

# Science & Math Information

<b>Faculty of Science and Horticulture</b>	
kwantlen.ca/science	
<b>IMPLEMENTATION DATE</b>	<b>START DATE(S)</b>
01-Sep-2011	September January May
<b>ADMISSION TYPE</b>	<b>ENROLMENT TYPE</b>
Not applicable	Open access
<b>PROGRAM TYPE</b>	<b>CREDENTIAL GRANTED</b>
Undergraduate	No Credential
<b>OFFERED AT</b>	<b>FORMAT</b>
Langley Richmond Surrey	Full-time Part-time
<b>HOW TO APPLY</b>	
www.kwantlen.ca/admission	

## DESCRIPTION

Kwantlen has, since 1981 as a college, followed by university college, and now as a designated polytechnic university, offered first and second year university transfer courses taken by thousands of students over that time for Bachelor of Science degree completion at any other university in British Columbia, or elsewhere. Similarly, it has offered the first year of engineering towards a Bachelor of Engineering or Applied Science, most often at UBC, UVic and SFU. For students lacking the high school courses, or grades in such, for direct entry into Year 1 courses, Kwantlen has also offered courses to meet this requirement.

Kwantlen currently offers the first two years of mathematics and science courses towards a Bachelor of Science degree in Biology, Chemistry, Mathematics or Physics. Students wishing to complete their Bachelor of Science degree can readily transfer to UBC, SFU, UVic, UNBC, or any other university college in British Columbia that offers a Bachelor of Science.

## PROGRAM ADMISSION REQUIREMENTS

Admission to a Kwantlen program is required to access Science courses.

## CONTENT ASTRONOMY

If you find yourself staring into the sky at night, curious about the solar system or the universe in general, one or more of these courses might be for you.

ASTR 1100 (Introduction to Astronomy) is a lab-science course for non-science students. No prior study of Physics

or Astronomy is required. Topics include the Earth, Solar System, Milky Way, galaxies and cosmology.

ASTR 1105 (Basic Astronomy) is a science course for non-science students. The course is similar to ASTR 1100 (introduction to Astronomy) but has no lab component. No prior study of Physics or Astronomy is required. Topics include the Earth, Solar System, Milky Way, galaxies and cosmology.

ASTR 3110 (Exploring the Solar System) is a course that surveys recent discoveries about the planets and other objects in the solar systems. Topics also include the Sun, the existence of planetary systems around other stars, and the search for life.

ASTR 3111 (Exploring Stars & Galaxies) is a course that surveys recent discoveries in modern astronomy. Topics also include the Sun, stars, pulsars, black holes, galaxies, quasars and the origin and evolution of the universe.

ASTR 1120 (Introduction to Astrophysics) is an introductory course in astronomy designed for science students. It can be taken as an elective toward Bachelor of Science degrees in many disciplines including biology, chemistry, mathematics, physics and geography. Topics include the Earth, Solar System, Milky Way, galaxies and cosmology. ASTR 1120 is not intended for students majoring in astronomy. Those students are advised to enter directly into ASTR 2101 and 2102.

ASTR 2101 (Astrophysics I: Stellar Astrophysics) and ASTR 2102 (Astrophysics II: Galactic Astronomy) are Astronomy courses for science students who are more seriously interested in astronomy and physics. These courses do not have lab components and are often suitable as electives for students majoring in the sciences (chemistry, biology, physics) – they are core courses for astronomy majors. ASTR 1120 is NOT a prerequisite.

### Notes:

ASTR 1100, ASTR 3110 and ASTR 3111 are for students majoring in fields other than science. (ASTR 3110 and ASTR 3111 do not have a lab component). These three courses can be used to meet the Liberal Education requirements of many of Kwantlen's applied degrees, as well as to meet the Q (Quantitative) and B (Breadth) requirements for the Bachelor of Arts degrees.

ASTR 1105, 1120, 2101 and 2102 are not offered every year. Please consult the department for scheduling information.

For further information visit the Department of Physics website at [kwantlen.ca/physics](http://kwantlen.ca/physics).

## BIOLOGY

Kwantlen offers a full range of first and second year Biology courses. All Biology courses (except BIOL 2421 - Cellular Biochemistry) have both lecture and laboratory components.

BIOL 1110 and BIOL 1210 (Introductory Biology I & II) – are required for students majoring in Biology and are prerequisites for all second year Biology courses. These courses operate on an Open Lab system in which students may do their lab work at any time during the laboratory's opening hours. (Open hours are posted at the lab entrance and are available on the

Biology department's web site). Students should expect to spend as many as six hours per week in the laboratory, and must consider this time commitment when timetabling. BIOL 1110 and 1210 have one 2-hour class each week in addition to this lab time.

BIOL 1160 and BIOL 1260 (Anatomy and Physiology I & II) – have one 2-hour class and a 1-hour question-and-answer period each week in addition to open lab time.

Second year courses have two 2-hour classes per week combined with a scheduled 2-hour lab (BIOL 2330 {Microbiology}), open lab time (BIOL 2320 {Genetics}, 2321 {Cell Biology}), or open lab time and scheduled field trips (BIOL 2322 {Ecology}).

**Note:** These are Biology courses, and the use of animal and plant tissues may be required.

For further information contact the Department of Biology ([kwantlen.ca/biology](http://kwantlen.ca/biology)).

## CHEMISTRY

All Chemistry courses have both a lecture and a lab component with the exception of CHEM 2311 (Physical Chemistry for Life Sciences).

Students intending to transfer into the second year of a university program are advised to refer to the appropriate university calendar for the specific course requirements, or contact an Educational Advisor.

Mathematics is a requirement in many university programs and most chemistry courses offered at Kwantlen possess mathematics prerequisites. For this reason, students are advised to consider carefully the sequence of math and chemistry courses taken. The following sequence is suggested to permit students to progress smoothly through chemistry and mathematics in the minimum number of semesters. Students should start at the level consistent with their previous experience.

- Students with no previous chemistry and little mathematics should take CHEQ 1094 (Preparation for General Chemistry) and MATQ 1093 (Intermediate Algebra)
- Math 11 or Pre-calculus 11 (with a C or better) or MATQ 1093 should take CHEM 1105 (Introductory Chemistry) and MATH 1112 (Pre-Calculus Algebra). [MATH 1112 has a prerequisite Students with Chemistry 11 (and a letter grade of C+ or better) and Math 11 (either Principles of Math 11 (either Principles of Math 11 or Pre-calculus 11) with a B.)]
- Students with Chemistry 12 (and a letter grade of C+ or better) and Math 12 (either Principles of Math 12 or Pre-calculus 12) (with a B or better) or (a C grade plus Mathematics Placement Test) or MATH 1112 should take the following:

**Semester 1:** CHEM 1110 and MATH 1120

**Semester 2:** CHEM 1210 and MATH 1220

Students may also take higher level chemistry at Kwantlen. Organic Chemistry (CHEM 2320 and CHEM 2420), Analytical Chemistry (CHEM 2315), and Physical Chemistry for both the Physical Sciences and Life Sciences (CHEM 3310 and CHEM 2311) are all offered and all transfer to British Columbia universities.

CHEM 1101 (CSI: Chemical Science Investigation) – for students who require a lab-science or quantitative requirement but do not want a typical science course, CHEM 1101 is an option. This course is tailored to meet the needs of students with little or no background in sciences and math and explains the chemistry behind forensic science. The lab aspect of the course is of particular benefit to students pursuing elementary education.

For further information contact the Department of Chemistry ([kwantlen.ca/chemistry](http://kwantlen.ca/chemistry)).

## ENVIRONMENTAL PROTECTION

Environmental Protection offers three courses to students from other disciplines who wish to learn more about the environment, and/or require it in their program of study.

ENVI 2305 (Environmental Toxicology) is required for students who wish to take the Environmental Toxicology program at SFU.

ENVI 3112 (Environment and Society) is a discussion course that studies the role the media, the artistic community, business, and cultural groups play in environmental disputes.

ENVI 3212 (The Urban Environment) is a course that discusses urban environmental issues from a variety of political, social, activist, and scientific perspectives.

ENVI 3112 and ENVI 3212 qualify as Liberal Education electives.

For further information visit the Department of Environmental Protection website at [kwantlen.ca/science/environment](http://kwantlen.ca/science/environment).

## MATHEMATICS

Many university departments require credits in mathematics at the first-year or second-year level for admission to certain upper-level courses. Students are therefore urged to consult the appropriate calendars, educational advising, or a mathematics instructor at Kwantlen for details of specific mathematics requirements.

### Mathematics Courses For Science Students

The normal sequence of mathematics courses for students who wish to receive credit for first-year calculus in sciences or applied sciences should be:

- MATH 1120 (Differential Calculus)
- MATH 1220 (Integral Calculus)

Students who intend to complete their second year of a science program at Kwantlen may (depending on their program) also require MATH 2315 (Probability and Statistics), 2321 (Multivariate Calculus {Calculus III}), 2331 (Introduction

to Analysis), 2335 (Statistics for Life Sciences), 3322 (Vector Calculus {Calculus IV}), 3421 (Ordinary Differential Equations)

**Note:** First-year science calculus (MATH 1120, 1220 or in some cases MATH 1130, 1230) are required for those planning to study mathematics, science, applied science, agriculture, forestry, pharmacy, medicine or dentistry.

### **Mathematics Courses for Business, Commerce and Economics Students**

Students wishing to transfer to a commerce, business administration or economics degree program at a university should consult the appropriate calendar or speak with educational advising with regard to mathematics requirements. However, the normal sequence of courses should be as per the following:

#### **UBC**

MATH 1120, 1130 or 1140 (Calculus I {Business Applications}) and 1220 or 1230 or 1240 (Calculus II {Business Applications}) SFU MATH 1140, 1240, 2341 (Introduction to Statistics)

#### **UVic**

MATH 1120 or 1140 and 1220 or 1240

### **Mathematics Courses for Non-Science Students**

Students whose major interests lie outside of the sciences and who would like to study the structure and development of Mathematics from the point of view of the non-mathematician are encouraged to take MATH 1116 (Mathematical Explorations). Students with a P or better in either Principles of Math 11 or Applications of Math 11 are eligible to take this course. This course can be used to partially fulfill the quantitative requirement for the B.A. degree.

For further information visit the Department of Mathematics website at [kwantlen.ca/science/mathematics](http://kwantlen.ca/science/mathematics).

## **PHYSICS**

The Physics Department offers first and second year physics courses that are foundational for Kwantlen Bachelor of Science degrees and that also transfer readily to other post-secondary institutions (see Transfer Guide). Many Physics courses have both a lecture and a lab component. Not all courses are offered every semester. Students are encouraged to contact Educational Advisors or any Physics instructor for information and guidance.

PHYS 1100 (Introductory Physics) is a preparatory course for students who have not taken Physics 12.

PHYS 1101 (Physics for Life Sciences I) and PHYS 1102 (Physics for Life Sciences II) are first year Physics courses for Life Science students, and include lab components. (PHYS 1220 (Physics for Physical & Applied Sciences II) can be taken in lieu of PHYS 1102.)

PHYS 1112 (Reel Physics) is a course aimed at non-science majors that explores physics portrayed in pop culture. Movies will be a main focus of this course! You can learn to tell if a movie stunt is real, or see just how much fiction is in science fiction. This course is designed to meet the Liberal Education requirements of many of Kwantlen's applied degrees, as

well as for meeting the Q (Quantitative) and B (Breadth) requirements of the Bachelor of Arts degrees.

PHYS 1120 (Physics for Physical & Applied Sciences I) and 1220 (Physics for Physical & Applied Sciences II) are first year Physics courses for Physical Science and Applied Science students, and include lab components.

PHYS 1170 (Mechanics I) is a Mechanics course for Applied Science students.

PHYS 2101 (Experimental Physics I)/2201 (Experimental Physics II), 2330 (Intermediate Mechanics) and 2424 (Relativity and Quanta) are second year courses in Experimental Physics, Mechanics and Special Relativity & Quantum Physics, respectively.

PHYS 3202 (Biophysics) is about analyzing biological systems and problems using the principles of physics. Areas of study include: how animals move, limitation on the size of organisms, how body heat is regulated, and how eyes and ears work.

For further information, visit the Department of Physics website at [kwantlen.ca/physics](http://kwantlen.ca/physics).

## **GRADUATION**

These courses may be used towards many Kwantlen credentials.