depending upon their program.

All students who request advanced placement in the program must consult with the Department Chair or an upper-level Advisor within the department of Fisheries & Aquaculture during their first year at VIU. As with all other categories of placement, admittance is determined by an interview and by previous GPA score. Applicants are strongly urged to consult with the Fisheries & Aquaculture Chair or Faculty Advisor before the interview.

**Note:** *Computer literacy (use of word processing, spreadsheets, and databases) is not an entrance requirement; however, it is expected that students entering second year will have those skills. Students may acquire computer literacy through self-study or may take a computer literacy course in their first year, e.g., CSCI 110 or QUME 185.*

## **Start Date and Application Deadline**

The program starts in September and applications are accepted between November 15 and March 31. For further information regarding late applications and program contacts check the Program Availability List.

## **Degree Requirements**

See the section on Institutional B.Sc. Degree Requirements. The 130 credits required for graduation are as follows:

Core courses	109
Upper-level Aquaculture, Fisheries, or Biology electives	6
Non-science electives	6
Electives (including 6 upper-level credits)	9

**Note:** Most core and elective courses have prerequisites. Students should check prerequisites carefully and consult the Fisheries & Aquaculture Advisor when planning their program.

## Core Courses

YEAR 1	Credits
BIOL 121 - (Introductory Zoology) <i>or</i> , FISH 123 - (Concepts in 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
FISH 204 - (Aquatic Plant Ecology and Culture)	4
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
<b>Total Credits</b>	<b>36</b>

\* 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.

YEAR 2	Credits
BIOL 201 - (Principles of Biochemistry)	3
BIOL 212 - (Genetics)	3
CHEM 231 - (Organic Chemistry I)	3
FISH 205 - (Invertebrate Zoology)	4
FISH 211 - (Life History and Management of Salmonids)	3
FISH 222 - (Larval Rearing and Invertebrate Culture)	4
FISH 227 - (Fish Husbandry I)	3
FISH 253 - (Fisheries Engineering I--Hydrology) <i>or</i> , FISH 254 - (Fisheries Engineering II--Hydraulics)	3
MATH 181 - (Intro to Statistics) <i>or</i> , MATH 211 - (Statistics I)	3
<b>Total Credits</b>	<b>29</b>

**Note:** Because of scheduling, some courses listed in second year may have to be delayed until third year and replaced by electives in second year. Students should plan their program with the Fisheries & Aquaculture Advisor.

<b>YEARS 3 and 4</b>	<b>Credits</b>
CHEM 311 - (Environmental Chemical Analysis)	3
FISH 321 - (Lake and Stream Ecosystems)	3
FISH 322 - (Coastal and Estuarine Ecosystems)	3
FISH 324 - (Ichthyology)	4
FISH 327 - (Salmonid Husbandry) <i>or</i> , FISH 331 - (Advanced Fish Culture)	3
FISH 341 - (Diseases of Fish and Shellfish)	4
FISH 371 - (Aquaculture Practices I)	3
FISH 372 - (Aquaculture Practices II)	3
FISH 392 - (Project in Husbandry IV)	3
FISH 423 - (Fisheries Management)	3
FISH 473 - (Summer Field Practicum)	3
FISH 490 - (Directed Studies) <i>and</i> 1 upper-level science elective <i>or</i> , FISH 491 - (Undergraduate Research Project) <i>or</i> , <i>Two</i> upper-level science electives	6
MATH 203 - (Biometrics)	3
<b>Total Credits</b>	<b>44</b>

## List of Suggested Electives

**Note:** *These courses may not be offered every year.*

AQUA 331 - (Advanced Fish Culture)	3
BIOL 200 - (Principles of Cell Biology)	3
BIOL 322 - (Terrestrial Ecosystems)	3
BIOL 331 - (Physiology and Genetics of Prokaryotes)	3
BIOL 332 - (Microbial Ecology)	3
BIOL 334 - (Virology)	3
BIOL 353 - (Non-Vascular Plants)	3
BIOL 356 - (Biological Issues in Forestry)	3
BIOL 395 - (Tropical Biology)	3
BIOL 402 - (Evolution)	3
BIOL 403 - (Current Topics in Biology)	3
FISH 333 - (Tropical Coastal Ecosystems)	3
FISH 334 - (Tropical Marine Aquaculture)	3
FISH 490 - (Directed Studies)	3
FISH 420 - (Marine Biodiversity and Conservation)	3
FRST 242 - (Integrated Resource Management Seminar)	3
MGMT 192 - (Principles of Management)	3
MGMT 381 - (Entre/Intrapreneurship)	3

## Options to take Courses Elsewhere

Third and fourth-year students in the B.Sc. in Fisheries & Aquaculture program may apply to UBC, Faculty of Agricultural Sciences, to take up to a full semester (15 credits) of courses related to their studies. The Chair or Faculty Advisor of the Fisheries & Aquaculture degree program must approve the courses before credit can be given following their successful completion at UBC. Fourth-year students wishing to take advantage of this option will need to address the timing of their FISH 491 (Research Project) course, which normally takes place in fourth year.

A student exchange program with the Department of Fisheries and Wildlife at Oregon State University (OSU) allows VIU Students to take upper-level courses at OSU. VIU Students pay tuition fees at the home institution (a set of 15 credits per semester) and, in consultation with the Department of Fisheries & Aquaculture, enroll in upper-level courses at OSU. The student exchange can occur over one or two semesters, depending on course availability and interest of the student.

The UBC Faculty of Agricultural Sciences has many relevant courses in such subject areas as Management and Economics of Food Production Systems, Marketing and Product Development, and others. This option offers the student a broad range of subject areas and the flexibility to design a program to satisfy specialized interests.

Most university-level courses offered at the Bamfield Marine Station during Fall or Summer sessions are also accepted as Science electives and, in some cases, as core courses in the B.Sc. in Fisheries & Aquaculture degree program. The Bamfield Marine Station offers many high quality courses and a unique West Coast experience. Accredited Science courses offered at many other universities may also be acceptable as either Core or Science elective courses. Students should, however, consult with the Chair or Faculty Advisor of Fisheries & Aquaculture before including such courses in their degree planning. Discussions are underway to arrange other one-semester exchange options at universities in both Canada and the United States.

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