# Bachelor of Science Degree

## B.Sc. Regulations

The regulations presented in this section apply to all Bachelor of Science programs. In addition to the requirements presented here, students must satisfy the University regulations common to all undergraduate students including the process of Academic Performance Evaluation (see the *Academic Regulations of the University* section of this Calendar).

### Breadth Requirement for the B.Sc.

Students in a Bachelor of Science program must present the following credits at graduation:

1. 2.0 credits in Science Continuation courses not in the major discipline; **students completing a double major are considered to have completed this requirement providing they have 2.0 credits in science continuation courses in each of the two majors**
2. 2.0 credits in courses outside of the faculties of Science and Engineering and Design (but may include NSCI 1000)

In most cases, the requirements for individual B.Sc. programs, as stated in this Calendar, contain these requirements, explicitly or implicitly.

Students admitted to B.Sc. programs by transfer from another institution must present at graduation (whether taken at Carleton or elsewhere):

1. 2.0 credits in courses outside of the faculties of Science and Engineering and Design (but may include NSCI 1000) if, on transfer, the student received credit for fewer than 10.0 credits.
2. 1.0 credit in courses outside of the faculties of Science and Engineering and Design (but may include NSCI 1000) if, on transfer, the student received credit for 10.0 or more credits.

### Declared and Undeclared Students

Students who are registered in a program within the degree are called Declared students. Most students designate a program of study when they first apply for admission and so begin their studies as Declared students. Students may also choose to begin their studies within the B.Sc. degree without being registered in a program. These students are referred to as Undeclared students. The recommended course pattern for Undeclared students is provided in the Undeclared entry of the Programs section of this Calendar. Undeclared students normally must apply to enter a program before beginning their second year of study. The Science Student Success Centre (SSSC) provides Undeclared students guidance to the appropriate support services in making this decision.

### Change of Program within the B.Sc. Degree

Students may transfer to a program within the B.Sc. degree if upon entry to the new program they would be in good academic standing.

Other applications for change of program will be considered on their merits; students may be accepted in the new program in *Good Standing* or on *Academic Warning*.

Applications to declare or change their program within the B.Sc. Degree must be made online through Carleton Central by completing a Change of Program Elements (COPE) application form within the published deadlines. Acceptance into a program or into a program element or option is subject to any enrolment, and/or specific program, program element or option requirements as published in the relevant Calendar entry.

### Minors, Concentrations and Specializations

Students may add a minor, concentration or specialization by completing a Change of Program Elements (COPE) application form online through Carleton Central. Acceptance into a minor, concentration or specialization requires that the student be in *Good Standing* and is subject to any specific requirements of the intended Minor, Concentration or Specialization as published in the relevant Calendar entry.

### Experimental Science Requirement

Students in a B.Sc. degree program must present at graduation at least two full credits of experimental science chosen from two different departments or institutes from the list below:

**Approved Experimental Science Courses**

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|---|---|
| **Biochemistry** | |
| BIOC 2200 [0.5] | Cellular Biochemistry |
| BIOC 4001 [0.5] | Methods in Biochemistry |
| BIOC 4201 [0.5] | Advanced Cell Culture and Tissue Engineering |
| **Biology** | |
| BIOL 1103 [0.5] | Foundations of Biology I |
| BIOL 1104 [0.5] | Foundations of Biology II |
| BIOL 2001 [0.5] | Animals: Form and Function |
| BIOL 2002 [0.5] | Plants: Form and Function |
| BIOL 2104 [0.5] | Introductory Genetics |
| BIOL 2200 [0.5] | Cellular Biochemistry |
| BIOL 2600 [0.5] | Ecology |
| **Chemistry** | |
| CHEM 1001 [0.5] | General Chemistry I |
| CHEM 1002 [0.5] | General Chemistry II |
| CHEM 1005 [0.5] | Elementary Chemistry I |
| CHEM 1006 [0.5] | Elementary Chemistry II |
| CHEM 2103 [0.5] | Physical Chemistry I |
| CHEM 2203 [0.5] | Organic Chemistry I |
| CHEM 2204 [0.5] | Organic Chemistry II |
| CHEM 2302 [0.5] | Analytical Chemistry I |
| CHEM 2303 [0.5] | Analytical Chemistry II |
| CHEM 2800 [0.5] | Foundations for Environmental Chemistry |
| **Earth Sciences** | |

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|---|---|
| ERTH 1006 [0.5] | Exploring Planet Earth |
| ERTH 1009 [0.5] | The Earth System Through Time |
| ERTH 2102 [0.5] | Mineralogy to Petrology |
| ERTH 2404 [0.5] | Engineering Geoscience |
| ERTH 2802 [0.5] | Field Geology I |
| ERTH 3111 [0.5] | Vertebrate Evolution: Mammals, Reptiles, and Birds |
| ERTH 3112 [0.5] | Vertebrate Evolution: Fish and Amphibians |
| ERTH 3204 [0.5] | Mineral Deposits |
| ERTH 3205 [0.5] | Physical Hydrogeology |
| ERTH 3806 [0.5] | Structural Geology |
| **Food Sciences** | |
| FOOD 3001 [0.5] | Food Chemistry |
| FOOD 3002 [0.5] | Food Analysis |
| FOOD 3005 [0.5] | Food Microbiology |
| **Geography** | |
| GEOG 1010 [0.5] | Global Environmental Systems |
| GEOG 3108 [0.5] | Soil Properties |
| **Neuroscience** | |
| NEUR 3206 [0.5] | Sensory and Motor Neuroscience |
| NEUR 3207 [0.5] | Systems Neuroscience |
| NEUR 4600 [0.5] | Advanced Lab in Neuroanatomy |
| **Physics** | |
| PHYS 1001 [0.5] | Foundations of Physics I |
| PHYS 1002 [0.5] | Foundations of Physics II |
| PHYS 1003 [0.5] | Introductory Mechanics and Thermodynamics |
| PHYS 1004 [0.5] | Introductory Electromagnetism and Wave Motion |
| PHYS 1007 [0.5] | Elementary University Physics I |
| PHYS 1008 [0.5] | Elementary University Physics II |
| PHYS 2202 [0.5] | Wave Motion and Optics |
| PHYS 2604 [0.5] | Modern Physics I |
| PHYS 3007 [0.5] | Third Year Physics Laboratory: Selected Experiments and Seminars |
| PHYS 3606 [0.5] | Modern Physics II |
| PHYS 3608 [0.5] | Modern Applied Physics |

## Course Categories for B.Sc. Programs

**Science Geography Courses**

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|---|---|
| GEOG 1010 [0.5] | Global Environmental Systems |
| GEOG 2006 [0.5] | Introduction to Quantitative Research |
| GEOG 2013 [0.5] | Weather and Water |
| GEOG 2014 [0.5] | The Earth's Surface |
| GEOG 3003 [0.5] | Quantitative Geography |
| GEOG 3010 [0.5] | Field Methods in Physical Geography |
| GEOG 3102 [0.5] | Geomorphology |
| GEOG 3103 [0.5] | Watershed Hydrology |
| GEOG 3104 [0.5] | Principles of Biogeography |
| GEOG 3105 [0.5] | Climate and Atmospheric Change |
| GEOG 3106 [0.5] | Aquatic Science and Management |
| GEOG 3108 [0.5] | Soil Properties |
| GEOG 4000 [0.5] | Field Studies |
| GEOG 4005 [0.5] | Directed Studies in Geography |
| GEOG 4013 [0.5] | Cold Region Hydrology |
| GEOG 4017 [0.5] | Global Biogeochemical Cycles |
| GEOG 4101 [0.5] | Two Million Years of Environmental Change |
| GEOG 4103 [0.5] | Water Resources Engineering |
| GEOG 4104 [0.5] | Microclimatology |
| GEOG 4108 [0.5] | Permafrost |

**Science Psychology Courses**

| | |
|---|---|
| PSYC 2001 [0.5] | Introduction to Research Methods in Psychology |
| PSYC 2002 [0.5] | Introduction to Statistics in Psychology |
| PSYC 2700 [0.5] | Introduction to Cognitive Psychology |
| PSYC 3000 [1.0] | Design and Analysis in Psychological Research |
| PSYC 3506 [0.5] | Cognitive Development |
| PSYC 3700 [1.0] | Cognition (Honours Seminar) |
| PSYC 3702 [0.5] | Perception |
| PSYC 2307 [0.5] | Human Neuropsychology I |
| PSYC 3307 [0.5] | Human Neuropsychology II |

**Science Continuation Courses**

A course at the 2000 level or above may be used as a Science Continuation credit in a B.Sc. program if it is not in the student's major discipline, and is chosen from the following:

- BIOC (Biochemistry)
- BIOL (Biology)
- CHEM (Chemistry)
- COMP (Computer Science) A maximum of two half-credits at the 1000-level in COMP, excluding COMP 1001 may be used as Science Continuation credits.
- ERTH (Earth Sciences), except ERTH 2415 which may be used only as a free elective for any B.Sc. program. Students in Earth Sciences programs may use ERTH 2401, ERTH 2402, and ERTH 2403 only as free electives.
- Engineering. Students wishing to register in Engineering courses must obtain the permission of the Faculty of Engineering and Design.
- ENSC (Environmental Science)
- FOOD (Food Science and Nutrition)
- GEOM (Geomatics)
- HLTH (Health Sciences)
- ISAP (Interdisciplinary Science Practice)
- MATH (Mathematics)
- NEUR (Neuroscience)
- PHYS (Physics), except PHYS 2903
- Science Geography Courses (see list above)
- Science Psychology Courses (see list above)
- STAT (Statistics)
- TSES (Technology, Society, Environment) except TSES 2305. Biology students may use these courses only as free electives. Integrated Science and Environmental Science students may include these courses in their programs but may not count them as part of the Science Sequence.

**Science Faculty Electives**

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| Science Faculty Electives are courses at the 1000-4000 level chosen from: |
| BIOC (Biochemistry) |
| BIOL (Biology) Biology & Biochemistry students may use BIOL 1010 and BIOL 2005 only as free electives |
| CHEM (Chemistry) except CHEM 1003, CHEM 1004 and CHEM 1007 |
| COMP (Computer Science) except COMP 1001 |
| ERTH (Earth Sciences) except ERTH 1010, ERTH 1011 and ERTH 2415. Earth Sciences students may use ERTH 2401, ERTH 2402, and ERTH 2403 only as free electives. |
| Engineering |
| ENSC 2001 |
| FOOD (Food Science and Nutrition) |
| GEOM (Geomatics) |
| HLTH (Health Science) |
| ISAP (Interdisciplinary Science Practice) |
| MATH (Mathematics) |
| NEUR (Neuroscience) |
| PHYS (Physics) except PHYS 1901, PHYS 1902, PHYS 1905, PHYS 2903 |
| Science Geography (see list above) |
| Science Psychology (see list above) |
| STAT (Statistics) |
| TSES (Technology, Society, Environment) Biology students may use these courses only as free electives. |

**Advanced Science Faculty Electives**

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| Advanced Science Faculty Electives are courses at the 2000-4000 level chosen from the Science Faculty Electives list above. |

**Approved Courses Outside the Faculties of Science and Engineering and Design (may include** NSCI 1000**)**

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| All courses offered by the Faculty of Arts and Social Sciences, the Faculty of Public Affairs, and the Sprott School of Business are approved as Arts or Social Sciences courses EXCEPT FOR: All Science Geography courses (see list above), all Geomatics (GEOM) courses, all Science Psychology courses (see list above). NSCI 1000 may be used as an Approved Course Outside the Faculties of Science and Engineering and Design. |

**Free Electives**

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|---|---|
| Any course is allowable as a Free Elective providing it is not prohibited (see below). Students are expected to comply with prerequisite requirements and enrolment restrictions for all courses as published in this Calendar. | |
| **Courses Allowable Only as Free Electives in any B.Sc. Program** | |
| BIOL 4810 [0.5] | Education Research in Biology |
| CHEM 1003 [0.5] | The Chemistry of Food, Health and Drugs |
| CHEM 1004 [0.5] | Drugs and the Human Body |
| CHEM 1007 [0.5] | Chemistry of Art and Artifacts |
| ERTH 1010 [0.5] | Our Dynamic Planet Earth |
| ERTH 1011 [0.5] | Evolution of the Earth |
| ERTH 2415 [0.5] | Natural Disasters |
| ISCI 1001 [0.5] | Introduction to the Environment |
| ISCI 2000 [0.5] | Natural Laws |
| ISCI 2002 [0.5] | Human Impacts on the Environment |
| MATH 0107 [0.5] | Algebra and Geometry |
| PHYS 1901 [0.5] | Planetary Astronomy |
| PHYS 1902 [0.5] | From our Star to the Cosmos |
| PHYS 1905 [0.5] | Physics Behind Everyday Life |
| PHYS 2903 [0.5] | Physics Towards the Future |

**Prohibited Courses**

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| The following courses are not acceptable for credit in any B.Sc. program: | |
| COMP 1001 [0.5] | Introduction to Computational Thinking for Arts and Social Science Students |
| MATH 0005 [0.5] | Precalculus: Functions and Graphs |
| MATH 0006 [0.5] | Precalculus: Trigonometric Functions and Complex Numbers |
| MATH 1009 [0.5] | Mathematics for Business |
| MATH 1119 [0.5] | Linear Algebra: with Applications to Business |
| MATH 1401 [0.5] | Elementary Mathematics for Economics I |
| MATH 1402 [0.5] | Elementary Mathematics for Economics II |