

## Table of Contents – Programs of Study (Science)

### Faculty of Pure and Applied Science – Programs of Study

<b>Applied Mathematics</b>	450
<b>Atmospheric Chemistry (Applied Science Streams)</b>	450
• Honours Programs	450
• Specialized Honours Program in Chemistry: Atmospheric Chemistry Stream	450
• Honours Double Major Program in Chemistry and Earth and Atmospheric Science: Atmospheric Chemistry Stream	450
<b>Biochemistry</b>	450
• Specialized Honours Program	450
• Honours Programs	450
• Specialized Honours Biochemistry Program	451
<b>Biology</b>	451
• Bachelor Program	451
• Honours Programs	451
• Specialized Honours Program	451
• Honours Double Major Program	452
• Honours Major/Minor Program	452
• Honours Major (for Honours Major/Minor Programs)	452
• Honours Minor	452
<b>Chemistry</b>	452
• Bachelor Program	453
• Honours Programs	453
• Specialized Honours Program	453
• Specialized Honours Program Stream in Pharmaceutical and Biological Chemistry	453
• Honours Double Major Program	453
• Honours Major/Minor Program	453
• Honours Minor	454
<b>Computer Science</b>	454
• Bachelor Program	454
• Honours Programs	454
• Specialized Honours Program	454
• Honours Double Major and Honours Major/Minor Programs	454
• Honours Major	455
• Honours Minor	455
<b>Earth and Atmospheric Science</b>	455
• Bachelor Program	455
• Honours Programs	455
• Honours Cores	455
• Specialized Honours Program	455
• Honours Double Major Program and Honours Major/Minor Programs	456
• Honours Major	456
• Honours Minor	456
• Concurrent Certificate in Geographic Information Systems (GIS) and Remote Sensing	456
• Concurrent Certificate in Meteorology	456
<b>Engineering</b>	456
<b>Environmental Science</b>	457
• Specialized Honours Program	457
• Concurrent Certificate in Geographic Information Systems (GIS) and Remote Sensing	457
• Environmental Science Courses	457
<b>Geography</b>	458
• Bachelor Program	458
• Honours Programs	458
• Specialized Honours Program	458
• Honours Double Major Programs	459
• Honours Major/Minor Program	459
• Honours Major (for Honours Major/Minor Programs)	459
• Honours Minor	459
• Concurrent Certificate in Geographic Information Systems (GIS) and Remote Sensing	459
<b>Kinesiology and Health Science</b>	459

• Honours Programs	459
• Specialized Honours Program	460
• Honours Double Major and Honours Major/Minor Programs	460
• Honours Major	460
• Honours Minor	460
<b>Mathematics and Statistics</b>	460
• Bachelor Programs	461
• Honours Programs	461
• I. Applied Mathematics Programs	461
• Bachelor Program	461
• Specialized Honours Program	461
• Honours Double Major and Honours Major/Minor Programs	461
• Honours Major	461
• Honours Minor	461
• II. Computational Mathematics Program	461
• Specialized Honours Program	461
• III. Mathematics Programs	462
• Bachelor Program	462
• Honours Programs	462
• Specialized Honours Program	462
• Honours Double Major and Honours Major/Minor Programs	462
• Honours Major	462
• Honours Minor	462
• IV. Statistics Programs	463
• Bachelor Program	463
• Specialized Honours Program	463
• Honours Double Major Program	463
• Honours Major (BSc Honours Double Major Programs)	463
• Honours Major/Minor Programs	463
• Honours Major (for BSc Honours Major/Minor Programs)	463
• Honours Minor	463
<b>Physics and Astronomy</b>	463
• Bachelor Program	464
• Honours Programs	464
• Specialized Honours Program	464
• Honours Double Major and Honours Major/Minor Programs	464
• Honours Major	465
• Honours Minor	465
<b>Psychology</b>	465
• Bachelor Program	465
• Honours Programs	465
• Specialized Honours Program	466
• Honours Double Major and Honours Major/Minor Programs	466
• Honours Major	466
• Honours Minor	466
• Joint York/Seneca Certificate Program in Rehabilitation Services	466
<b>BSc Honours Science and BSc Science</b>	466
<b>Space and Communication Sciences (Applied Science Streams)</b>	466
• Honours Programs	467
• Specialized Honours in Earth and Atmospheric Science	467
• Specialized Honours in Physics and Astronomy	467
<b>Statistics</b>	467

## Faculty of Pure and Applied Science – Programs of Study

### V. Programs of Study

#### Applied Mathematics

See the *Mathematics and Statistics* section.

#### Atmospheric Chemistry (Applied Science Streams)

The Department of Chemistry and the Department of Earth and Space Science and Engineering offer degree program Streams in Atmospheric Chemistry. Both programs of study are particularly demanding and will be of interest to students with academic performances of B grade or better.

i) All BSc Honours degree candidates must complete the program core (normally before proceeding to 3000- or higher-level courses): SC/CHEM 1000 3.00; SC/CHEM 1001 3.00; SC/CHEM 2010 3.00; SC/CHEM 2011 3.00; SC/CHEM 2020 6.00; SC/CHEM 2030 4.00; SC/CHEM 2080 4.00; SC/EATS 2010 3.00; SC/MATH 2015 3.00; SC/MATH 2270 3.00.

ii) All BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00 from the program core):

- SC/COSC 1540 3.00;
- SC/EATS 1011 3.00 (Honours Double Major stream only);
- SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1025 3.00;
- SC/PHYS 1010 6.00\*;
- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

\*Note: SC/PHYS 1410 6.00 with a minimum grade of C may replace SC/PHYS 1010 6.00.

iii) All BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

#### Honours Programs

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

Note: students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.

#### Specialized Honours Program in Chemistry: Atmospheric Chemistry Stream

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/CHEM 3011 4.00; SC/CHEM 3020 4.00; SC/CHEM 3030 4.00; SC/CHEM 3060 3.00; SC/CHEM 3080 4.00;
- SC/EATS 3030 3.00;

- SC/CHEM 4060 4.00; SC/CHEM 4061 4.00; SC/CHEM 4000 8.00;
- four additional credits chosen from 3000- and 4000-level chemistry courses or from 3000- or 4000-level earth and atmospheric science courses chosen in consultation with the Department of Chemistry;
- additional elective credits, as required for an overall total of at least 120 credits.

#### Honours Double Major Program in Chemistry and Earth and Atmospheric Science: Atmospheric Chemistry Stream

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/EATS 2470 3.00;
- SC/CHEM 3011 4.00; SC/CHEM 3080 4.00;
- SC/CHEM 3060 3.00 or SC/EATS 3130 3.00;
- SC/EATS 3030 3.00; SC/EATS 3040 3.00;
- SC/CHEM 4060 4.00;
- SC/CHEM 4061 4.00;
- SC/CHEM 4000 4.00 or SC/EATS 4000 3.00;
- SC/EATS 4050 3.00; SC/EATS 4120 3.00;
- SC/MATH 3241 3.00;
- at least 12 additional credits (including at least three credits in earth and atmospheric science) from the following: SC/EATS 4051 3.00, SC/EATS 4130 3.00, SC/EATS 4140 3.00, SC/EATS 4150 3.00, SC/EATS 4160 3.00, SC/EATS 4230 3.00, SC/CHEM 3010 4.00, SC/CHEM 3020 4.00, SC/CHEM 3021 4.00, SC/CHEM 3030 4.00, SC/CHEM 3031 4.00, SC/PHYS 2020 3.00.

#### Biochemistry

The Department of Biology and the Department of Chemistry offer jointly a Specialized Honours Program in Biochemistry.

#### Specialized Honours Program

i) All BSc Honours degree candidates must complete the program core: SC/BIOL 1010 6.00, SC/CHEM 1000 3.00, SC/CHEM 1001 3.00, SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00, SC/BCHM 2020 4.00, SC/BCHM 2021 4.00, SC/BIOL 2040 4.00, SC/CHEM 2011 3.00, SC/CHEM 2020 6.00, SC/CHEM 2030 3.00.

ii) All BSc Honours biochemistry degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section (IV) of this Calendar) by completing:

- SC/MATH 1013 3.00 and SC/MATH 1014 3.00;
- SC/COSC 1520 3.00, SC/COSC 1530 3.00, or SC/COSC 1540 3.00.

iii) 12 general education credits.

iv) All BSc Honours degree candidates must comply with general regulation 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section (IV) of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

#### Honours Programs

To declare Honours requires successful completion of at least 24 credits, a minimum cumulative credit-weighted grade point average of 5.5 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed.

To proceed in each year of the Honours program requires a minimum cumulative credit-weighted grade point average of 5.5 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed.

To graduate in Specialized Honours Biochemistry requires successful completion of all Faculty requirements and all required program courses, a minimum cumulative credit-weighted grade point average of 5.5 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed.

## Specialized Honours Biochemistry Program

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level requirements, as specified in ii) above;
- SC/BCHM 3010 3.00, SC/BCHM 3110 3.00, SC/BCHM 3130 3.00, SC/BCHM 3140 4.00, SC/BCHM 3051 3.00, SC/CHEM 3020 4.00, SC/BCHM 4290 4.00, SC/BCHM 4000 8.00, SC/BCHM 4050 3.00, nine credits from any other 3000- or 4000-level biochemistry, biology or chemistry courses;
- additional elective credits, as required for an overall total of at least 120 credits.

## Biology

i) All BSc and BSc Honours degree candidates (except those in Honours Double Major programs) must complete the program core: SC/BIOL 1010 6.00; and any five of SC/BIOL 2010 4.00, SC/BIOL 2020 4.00, SC/BIOL 2021 4.00, SC/BIOL 2030 4.00, SC/BIOL 2040 4.00, SC/BIOL 2050 4.00, SC/BIOL 2060 3.00, SC/CHEM 2020 6.00.

ii) All BSc and BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to SC/BIOL 1010 6.00 from the program core):

- SC/COSC 1520 3.00 or SC/COSC 1530 3.00 or SC/COSC 1540 3.00;
- SC/MATH 1505 6.00, or six credits from SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1025 3.00; (Note: students intending to combine biology with applied mathematics, chemistry, computer science, earth and atmospheric science, mathematics, physics and astronomy or statistics should not take SC/MATH 1505 6.00.)
- six credits from SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00 (prerequisites for SC/BIOL 2020 4.00 and SC/CHEM 2020 6.00), SC/EATS 1010 3.00 and SC/EATS 1011 3.00, SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00;
- a minimum of three additional credits from SC/BC 1800 3.00, SC/CHEM 1000 3.00, SC/CHEM 1001 3.00, SC/EATS 1010 3.00, SC/EATS 1011 3.00, SC/MATH 1025 3.00, SC/MATH 1190 3.00, SC/PHYS 1070 3.00, SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00; (Note: SC/PSYC 1010 6.00 may be included in this section for Honours Double Major and Honours Major/Minor combinations of biology and psychology.)
- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

iii) All BSc and BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 5 or 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

## Bachelor Program

**To Graduate in a Bachelor Program.** For students admitted to York University for 2001-2002 and subsequent years, the Senate of York University requires a minimum overall grade point average of 4.0 (C) in order to be eligible to graduate with a BSc degree (bachelor program).

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- additional credits from biology courses, as required for an overall total of at least 46 credits from biology courses;
- additional elective credits, as required for an overall total of at least 90 credits, including at least 66 credits from science courses and at least 18 credits at the 3000 or higher level.

## Honours Programs

To declare Honours requires successful completion of at least 24 credits, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

Notes:

- The minimum 6.0 (B) science grade point average is not required where biology is the minor in an Honours Major/Minor program. Only the minimum 5.0 (C+) overall grade point average is required in that case.
- Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.

## Specialized Honours Program

Students may follow a Stream in Biology, Biotechnology or Conservation Ecology.

### Biology Stream

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/BIOL 3100 2.00; SC/BIOL 4000 8.00 or SC/BIOL 4000 3.00;
- additional credits from biology courses, as required for an overall total of at least 68 credits from biology courses;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

### Biotechnology Stream

- the program core, as specified in i) above, including SC/BIOL 1010 6.00, SC/BIOL 2020 4.00, SC/BIOL 2021 4.00, SC/BIOL 2040 4.00, SC/BIOL 2060 3.00 and SC/CHEM 2020 6.00;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above, including the following:
  - 12 general education credits, including AS/ECON 1000 3.00, AS/ECON 1010 3.00 and either AS/PHIL 2070 3.00 or AS/PHIL 2075 3.00;
  - SC/COSC 1520 3.00 or SC/COSC 1530 3.00 or SC/COSC 1540 3.00;
  - SC/MATH 1505 6.00, or six credits from SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1025 3.00;
  - SC/CHEM 1000 3.00; SC/CHEM 1001 3.00; SC/PHYS 1410 6.00;
- SC/CHEM 2080 4.00; SC/CHEM 3070 3.00 or SC/CHEM 3071 3.00; SC/CHEM 3080 4.00;
- SB/BFND 3100 3.00; SB/BFND 3200 3.00;
- SC/BIOL 3110 3.00; SC/BIOL 3130 3.00; SC/BIOL 3140 4.00; SC/BIOL 3150 3.00;
- SC/BIOL 4000 8.00; SC/BIOL 4290 4.00;
- a minimum of 12 credits chosen from the following courses in lists A and B, with a minimum of six credits chosen from list A. List A: SC/BIOL 3010 3.00, SC/BIOL 3120 3.00, SC/BIOL 3155 3.00, SC/BIOL 4061 3.00, SC/BIOL 4110 4.00, SC/BIOL 4280 3.00, SC/BIOL 4285 3.00; List B: SC/BIOL 3160 4.00 (SC/BIOL 2010 4.00 is a prerequisite), SC/BIOL 4040 3.00, SC/BIOL 4150 3.00, SC/BIOL 4151 3.00, SC/BIOL 4270 3.00, SC/BIOL 4370 3.00, SC/BIOL 4510 3.00;

- additional elective credits as required for an overall total of at least 120 credits.

### Conservation Ecology Stream

- the program core, as specified in i) above, including SC/BIOL 1010 6.00, SC/BIOL 2010 4.00, SC/BIOL 2030 4.00, SC/BIOL 2040 4.00, SC/BIOL 2050 4.00 and SC/BIOL 2060 3.00;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above, including the following:
  - 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar); (AS/PHIL 2075 3.00 and ES/ENVS 1000 6.00 are recommended.)
  - SC/COSC 1520 3.00 or SC/COSC 1530 3.00 or SC/COSC 1540 3.00;
  - SC/CHEM 1000 3.00; SC/CHEM 1001 3.00;
  - SC/MATH 1505 6.00, or six credits from SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1025 3.00;
  - SC/EATS 1010 3.00, SC/EATS 1011 3.00;
- SC/BIOL 3001 2.00 or SC/BIOL 3001 3.00; SC/BIOL 3170 3.00; SC/BIOL 3200 3.00;
- SC/BIOL 4000 8.00; SC/BIOL 4095 3.00; SC/BIOL 4245 3.00; SC/BIOL 4255 3.00; SC/BIOL 4265 3.00; at least seven additional credits from biology courses at the 4000 level, chosen in consultation with the department;
- additional credits from biology courses, as required for an overall total of at least 68 credits from biology courses;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits from courses at the 3000 or higher level.

### Honours Double Major Program

All BSc Honours degree candidates should consult departmental advisers as early as possible concerning course requirements for particular Honours Double Major programs. The following are the normal minimum requirements, but some subject combinations require more than the minimum number of biology credits and/or specific biology courses (consult the departmental undergraduate handbook for details). Possible subject combinations for BSc Honours Double Major degree programs are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- SC/BIOL 1010 6.00;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the second major;
- at least 12 credits from 2000-level biology courses in the program core (see i) above);
- at least 12 credits from biology courses at the 3000 or higher level;
- additional credits from biology courses, as required for an overall total of at least 36 credits from biology courses;
- the course requirements for the second major;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

### Honours Major/Minor Program

An Honours major in biology may be combined with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the minor;
- the biology Honours major requirements below;
- the course requirements for the minor;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 42 credits at the 3000 or higher level.

### Honours Major (for Honours Major/Minor Programs)

- the program core, as specified in i) above;
- SC/BIOL 4000 3.00 or SC/BIOL 4000 8.00;
- additional credits from biology courses, as required for an overall total of at least 51 credits from biology courses.

*Note: both SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00 are required as prerequisites for SC/BIOL 2020 4.00 and SC/CHEM 2020 6.00 in the program core.*

### Honours Minor

- SC/BIOL 1010 6.00;
- at least 12 credits from biology courses at the 2000 level;
- at least nine credits from biology courses at the 3000 or higher level;
- additional credits from biology courses at the 2000 or higher level, as required for an overall total of at least 30 credits from biology courses.

*Note: it is recommended that students interested in cell biology, genetics, molecular biology and biochemistry take the following courses: SC/BIOL 1010 6.00, SC/CHEM 1000 3.00, SC/CHEM 1001 3.00, SC/BIOL 2020 4.00, SC/BIOL 2021 4.00, SC/BIOL 2040 4.00 and SC/CHEM 2020 6.00, plus a minimum of nine additional credits from biology courses at the 3000 or higher level. For other areas of interest, students are advised to choose their 2000-level biology courses wisely, based on the prerequisites for the courses they wish to take at the 3000 or higher level. Check the course outlines in this Calendar for course prerequisites.*

### Chemistry

i) All BSc and BSc Honours degree candidates (exception noted below) must complete the program core (normally before proceeding to 3000- or higher- level courses): SC/CHEM 1000 3.00; SC/CHEM 1001 3.00; SC/CHEM 2010 3.00; SC/CHEM 2011 3.00; SC/CHEM 2020 6.00; SC/CHEM 2030 4.00.

ii) All BSc and BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00 from the program core):

- SC/COSC 1540 3.00 or SC/COSC 1020 3.00 or SC/COSC 1520 3.00 or SC/COSC 1530 3.00;
  - SC/MATH 1013 3.00; SC/MATH 1014 3.00;
  - SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00 (not necessarily in year one);
  - for bachelor and Specialized Honours programs (except in the Pharmaceutical and Biological Chemistry Stream): three credits from SC/MATH 1021 3.00, SC/MATH 1025 3.00, SC/MATH 2015 3.00, SC/MATH 2221 3.00, SC/MATH 2310 3.00; for Specialized Honours Stream in Pharmaceutical and Biological Chemistry: SC/BIOL 1010 6.00; for Honours Double Major and Honours Major/Minor programs: at least three credits from SC/BIOL 1010 6.00 (strongly recommended for students lacking OAC biology), SC/EATS 1010 3.00, SC/EATS 1011 3.00, SC/MATH 1025 3.00, or from other 1000-level science courses required for the second major or the minor;
  - additional 1000-level science credits (excluding SC/CHEM 1500 4.00, SC/MATH 1510 6.00, SC/MATH 1515 3.00, SC/PHYS 1510 4.00 and all natural science courses), if required, for an overall total of at least 24 credits from 1000-level science courses; (SC/BIOL 1010 6.00 is strongly recommended for students lacking OAC biology.)
  - 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).
- iii) All BSc and BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 5 or 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

## Bachelor Program

**To Graduate in a Bachelor Program.** For students admitted to York University for 2001-2002 and subsequent years, the Senate of York University requires a minimum overall grade point average of 4.0 (C) in order to be eligible to graduate with a BSc degree (bachelor program).

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/CHEM 2080 4.00;
- at least 21 credits from chemistry courses at the 3000 level, for an overall total of at least 47 credits from chemistry courses; (Note: SC/CHEM 3080 4.00 is strongly advised.)
- additional elective credits, as required for an overall total of at least 90 credits, including at least 66 credits from science courses.

## Honours Programs

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

Notes:

1. In addition, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed is required to declare, proceed and graduate in (i) the Honours Double Major program where biology is the other major, and (ii) the Honours Major/Minor program where biology is the major. (The minimum 6.0 (B) science grade point average is not required where biology is the minor.)

2. Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.

## Specialized Honours Program

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/CHEM 2080 4.00;
- SC/CHEM 3010 4.00 or SC/CHEM 3011 4.00; SC/CHEM 3020 4.00; SC/CHEM 3030 4.00; SC/CHEM 3080 4.00;
- SC/CHEM 4000 8.00;
- a minimum of 18 additional credits from chemistry courses at the 3000 or 4000 level, of which at least 10 must be at the 4000 level, for an overall total of at least 68 credits from chemistry courses;
- additional science credits, as required for an overall total of at least 90 credits from science courses;
- additional elective credits, as required for an overall total of at least 120 credits.

In the applied chemistry area, the Department of Chemistry offers a Specialized Honours Program Stream in Atmospheric Chemistry (see separate entry in the Faculty of Pure and Applied Science Programs of Study section of this Calendar) and a Specialized Honours Program Stream in Pharmaceutical and Biological Chemistry.

In addition, students may develop a concentration in analytical chemistry, or materials chemistry, for which they should consult the Department of Chemistry on course selection.

## Specialized Honours Program Stream in Pharmaceutical and Biological Chemistry

A degree program stream of interest as an entry into the field of pharmaceutical (medicinal) chemistry, or for those wishing to explore biologically relevant topics and issues from a chemical perspective. It is suitable for employment in the pharmaceutical and related industries, and

in government laboratories, as well as for graduate work in areas of biological chemistry, including medicinal chemistry and structural biology.

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above (SC/MATH 1013 3.00 and SC/MATH 1014 3.00 may be replaced by SC/MATH 1505 6.00 with a minimum grade of B);
- SC/BIOL 2020 4.00; SC/BIOL 2021 4.00; SC/BIOL 2040 4.00; SC/CHEM 2080 4.00;
- SC/CHEM 3011 4.00; SC/CHEM 3020 4.00; SC/CHEM 3030 4.00; SC/CHEM 3050 3.00; SC/CHEM 3051 3.00; SC/CHEM 3071 3.00; SC/CHEM 3080 4.00;
- SC/CHEM 4000 8.00; SC/CHEM 4050 3.00; SC/CHEM 4051 3.00 or SC/CHEM 4021 3.00;
- at least three additional credits chosen from SC/CHEM 3021 3.00, SC/CHEM 4021 3.00 (if not already taken), SC/CHEM 4023 3.00, SC/CHEM 4051 3.00 (if not already taken), SC/BIOL 3110 3.00, SC/BIOL 4151 3.00;
- additional elective credits, as required, for an overall total of at least 120 credits including at least 90 credits from science courses.

## Honours Double Major Program

Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

Students should consult the departmental undergraduate handbook or a departmental adviser to plan their studies in order to meet the requirements for both majors and their prerequisites. The following are minimum chemistry requirements:

- SC/CHEM 1000 3.00, SC/CHEM 1001 3.00;
- any four of SC/CHEM 2010 3.00, SC/CHEM 2011 3.00, SC/CHEM 2020 6.00, SC/CHEM 2030 4.00 and SC/CHEM 2080 4.00;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- 18 chemistry credits at the 3000 and 4000 levels, including at least two four-credit 3000-level courses and including at least six credits at the 4000 level;
- SC/CHEM 4000 4.00 or SC/CHEM 4000 8.00 or an equivalent research project course in second major;
- the course requirements for the second major;
- additional elective credits, as required, for an overall total of at least 120 credits, including at least 90 credits in science courses and at least 42 science credits at the 3000 or 4000 levels.

Honours Double Major programs are necessarily highly demanding and should not be considered by any student without an average academic performance of B grade or better.

In the applied chemistry area, the Department of Chemistry and the Department of Earth and Space Science and Engineering offer an Honours Double Major Program Stream in Atmospheric Chemistry (see separate entry in the Faculty of Pure and Applied Science Programs of Study section of this Calendar).

## Honours Major/Minor Program

An Honours major in chemistry may be combined with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the program core as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the minor;
- SC/CHEM 2080 4.00;
- a minimum of 22 credits from chemistry courses at the 3000 or 4000 level, including a minimum of 16 credits from the following: SC/CHEM 3010 4.00, SC/CHEM 3011 4.00, SC/CHEM 3020 4.00, SC/CHEM 3021 4.00, SC/CHEM 3030 4.00, SC/CHEM 3031 4.00, SC/CHEM 3080 4.00;

- a minimum of nine additional credits from chemistry courses at the 4000 level, for an overall total of at least 57 credits from chemistry courses;
- the course requirements for the minor;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 42 credits at the 3000 or higher level.

*Note: The following courses are required as prerequisites or corequisites for the chemistry courses above: SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00.*

### Honours Minor

- SC/CHEM 1000 3.00; SC/CHEM 1001 3.00;
- at least 24 additional credits from chemistry courses at the 2000 or higher level, for an overall total of at least 30 credits from chemistry courses.

*Note: Some 2000-level chemistry courses require mathematics and physics courses as prerequisites or corequisites. Careful planning is required to ensure that prerequisites for the 2000- and higher-level chemistry courses in which the student is interested are completed.*

## Computer Science

i) All BSc and BSc Honours degree candidates must complete the program core: SC/COSC 1020 3.00; SC/COSC 1030 3.00; SC/COSC 2001 3.00; SC/COSC 2011 3.00; SC/COSC 2021 4.00; SC/COSC 2031 3.00; SC/COSC 3101 3.00; SC/COSC 3221 3.00; SC/COSC 3311 3.00; SC/MATH 1019 3.00; SC/MATH 1090 3.00; SC/MATH 1300 3.00; SC/MATH 1310 3.00; (see Note 2 below).

ii) All BSc and BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to the computer science and mathematics courses from the program core):

- six credits from SC/BIOL 1010 6.00, SC/BIOL 1410 6.00, SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, SC/EATS 1010 3.00 and SC/EATS 1011 3.00, SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00; (Note: in this context, SC/COSC 1020 3.00 and SC/COSC 1030 3.00 satisfy the other half of the 1000-level science requirement for courses with laboratories.)
- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

iii) All BSc and BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 5 or 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

iv) All BSc Honours degree candidates with a major in computer science must complete at least 30 credits which are neither computer science nor mathematics.

*Note 1: See the general prerequisites for 2000-, 3000- and 4000-level computer science courses (under Courses of Instruction section of this Calendar) for information about cumulative grade point average requirements in completed computer science courses.*

*Note 2: To satisfy computer science degree requirements, SC/MATH 1000 3.00 or SC/MATH 1013 3.00 may be taken in lieu of SC/MATH 1300 3.00; SC/MATH 1010 3.00 or SC/MATH 1014 3.00 may be taken in lieu of SC/MATH 1310 3.00; SC/MATH 1021 3.00 or SC/MATH 2221 3.00 may be taken in lieu of SC/MATH 1025 3.00.*

### Bachelor Program

**To Graduate in a Bachelor Program.** For students admitted to York University for 2001-2002 and subsequent years, the Senate of York University requires a minimum overall grade point average of 4.0 (C) in order to be eligible to graduate with a BSc degree (bachelor program).

- the program core, as specified in i) above;

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- at least nine additional credits from computer science courses at the 3000 level, including at least three credits from courses with second digit 4 (i.e. applications area), for an overall total of at least 37 credits from computer science courses;
- additional elective credits, as required for an overall total of at least 90 credits, including at least 66 credits from science courses.

### Honours Programs

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

*Notes:*

1. *In addition, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed is required to declare, proceed and graduate in (i) the Space and Communication Sciences Stream of Specialized Honours (applies to students admitted prior to 2002-2003), (ii) the Honours Double Major program where biology is the other major, and (iii) the Honours Major/Minor program where biology is the major. (The minimum 6.0 (B) science grade point average is not required where biology is the minor.)*

2. *Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.*

### Specialized Honours Program

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/MATH 1025 3.00; SC/MATH 2030 3.00;
- SC/COSC 3002 1.00, SC/COSC 3401 3.00; at least six additional credits from computer science courses at the 3000 level;
- at least 12 credits from computer science courses at the 4000 level, including SC/COSC 4101 3.00 or SC/COSC 4111 3.00 or SC/COSC 4115 3.00;
- at least six additional credits from computer science courses at the 3000 or 4000 level, for an overall total of at least 56 credits from computer science courses;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses, at least 42 credits at the 3000 or higher level, and at least 30 credits which are neither computer science nor mathematics.

### Honours Double Major and Honours Major/Minor Programs

An Honours major in computer science may be combined with an Honours major in another subject area in a BSc Honours Double Major degree program, or with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including choices appropriate for the second major or the minor;
- the computer science Honours major requirements below;
- the course requirements for the second major or the minor;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90\* credits from science courses, at

least 42 credits at the 3000 or higher level, and at least 30 credits which are neither computer science nor mathematics.

\* or at least 66 credits from science courses if the minor is in a fine arts subject area

### Honours Major

- the program core, as specified in i) above;
- SC/MATH 2030 3.00;
- SC/COSC 3002 1.00, SC/COSC 3401 3.00;
- at least 12 credits from computer science courses at the 4000 level, for an overall total of at least 44 credits from computer science courses.

### Honours Minor

- the program core, as specified in i) above;
- SC/MATH 2030 3.00;
- SC/COSC 3002 1.00, SC/COSC 3401 3.00;
- six credits from computer science courses at the 4000 level, for an overall total of at least 38 credits from computer science courses.

It is recommended that students in Honours Double Major or Honours Major/Minor programs take a linear algebra course such as SC/MATH 1025 3.00 among their electives.

## Earth and Atmospheric Science

*Note: The following BSc and BSc Honours degree requirements do not apply to students in the Space and Communication Sciences Stream of Specialized Honours in earth and atmospheric science (see Space and Communication Sciences in the Faculty of Pure and Applied Science Programs of Study section of this Calendar) or the Atmospheric Chemistry Stream of Honours Double Major in earth and atmospheric science and chemistry (see Atmospheric Chemistry in the Faculty of Pure and Applied Science Programs of Study section of this Calendar).*

- With the exceptions noted above, all BSc and BSc Honours degree candidates must complete the EATS program core: SC/COSC 1540 3.00; SC/EATS 2030 3.00; SC/EATS 2470 3.00; SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1025 3.00; SC/MATH 2015 3.00; SC/MATH 2270 3.00; SC/PHYS 1010 6.00; SC/PHYS 2020 3.00; SC/PHYS 2211 1.00.
- All BSc and BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to the EATS program core):
  - 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).
- All BSc and BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 5 or 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

### Bachelor Program

**To Graduate in a Bachelor Program.** Students who were admitted to York University for 2001-2002 and subsequent years are required to have a minimum overall grade point average of 4.0 (C) in order to be eligible to graduate with a BSc degree (bachelor program).

- the EATS program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education requirements, as specified in ii) above;
- SC/EATS 1010 3.00, SC/EATS 1011 3.00, SC/CHEM 1000 3.00, SC/CHEM 1001 3.00; SC/EATS 2010 3.00 (for those wishing to emphasize Atmospheric Science) or SC/EATS 2050 4.00 (for those wishing to emphasize Earth Science); SC/MATH 2560 3.00 or SC/GEOG 2420 3.00, SC/EATS 3300 3.00;

- nine credits from SC/EATS 3010 2.00 and SC/EATS 3011 1.00, SC/EATS 3020 3.00, SC/EATS 3030 3.00, SC/EATS 3040 3.00, SC/EATS 3180 3.00, SC/MATH 3241 3.00, SC/PHYS 3050 3.00;
- nine additional credits from earth and atmospheric science courses at the 3000 or higher level;
- additional elective credits, approved by the Department of Earth and Space Science and Engineering, as required for an overall total of at least 90 credits, including at least 66 credits from science courses.

### Honours Programs

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

*Notes:*

- In addition, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed is required to declare, proceed and graduate in (i) the Space and Communication Sciences Stream of Specialized Honours, (ii) the Honours Double Major program where biology is the other major, and (iii) the Honours Major/Minor program where biology is the major. (The minimum 6.0 (B) science grade point average is not required where biology is the minor.)*
- Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.*

### Honours Cores

The atmospheric science Honours core requires the following in addition to the EATS program core: SC/EATS 1011 3.00; SC/EATS 2010 3.00; SC/EATS 3030 3.00; SC/EATS 3040 3.00; SC/EATS 4050 3.00; SC/EATS 4051 3.00; SC/EATS 4120 3.00; SC/EATS 4130 3.00; SC/EATS 4140 3.00; SC/EATS 4230 3.00; SC/MATH 3241 3.00.

The earth science Honours core requires the following in addition to the EATS program core: SC/EATS 1010 3.00; SC/EATS 2050 4.00; SC/EATS 3010 2.00; SC/EATS 3011 1.00; SC/EATS 3020 3.00; SC/EATS 3180 3.00; SC/EATS 3300 3.00; SC/EATS 4010 6.00; SC/EATS 4020 3.00; SC/EATS 4220 3.00; SC/MATH 2560 3.00 or SC/GEOG 2420 3.00.

### Specialized Honours Program

- the EATS program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education requirements, as specified in ii) above;
- all obligatory courses in one of the following streams:

#### Atmospheric Science Stream

- the atmospheric science Honours core;
- SC/EATS 1010 3.00; SC/EATS 3020 3.00; SC/EATS 3280 3.00; SC/EATS 3300 3.00; SC/EATS 4160 3.00; SC/MATH 2560 3.00 or SC/GEOG 2420 3.00; SC/CHEM 1000 3.00 or SC/CHEM 1001 3.00;
- at least three science credits chosen from SC/CHEM 2011 3.00, SC/CHEM 2030 4.00, SC/MATH 2222 3.00;
- 15 credits (to include at least three credits from earth and atmospheric science courses), chosen from the following: SC/EATS 3130 3.00, SC/EATS 4000 3.00, SC/EATS 4000 6.00, SC/EATS 4020 3.00, SC/EATS 4220 3.00, SC/EATS 4240 3.00, SC/GEOG 2400 6.00, SC/GEOG 4210 3.00, SC/GEOG 4310 3.00, SC/MATH 3242 3.00, SC/MATH 3271.30, SC/MATH 4141 3.00, SC/MATH 4142 3.00, SC/PHYS 2060 3.00, SC/PHYS 3050 3.00;
- additional elective credits, approved by the Department, as required for an overall total of at least 120 credits.

### Earth Science Stream

- the earth science Honours core;
- SC/EATS 1011 3.00; SC/EATS 2010 3.00;
- SC/CHEM 1000 3.00; SC/CHEM 1001 3.00; SC/EATS 2060 3.00; SC/EATS 2610 2.00 or SC/EATS 2620 4.00;
- SC/EATS 3140 3.00; SC/EATS 3280 3.00; SC/MATH 3241 3.00;
- SC/EATS 4230 3.00; SC/EATS 4400 3.00;
- at least nine credits from SC/EATS 4000 3.00, SC/EATS 4000 6.00, SC/MATH 3242 3.00, SC/MATH 3271 3.00, SC/MATH 3410 3.00; SC/PHYS 3020 3.00; SC/PHYS 3050 3.00; SC/PHYS 3150 3.00, for an overall total of at least 42 credits from earth and atmospheric science courses;
- additional elective credits, approved by the Department, as required for an overall total of at least 120 credits.

The Department of Earth and Space Science and Engineering also offers a BSc Specialized Honours degree Stream in Space and Communication Sciences whose degree requirements are specified in a separate entry in the Faculty of Pure and Applied Science Programs of Study section of this Calendar.

### Honours Double Major Program and Honours Major/Minor Programs

An Honours major in earth and atmospheric science may be combined with an Honours major in another subject area in a BSc Honours Double Major degree program, or with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar. Further information on course selection for various Honours Double Major programs is detailed in the departmental handbook.

All degree candidates should contact departmental advisers as early as possible regarding course requirements for particular Honours Double Major and Honours Major/Minor programs. Early planning of courses is strongly advised so that the necessary prerequisites for courses in both departments are met.

- the Faculty of Pure and Applied Science general education requirement, as specified in ii) above;
- the earth and atmospheric science Honours major requirements below;
- the course requirements for the second major or the minor;
- additional elective credits, approved by the Department, as required for an overall total of at least 120 credits, including at least 42 credits at the 3000 or higher level.

In cooperation with the Department of Chemistry, the department offers an Honours Double Major program stream in the applied science area of atmospheric chemistry - see separate entry in the Faculty of Pure and Applied Science Programs of Study section of this Calendar.

### Honours Major

An Honours major in earth and atmospheric science may be taken in either the Atmospheric Science Stream or the Earth Science Stream.

### Atmospheric Science Stream

- the atmospheric science Honours core, including the EATS program core, as specified above;

### Earth Science Stream

- the earth science Honours core, including the EATS program core, as specified above.

### Honours Minor

- SC/EATS 1010 3.00; SC/EATS 1011 3.00;
- SC/EATS 2010 3.00; SC/EATS 2030 3.00; SC/EATS 2050 4.00;
- at least 14 credits from the following courses: SC/EATS 2470 3.00, SC/EATS 3010 2.00, SC/EATS 3011 1.00, SC/EATS 3020 3.00, SC/EATS 3030 3.00, SC/EATS 3040 3.00, SC/EATS 3140 3.00, SC/EATS 3180 3.00, SC/EATS 3300 3.00.

*Note: The following courses are required as prerequisites or corequisites for the courses listed above: SC/COSC 1540 3.00; SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1025 3.00; SC/MATH 2015 3.00; SC/MATH 2270 3.00; SC/MATH 2560 3.00 or SC/GEOG 2420 3.00; SC/PHYS 1010 6.00; SC/PHYS 2010 3.00; SC/PHYS 2020 3.00.*

### Concurrent Certificate in Geographic Information Systems (GIS) and Remote Sensing

*See Certificate Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.*

### Concurrent Certificate in Meteorology

*See Certificate Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.*

## Engineering

Commencing in the Fall of 2001, the Faculty of Pure and Applied Science offered a new Engineering Program, leading to an Honours Bachelor of Applied Science (BASC [Honours]) degree. The first year of the program was offered for the first time in 2001-2002, the second year in 2002-2003, the third year in 2003-2004 and the fourth year will be offered in 2004-2005. After completion of a common first-year program, students will choose one of four streams: computer engineering, engineering physics, geomatics engineering or space engineering.

i) All BASc (Honours) degree candidates must complete the Engineering Program core: SC/CHEM 1000 3.00; SC/COSC 1020 3.00; SC/COSC 1030 3.00; SC/EATS 1010 3.00; SC/ENG 1000 6.00; SC/ENG 2000 6.00; SC/ENG 3000 3.00; SC/ENG 4000 6.00; SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1019 3.00; SC/MATH 1025 3.00; SC/MATH 2015 3.00; SC/PHYS 1010 6.00; SC/PHYS 2020 3.00; SC/PHYS 3050 3.00.

ii) All BASc (Honours) degree candidates must complete twelve non-science general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar). Three of these credits must be ES/ENVS 2150 3.00.

iii) All BASc (Honours) degree candidates, in accordance with their declared stream, must satisfy the academic standing and course requirements below.

To proceed in each year of the BASc (Honours) program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed.

To graduate in the BASc (Honours) program requires successful completion of all Faculty requirements and program and stream required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed.

### Computer Engineering Stream

- the Engineering Program core;
- SC/COSC 2001 3.00; SC/COSC 2011 3.00; SC/COSC 2021 4.00; SC/COSC 2031 3.00;
- SC/MATH 1090 3.00; SC/MATH 2030 3.00;
- At least six additional credits from SC/BIOL 1010 6.00, SC/BIOL 1410 6.00, SC/CHEM 1001 3.00, SC/CHEM 2011 3.00, SC/EATS 1011 3.00, SC/PHYS 1070 3.00, SC/PHYS 2010 3.00, SC/PHYS 2040 3.00, SC/PHYS 2060 3.00;
- SC/COSC 3101 3.00; SC/COSC 3201 4.00; SC/COSC 3213 3.00; SC/COSC 3215 4.00; SC/COSC 3221 3.00; SC/COSC 3311 3.00; SC/COSC 3451 3.00; SC/COSC 3900 0.00;
- three additional credits from computer science courses at the 3000 or 4000 level;
- SC/PHYS 3150 3.00;
- SC/COSC 4201 3.00; SC/COSC 4214 3.00; SC/COSC 4312 3.00;
- 12 credits from: SC/COSC 4211 3.00; SC/COSC 4213 3.00; SC/COSC 4313 3.00; SC/COSC 4352 3.00; SC/COSC 4421 3.00; SC/COSC 4422 3.00; SC/COSC 4431 3.00; SC/COSC 4441 3.00.



A non-credit, four-16 month internship program is required between third and fourth year.

### Engineering Physics Stream

- the Engineering Program core;
- SC/COSC 2011 3.00; SC/COSC 2021 4.00;
- SC/CHEM 2011 3.00 SC/EATS 2470 3.00; SC/PHYS 2040 3.00; SC/PHYS 2211 1.00;
- SC/MATH 2270 3.00; SC/MATH 3271 3.00;
- SC/PHYS 3010 3.00; SC/PHYS 3020 3.00; SC/PHYS 3030 3.00; SC/PHYS 3040 6.00; SC/PHYS 3150 3.00; SC/PHYS 3210 6.00;
- SC/PHYS 4010 3.00; SC/PHYS 4020 3.00; SC/PHYS 4050 3.00; SC/PHYS 4060 3.00; SC/PHYS 4211 3.00;
- six additional credits from courses in engineering design; six additional credits from engineering courses.

*Note: The Faculty of Pure and Applied Science will not be accepting applicants for the Engineering Physics stream in 2004-2005.*

### Space Engineering Stream

- the Engineering Program core;
- SC/COSC 2011 3.00; SC/COSC 2031 3.00; SC/COSC 2501 1.00;
- SC/MATH 2270 3.00;
- SC/EATS 2030 3.00; SC/EATS 2470 3.00; SC/ENG 2110 2.00; SC/ENG 2120 4.00;
- SC/PHYS 2030 3.00;
- SC/PHYS 3150 3.00; SC/PHYS 3250 3.00; SC/PHYS 3280 3.00; SC/ENG 3310 3.00; SC/ENG 3320 3.00; SC/ENG 3330 3.00;
- SC/EATS 3020 3.00; SC/ENG 3110 4.00;
- SC/COSC 4421 3.00; SC/ENG 4350 2.00; SC/ENG 4360 3.00; SC/PHYS 4110 3.00; SC/PHYS 4250 3.00;
- three of SC/EATS 4220 3.00, SC/EATS 4230 3.00, SC/ENG 4110 3.00, SC/ENG 4330 3.00, SC/PHYS 3070 3.00.

### Geomatics Engineering Stream

- the Engineering Program core;
- SC/COSC 2011 3.00; SC/COSC 2031 3.00; SC/COSC 2501 1.00;
- SC/EATS 2030 3.00; SC/EATS 2470 3.00; SC/ENG 2110 2.00; SC/ENG 2140 4.00; SC/ENG 2130 3.00; SC/GEOG 2420 3.00;
- SC/MATH 2270 3.00;
- SC/EATS 3020 3.00; SC/EATS 3300 3.00; SC/ENG 3110 4.00; SC/ENG 3120 4.00; SC/ENG 3130 4.00; SC/ENG 3140 4.00; SC/ENG 3150 4.00; SC/ENG 3160 4.00;
- SC/EATS 4020 3.00; SC/EATS 4220 3.00; SC/EATS 4400 3.00; SC/ENG 4110 3.00; SC/ENG 4120 3.00; SC/ENG 4130 3.00; SC/ENG 4140 3.00; SC/ENG 4150 3.00 or SC/ENG 4160 3.00.

## Environmental Science

### Specialized Honours Program

i) All BSc Honours degree candidates must complete the program core: SC/GEOG 1400 6.00; SC/GEOG 2400 6.00; SC/GEOG 2500 3.00 or SC/GEOG 2600 3.00; six credits from SC/GEOG 2610 3.00; SC/GEOG 3200 3.00, SC/GEOG 3500 3.00, SC/GEOG 4180 4.00, SC/GEOG 4200 3.00, SC/GEOG 4500 3.00; six credits from SC/GEOG 4205 3.00, SC/GEOG 4210 3.00, SC/GEOG 4310 3.00, SC/GEOG 4400 3.00, SC/GEOG 4600 3.00; 12 additional credits from science geography courses (including three credits in statistics for students in the Physical Sciences Stream).

ii) All BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to SC/GEOG 1400 6.00 from the program core):

- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

### Life Sciences Stream

- SC/COSC 1520 3.00 or SC/COSC 1540 3.00;

- SC/MATH 1505 6.00, or both SC/MATH 1013 3.00 and SC/MATH 1014 3.00;
- SC/BIOL 1010 6.00; SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, or SC/EATS 1010 3.00 and SC/EATS 1011 3.00;

### Physical Sciences Stream

- SC/COSC 1540 3.00;
- SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1025 3.00;
- SC/CHEM 1000 3.00; SC/CHEM 1001 3.00; SC/PHYS 1010 6.00 or SC/PHYS 1410 6.00.

iii) All BSc Honours degree candidates, in accordance with their declared program, must comply with general regulation 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must satisfy the course, credit and standing requirements specified below.

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To graduate in an Honours program requires successful completion of all Faculty requirements and program required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

*Note: students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.*

### Additional Course Requirements

All obligatory courses in one of the following streams:

#### Life Sciences Stream

- SC/BIOL 2010 4.00; SC/BIOL 2030 4.00; SC/BIOL 2050 4.00; SC/BIOL 2060 3.00;
- one ecology field course (SC/BIOL 3001 3.00 or SC/BIOL 3001 2.00);
- 15 additional credits chosen from the following: a second ecology field course (SC/BIOL 3002 3.00 or SC/BIOL 3002 2.00), SC/BIOL 3170 3.00, SC/BIOL 4000 8.00, SC/BIOL 4020 3.00, SC/BIOL 4070 3.00, SC/BIOL 4080 3.00, SC/BIOL 4090 4.00, SC/BIOL 4095 3.00, SC/BIOL 4100 3.00, SC/BIOL 4120 3.00, SC/BIOL 4130 3.00, SC/BIOL 4230 4.00, SC/BIOL 4240 4.00, SC/BIOL 4245 3.00, SC/BIOL 4250 3.00, SC/BIOL 4255 3.00, SC/BIOL 4260 3.00, SC/BIOL 4265 3.00, SC/BIOL 4340 3.00, SC/BIOL 4400 3.00, SC/BIOL 4420 3.00;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 42 credits at the 3000 or higher level.

#### Physical Sciences Stream

- SC/EATS 2010 3.00; SC/EATS 2470 3.00;
- SC/CHEM 2030 4.00; SC/PHYS 2020 3.00;
- SC/MATH 2015 3.00; SC/MATH 2270 3.00;
- SC/EATS 3030 3.00; SC/EATS 3130 3.00; SC/EATS 4220 3.00;
- six additional credits chosen from SC/EATS 3040 3.00, SC/EATS 4050 3.00, SC/EATS 4051 3.00, SC/EATS 4120 3.00, SC/EATS 4130 3.00, SC/EATS 4140 3.00, SC/EATS 4150 3.00, SC/EATS 4160 3.00, SC/EATS 4230 3.00, SC/EATS 4240 3.00, SC/EATS 4300 3.00 (atmospheric science topics), SC/MATH 3241 3.00;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 42 credits at the 3000 or higher level.

### Concurrent Certificate in Geographic Information Systems (GIS) and Remote Sensing

*See Certificate Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.*

### Environmental Science Courses

The following list includes required and elective courses in the BSc Specialized Honours Program in Environmental Science.

**Geography**

SC/GEOG 2400 6.00  
 SC/GEOG 2500 3.00  
 SC/GEOG 2600 3.00  
 SC/GEOG 2610 3.00  
 SC/GEOG 3200 3.00  
 SC/GEOG 3500 3.00 (cross-listed to: SC/BIOL 3500 3.00)  
 SC/GEOG 4180 4.00  
 SC/GEOG 4200 3.00  
 SC/GEOG 4205 3.00  
 SC/GEOG 4210 3.00  
 SC/GEOG 4310 3.00  
 SC/GEOG 4400 3.00  
 SC/GEOG 4500 3.00  
 SC/GEOG 4600 3.00

**Biology**

SC/BIOL 2010 4.00  
 SC/BIOL 2030 4.00  
 SC/BIOL 2050 4.00  
 SC/BIOL 2060 3.00  
 SC/BIOL 3001 3.00 (ecology sections)  
 SC/BIOL 3001 2.00 (ecology sections)  
 SC/BIOL 3002 3.00 (ecology sections)  
 SC/BIOL 3002 2.00 (ecology sections)  
 SC/BIOL 3170 3.00  
 SC/BIOL 4000 8.00  
 SC/BIOL 4020 3.00  
 SC/BIOL 4070 3.00  
 SC/BIOL 4080 3.00  
 SC/BIOL 4090 4.00  
 SC/BIOL 4095 3.00  
 SC/BIOL 4100 3.00  
 SC/BIOL 4120 3.00  
 SC/BIOL 4130 3.00  
 SC/BIOL 4230 4.00  
 SC/BIOL 4240 4.00  
 SC/BIOL 4245 3.00 (cross-listed to: ES/ENVS 4110 3.00)  
 SC/BIOL 4250 3.00  
 SC/BIOL 4255 3.00 (cross-listed to: ES/ENVS 4111 3.00)  
 SC/BIOL 4260 3.00  
 SC/BIOL 4265 3.00  
 SC/BIOL 4340 3.00  
 SC/BIOL 4400 3.00  
 SC/BIOL 4420 3.00

**Earth and Atmospheric Science**

SC/EATS 2010 3.00  
 SC/EATS 2470 3.00  
 SC/EATS 3030 3.00 (cross-listed to: SC/PHYS 3080 3.00)  
 SC/EATS 3040 3.00  
 SC/EATS 3130 3.00 (cross-listed to: SC/CHEM 3060 3.00)  
 SC/EATS 4050 3.00  
 SC/EATS 4051 3.00  
 SC/EATS 4120 3.00  
 SC/EATS 4130 3.00  
 SC/EATS 4140 3.00  
 SC/EATS 4160 3.00  
 SC/EATS 4220 3.00  
 SC/EATS 4230 3.00  
 SC/EATS 4240 3.00

**Geography**

i) All BSc and BSc Honours degree candidates must complete the program core: SC/GEOG 1400 6.00; AS/GEOG 1410 6.00; SC/GEOG 2400 6.00; SC/GEOG 2420 3.00; SC/GEOG 2500 3.00 or SC/GEOG 2600 3.00 or both SC/GEOG 4205 3.00 and SC/GEOG 4210 3.00. (Note: Both SC/GEOG 2600 3.00 and SC/GEOG 2610 3.0 are required for Honours Double Major in geography and earth science; SC/GEOG 4205 3.00 and

SC/GEOG 4210 3.00 are required for Honours Double Major in geography and atmospheric science.)

ii) All BSc and BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to SC/GEOG 1400 6.00 from the program core):

- SC/COSC 1520 3.00 or SC/COSC 1530 3.00 or SC/COSC 1540 3.00;
- six credits from SC/MATH 1505 6.00, SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1025 3.00;
- 12 credits from SC/BIOL 1010 6.00 or SC/BIOL 1410 6.00, SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, SC/EATS 1010 3.00 and SC/EATS 1011 3.00, SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00;
- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

iii) All BSc and BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 5 or 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must satisfy the course, credit and standing requirements specified below.

**Bachelor Program**

**To Graduate in a Bachelor Program.** For students admitted to York University for 2001-2002 and subsequent years, the Senate of York University requires a minimum overall grade point average of 4.0 (C) in order to be eligible to graduate with a BSc degree (bachelor program).

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- at least six credits from science geography courses at the 3000 or 4000 level, for an overall total of at least 30 credits from geography courses;
- additional elective credits, as required for an overall total of at least 90 credits, including at least 66 credits from science courses and at least 18 credits at the 3000 or higher level.

**Honours Programs**

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

*Note: Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.*

**Specialized Honours Program**

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/GEOG 3420 3.00;
- at least 33 additional credits from science geography courses at the 3000 or 4000 level, for an overall total of at least 54 credits from science geography courses (at least 60 from geography courses);
- at least six credits from non-geography science courses at the 2000 or higher level;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

## Honours Double Major Programs

BSc Honours Double Major programs are offered in geography and earth and atmospheric science (in either the Atmospheric Science Stream or the Earth Science Stream).

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the second major;
- for the Geography and Atmospheric Science Stream: at least 36 credits from geography courses, including the program core (see i) above), SC/GEOG 3420 3.00, and at least three credits from the following courses: SC/GEOG 4000 6.00, SC/GEOG 4310 3.00; *(Note: If only three credits are chosen from the list above, three additional credits from geography courses at the 3000- or 4000-level are required.)*

or

for the Geography and Earth Science Stream: at least 36 credits from geography courses, including the program core (see i) above), SC/GEOG 3420 3.00, and at least nine credits selected from the following courses: SC/GEOG 4000 6.00, SC/GEOG 4180 4.00, SC/GEOG 4200 3.00, SC/GEOG 4205 3.00, SC/GEOG 4210 3.00, SC/GEOG 4310 3.00, SC/GEOG 4400 3.00, SC/GEOG 4600 3.00;

- the course requirements for the second major;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

## Honours Major/Minor Program

An Honours major in geography may be combined with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the minor;
- the geography Honours major requirements below;
- the course requirements for the minor;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 42 credits at the 3000 or higher level.

## Honours Major (for Honours Major/Minor Programs)

- the program core, as specified in i) above;
- SC/GEOG 3420 3.00;
- at least 15 additional credits in science geography courses at the 3000 or 4000 level, for an overall total of at least 42 credits in geography courses.

## Honours Minor

- SC/GEOG 1400 6.00;
- SC/GEOG 1410 6.00;
- six credits in science geography courses at the 4000 level;
- at least 12 credits from science geography courses for an overall total of at least 30 credits from geography courses.

## Concurrent Certificate in Geographic Information Systems (GIS) and Remote Sensing

See *Certificate Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.*

## Kinesiology and Health Science

All BSc Honours degree candidates must complete a specified core of academic and practicum courses, and, depending on individual interests, personal objectives and the stream selected, complement the designated requirements with optional courses from within and outside the kinesiology and health science curriculum. The streams available for proceeding towards a BSc Honours in the Specialized Honours program are a) health

and kinesiology and b) applied certificate. The Health and Kinesiology Stream is particularly suited to students aspiring to careers related to teaching or recreation or for those desiring a generalized approach to kinesiology and health science. The Applied Certificate Stream focuses on specific professionally related areas; a student in this stream graduates with a certificate as well as a BSc Honours.

Kinesiology and health science may also be combined with the study of another science major or a minor within the Faculty of Pure and Applied Science in a BSc Honours Double Major or Honours Major/Minor program.

On entering the University and selecting kinesiology and health science as a major, first-year BSc Honours students are automatically enrolled in the Health and Kinesiology Stream of Specialized Honours. Students who hope to proceed in Honours Double Major or Honours Major/Minor programs select 1000- level science and mathematics options (within this stream) which are appropriate for the second major or the minor. After successful completion of 24 academic credits with a cumulative credit-weighted grade point average of at least 5.0 (C+), students declare their choice of program and stream. Entrance

into the Applied Certificate Stream requires an application at this time - contact the School of Kinesiology and Health Science regarding application requirements and procedures.

*Note: Students may only be enrolled in one certificate stream at a time.*

## Honours Programs

*Note: Academic courses in kinesiology and health science have the prefix "KINE". Practicum courses have the prefix "PKIN".*

i) All BSc Honours degree candidates must complete the kinesiology and health science core which includes an academic core: SC/KINE 1000 4.00; SC/KINE 1020 5.00; SC/KINE 2000 3.00; SC/KINE 2020 3.00; SC/KINE 2031 3.00; SC/KINE 2049 3.00; SC/KINE 2050 3.00; SC/KINE 3011 3.00; SC/KINE 3012 3.00; SC/KINE 3020 3.00; SC/KINE 3030 3.00; SC/KINE 4010 3.00; SC/KINE 4020 3.00; and a practicum core: SC/PKIN 7500 2.00; and at least two practicum credits in each of the following practicum areas: gymnastics/dance, aquatics, team sports, individual and dual sports, and track and field.

ii) All BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to the Kinesiology and Health Science core):

- SC/COSC 1520 3.00;
- six credits from SC/MATH 1505 6.00, SC/MATH 1013 3.00 or SC/MATH 1300 3.00, SC/MATH 1014 3.00 or SC/MATH 1310 3.00, SC/MATH 1025 3.00;
- six credits from SC/BIOL 1010 6.00, SC/BIOL 1410 6.00, SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, SC/EATS 1010 3.00 and SC/EATS 1011 3.00, SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00; *(Note: Required kinesiology and health science core courses satisfy the other half of the 1000-level science requirement for courses with laboratories.)*
- SC/PSYC 1010 6.00;
- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

iii) All BSc Honours degree candidates, in accordance with their declared Honours program, must comply with general regulation 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum

cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

Notes:

1. In addition, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed is required to declare, proceed and graduate in (i) the Honours Double Major program where biology is the other major, and (ii) the Honours Major/Minor program where biology is the major. (The minimum 6.0 (B) science grade point average is not required where biology is the minor.)

2. Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.

## Specialized Honours Program

### Health and Kinesiology Stream

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- at least 54 academic credits from kinesiology and health science courses, including the kinesiology and health science academic core (see i) above) and at least six additional academic credits from kinesiology and health science courses at the 4000 level;
- additional academic elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level;
- the practicum core (see i) above) and a minimum of six additional practicum (PKIN) credits, for an overall total of at least 18 practicum credits.

Students in the Health and Kinesiology Stream can use the available non-science elective credits in that stream to take courses towards a Certificate in Sport Administration. More than 120 credits may be required to complete both the certificate and the degree requirements. Consult the kinesiology and health science mini-calendar for details.

### Applied Certificate Stream

Note: Students may only be enrolled in one certificate stream at a time.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- at least 66 academic credits from kinesiology and health science courses, including the kinesiology and health science academic core (see i) above) and all obligatory courses for one of the following certificates:
  - Certificate in Athletic Therapy:** SC/KINE 2490 3.00; SC/KINE 3450 3.00; SC/KINE 3585 3.00; SC/KINE 3600 3.00; SC/KINE 4570 3.00; SC/KINE 4580 3.00; SC/KINE 4590 6.00;
  - Certificate in Coaching:** SC/KINE 2475 3.00; SC/KINE 3450 3.00 or AS/KINE 3580 3.00; SC/KINE 3570 3.00; SC/KINE 3610 3.00; SC/KINE 4550 6.00; SC/KINE 4600 3.00; SC/KINE 4610 3.00;
  - Certificate in Fitness Assessment and Exercise Counselling:** SC/KINE 3400 3.00; SC/KINE 3450 3.00; SC/KINE 3640 3.00; SC/KINE 4400 6.00; AS/KINE 4430 3.00; SC/KINE 4460 3.00; SC/KINE 4900 3.00;
- additional academic elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level;
- the practicum core (see i) above) and a minimum of four additional practicum (PKIN) credits, for an overall total of at least 16 practicum credits. Specific practicum courses are required for each certificate as follows: Certificate in Athletic Therapy: SC/PKIN 7600 2.00; Certificate in Coaching: SC/PKIN 4600 2.00 and all PKIN courses in the sport specialty; Certificate in Fitness Assessment and Exercise Counselling: SC/PKIN 8060 4.00.

## Honours Double Major and Honours Major/Minor Programs

An Honours major in kinesiology and health science may be combined with an Honours major in another subject area in a BSc Honours Double Major degree program, or with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are

listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the second major or the minor;
- the kinesiology and health science Honours major requirements below;
- the course requirements for the second major or the minor;
- additional academic elective credits, as required for an overall total of at least 120 credits, including at least 90\* credits from science courses and at least 42 credits at the 3000 or higher level.

\* or at least 66 credits from science courses if the minor is in a fine arts subject area

## Honours Major

- the kinesiology and health science core (see i) above), including the academic core and the practicum core;
- at least six additional academic credits from kinesiology and health science courses at the 4000 level, for an overall total of at least 48 academic credits from kinesiology and health science courses;
- at least six additional practicum (PKIN) credits, for an overall total of at least 18 practicum credits.

Note: SC/PSYC 1010 6.00 is required as a prerequisite for one core course.

## Honours Minor

- the kinesiology and health science core (see i) above), including the academic core and the practicum core, for a total of at least 42 academic credits from kinesiology and health science courses;
- at least six additional practicum (PKIN) credits, for an overall total of at least 18 practicum credits.

Note: SC/PSYC 1010 6.00 is required as a prerequisite for one core course.

## Mathematics and Statistics

The Department of Mathematics and Statistics offers BSc and BSc Honours degree programs in four subject areas:

- applied mathematics
- computational mathematics (BSc Honours only)
- mathematics
- statistics

The BSc and BSc Honours degree programs in each subject area are listed separately below. A student should choose one of these subject areas based on interest and employment goals, but it is possible to change subject areas provided the requirements of the desired subject area can be met.

i) All BSc and BSc Honours degree candidates must complete a program core (see program specifications below).

ii) All BSc and BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to the 1000-level COSC and MATH requirements specified for their program):

- 12 credits from SC/BIOL 1010 6.00 or SC/BIOL 1410 6.00, SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, SC/EATS 1010 3.00 and SC/EATS 1011 3.00, SC/MATH 2041 3.00 and SC/MATH 2042 3.00, SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00;
- additional 1000-level science credits (excluding SC/CHEM 1500 4.00, SC/MATH 1510 6.00, SC/MATH 1515 3.00, SC/PHYS 1510 4.00 and all natural science courses) - as required for a total of at least 24 1000-level science credits;
- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

iii) All BSc and BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 5 or 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must satisfy the course, credit and standing requirements specified below.

### Bachelor Programs

**To Graduate in a Bachelor Program.** For students admitted to York University for 2001-2002 and subsequent years, the Senate of York University requires a minimum overall grade point average of 4.0 (C) in order to be eligible to graduate with a BSc degree (bachelor program).

### Honours Programs

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

#### Notes:

1. In addition, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed is required to declare, proceed and graduate in (i) the Honours Double Major program where biology is the other major, and (ii) the Honours Major/Minor program where biology is the major. (The minimum 6.0 (B) science grade point average is not required where biology is the minor.)

2. Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.

#### Additional Notes:

1. For the purpose of satisfying departmental degree requirements, the following minimum numbers of credits must be completed within the Department of Mathematics and Statistics: 18 for the bachelor program, 21 for the Honours Double Major program, 30 for the Specialized Honours program.

2. For BA and BA Honours degree programs in mathematics and statistics, see the Faculty of Arts Programs of Study section of this Calendar.

## I. Applied Mathematics Programs

All BSc and BSc Honours degree candidates must complete the program core: SC/COSC 1540 3.00 or SC/COSC 2031 3.00; SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH1016 1.00; SC/MATH 1017 1.00; SC/MATH 1021 3.00; SC/MATH 2015 3.00; SC/MATH 2018 1.00; SC/MATH 2041 3.00; SC/MATH 2270 3.00; SC/MATH 3241 3.00.

In addition, all degree candidates must select a number of credits (depending on their program) from science mathematics courses without second digit 5 at the 3000 level or higher.

### Bachelor Program

- the program core;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- one of SC/MATH 2022 3.00, SC/MATH 2030 3.00, SC/MATH 2222 3.00, SC/MATH 2320 3.00;
- at least 12 credits selected from science mathematics courses without second digit 5 at the 3000 level or higher, for an overall total of at least 39 credits from major science mathematics courses;
- additional elective credits, as required for an overall total of at least 90 credits, including at least 66 credits from science courses and at least 18 credits at the 3000 or higher level.

### Specialized Honours Program

- the program core;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/MATH 2022 3.00; SC/MATH 2030 3.00;
- SC/MATH 3110 3.00; SC/MATH 3210 3.00; SC/MATH 3242 3.00; SC/MATH 3410 3.00;
- at least 21 additional credits selected from science mathematics courses without second digit 5 at the 3000 level or higher (these 21 credits must include SC/MATH 3260 3.00 or SC/MATH 3170 6.00, and at least 12 credits at the 4000 level), for an overall total of at least 63 credits from major science mathematics courses;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level

### Honours Double Major and Honours Major/Minor Programs

An Honours major in applied mathematics may be combined with an Honours major in another subject area in a BSc Honours Double Major degree program or with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the second major or the minor;
- the applied mathematics Honours major requirements below;
- the course requirements for the second major or the minor;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

### Honours Major

- the program core;
- SC/MATH 3242 3.00 or SC/MATH 3170 6.00;
- 12 credits at the 4000 level, selected from science mathematics courses without second digit 5, for an overall total of at least 39 credits from major science mathematics courses.

### Honours Minor

- SC/COSC 1540 3.00;
- SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1021 3.00;
- SC/MATH 2015 3.00; two of SC/MATH 2041 3.00, SC/MATH 2222 3.00 (or SC/MATH 2022 3.00), SC/MATH 2270 3.00;
- at least nine more credits, including at least one of SC/MATH 3170 6.00 or SC/MATH 3241 3.00 or SC/MATH 3260 3.00, and the remaining credits from science mathematics courses without second digit 5 at the 3000 level or higher, for an overall total of at least 30 credits from major science mathematics courses, including SC/COSC 1540 3.00.

## II. Computational Mathematics Program

### Specialized Honours Program

- SC/COSC 1020 3.00; SC/COSC 1030 3.00; SC/COSC 2031 3.00; SC/MATH 2041 3.00
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 2015 3.00 or approved equivalents
- SC/MATH 1021 3.00; SC/MATH 2022 3.00;
- SC/MATH 2030 3.00; SC/MATH 1131 3.00;
- SC/MATH 1016 1.00; SC/MATH 1017 1.00; SC/MATH 2018 1.00; or SC/MATH 2131 3.00; or SC/MATH 1190 3.00
- SC/MATH 3090 3.00; SC/MATH4090 3.00;

- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

In addition, students must choose from one of three areas of concentration, and in each case complete the courses listed:

#### Applied and Industrial Mathematics

- SC/MATH 2270 3.00; SC/MATH 2042 3.00; SC/MATH 3241 3.00; SC/MATH 3242 3.00; SC/MATH 4141 3.00; SC/MATH 4142 3.00.

#### Financial Mathematics

- SC/MATH 2280 3.00; SC/MATH 3170 6.00;
- AS/ECON 1000 3.00; AS/ECON 1010 3.00;
- three credits from 4000-level science mathematics courses in financial mathematics.

#### Actuarial Mathematics

- SC/MATH 2280 3.00; SC/MATH 3280 3.00; SC/MATH 3033 3.00; SC/MATH 4280 3.00; SC/MATH 4430 3.00; or SC/MATH 4431 3.00; three credits from 4000-level science mathematics courses in financial mathematics.

### III. Mathematics Programs

#### Bachelor Program

- SC/COSC 1520 3.00; SC/COSC 1530 3.00 or SC/MATH 2041 3.00; or equivalents;
- SC/MATH 1021 3.00; SC/MATH 1300 3.00 and SC/MATH 1310 3.00, or equivalents;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/MATH 1090 3.00 or SC/MATH 1190 3.00 or SC/MATH 2090 3.00 or SC/MATH 2320 3.00;
- SC/MATH 2022 3.00; SC/MATH 2310 3.00;
- at least 12 credits from major (i.e. without second digit 5) science mathematics courses, or approved or equivalent courses, at the 3000 level or higher, for a total of at least 30 credits from major science mathematics courses;
- additional elective credits, as required for an overall total of at least 90 credits, including at least 66 credits from science courses and at least 18 credits at the 3000 or higher level.

*Note: Mathematics Honours core courses SC/MATH 1000 3.00, SC/MATH 1010 3.00 may replace SC/MATH 1300 3.00, SC/MATH 1310 3.00 respectively.*

#### Honours Programs

##### Mathematics Honours Core

The core courses below are required in all Honours mathematics programs:

- SC/MATH 1000 3.00; SC/MATH 1010 3.00;
- SC/MATH 1021 3.00; SC/MATH 2022 3.00;
- SC/MATH 1090 3.00 or SC/MATH 1190 3.00 or SC/MATH 2090 3.00 or SC/MATH 2320 3.00;
- SC/MATH 2310 3.00; SC/MATH 3010 3.00;
- SC/MATH 3020 6.00, or both SC/MATH 3131 3.00 and SC/MATH 3132 3.00;
- SC/MATH 3210 3.00;
- six credits from SC/MATH 4000 3.00/4000 6.00 (projects in pure mathematics), SC/MATH 4010 6.00, SC/MATH 4020 6.00, SC/MATH 4030 3.00, SC/MATH 4080 6.00, SC/MATH 4110 3.00, SC/MATH 4120 3.00, SC/MATH 4130 3.00, SC/MATH 4140 3.00, SC/MATH 4150 3.00, SC/MATH 4160 3.00, SC/MATH 4170 6.00, SC/MATH 4230 3.00, SC/MATH 4250 6.00, SC/MATH 4280 3.00, SC/MATH 4290 3.00, SC/MATH 4430 3.00, SC/MATH 4630 3.00, SC/MATH 4730 3.00.

*Note: Students may substitute non-Honours versions of the sequence SC/MATH 1000/1010, but any student who does not complete SC/MATH 1010 3.00 must take SC/MATH 3110 3.00 above and beyond the normal Honours requirements. If one or more of SC/MATH 1021 3.00 or SC/*

*MATH 2022 3.00 is replaced by other linear algebra courses and if the grades obtained were less than A, then SC/MATH 2090 3.00 or SC/MATH 2320 3.00 must be taken above and beyond the normal Honours requirements.*

#### Specialized Honours Program

- the mathematics Honours core;
- SC/COSC 1520 3.00; SC/COSC 1530 3.00 or SC/MATH 2041 3.00; or equivalents;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- at least six additional credits from major science mathematics courses at the 4000 level (these must include either SC/MATH 4010 6.00 or SC/MATH 4020 6.00 if neither was taken as part of the mathematics Honours core);
- at least 24 additional credits from major (i.e. without second digit 5) science mathematics courses, or approved or equivalent courses, for a total of at least 66 credits from major science mathematics courses;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

#### Honours Double Major and Honours Major/Minor Programs

An Honours major in mathematics may be combined with an Honours major in another subject area in a BSc Honours Double Major degree program or with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- SC/COSC 1520 3.00; SC/COSC 1530 3.00 or SC/MATH 2041 3.00; or equivalents;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the second major or the minor;
- the mathematics Honours major requirements below;
- the course requirements for the second major or the minor;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90\* credits from science courses and at least 42 credits at the 3000 or higher level.

\* or at least 66 credits from science courses if the minor is in a fine arts subject area

#### Honours Major

- the mathematics Honours core;
- at least six additional major (i.e. without second digit 5) science mathematics credits at the 4000 level, for a total of at least 42 credits from major science mathematics courses.

#### Honours Minor

- SC/MATH 1300 3.00; SC/MATH 1310 3.00;
- SC/MATH 1021 3.00; SC/MATH 2022 3.00;
- SC/MATH 1090 3.00 or SC/MATH 1190 3.00 or SC/MATH 2090 3.00 or SC/MATH 2320 3.00;
- SC/MATH 2310 3.00;
- at least 12 credits from major (i.e. without second digit 5) science mathematics courses, or approved or equivalent courses, at the 3000 or higher level, for an overall total of at least 30 science mathematics credits.

*Note: Mathematics Honours core courses SC/MATH 1000 3.00 and SC/MATH 1010 3.00 may replace SC/MATH 1300 3.00 and SC/MATH 1310 3.00 respectively.*

## IV. Statistics Programs

### Bachelor Program

- SC/COSC 1520 3.00 and SC/COSC 1530 3.00, or SC/COSC 1540 3.00, or SC/COSC 1020 3.00 and SC/COSC 1030 3.00, or equivalents;
- six credits from 1000-level major (i.e. without second digit 5) science mathematics courses in calculus;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/MATH 1021 3.00\*; SC/MATH 2022 3.00\*;
- SC/MATH 1131 3.00; SC/MATH 2030 3.00; SC/MATH 2131 3.00;
- SC/MATH 2310 3.00 or SC/MATH 2015 3.00
- SC/MATH 3033 3.00 or SC/MATH 3330 3.00; SC/MATH 3131 3.00;
- at least three additional credits from 3000- or 4000-level science mathematics courses with third digit 3 for a total of at least 33 credits from major science mathematics courses;
- additional elective credits, as required for an overall total of at least 90 credits, including at least 66 credits from science courses and at least 18 credits at the 3000 or higher level.

\*Note: SC/MATH 1025 3.00, SC/MATH 2221 3.00 and SC/MATH 2222 3.00 will be accepted in this program, but are not recommended.

### Specialized Honours Program

- SC/COSC 1520 3.00 and SC/COSC 1530 3.00, or SC/COSC 1540 3.00, or SC/COSC 1020 3.00 and SC/COSC 1030 3.00, or equivalents;
- SC/MATH 1000 3.00; SC/MATH 1010 3.00; SC/MATH 1021 3.00; SC/MATH 1131 3.00;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/MATH 2022 3.00; SC/MATH 2310 3.00
- SC/MATH 2030 3.00; SC/MATH 2131 3.00;
- SC/MATH 3010 3.00; SC/MATH 3210 3.00;
- SC/MATH 3033 3.00 or SC/MATH 3330 3.00; SC/MATH 3034 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3430 3.00;
- 12 credits from 4000-level science mathematics courses with third digit 3;
- nine additional credits from major (second digit not 5) science mathematics courses, for a total of at least 66 credits from major science mathematics courses;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

### Honours Double Major Program

An Honours Major in statistics may be combined with an Honours Major in another subject area in a BSc Honours Double Major degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the second major;
- the statistics Honours Major requirements (for BSc Honours Double Major programs) below;
- the course requirements for the second major;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

### Honours Major (BSc Honours Double Major Programs)

- SC/COSC 1520 3.00 and SC/COSC 1530 3.00, or SC/COSC 1540 3.00, or SC/COSC 1020 3.00 and SC/COSC 1030 3.00, or equivalents;
- six credits from 1000-level major (i.e. without second digit 5) science mathematics courses in calculus;
- SC/MATH 1021 3.00\*; SC/MATH 2022 3.00\*;
- SC/MATH 1131 3.00; SC/MATH 2030 3.00; SC/MATH 2131 3.00;
- SC/MATH 2015 3.00, or SC/MATH 2310 3.00;

- SC/MATH 3033 3.00 or SC/MATH 3330 3.00; SC/MATH 3131 3.00;
- nine additional credits from 3000- or 4000-level science mathematics courses with third digit 3 for an overall total of at least 39 credits from major science mathematics courses.

\*Note: SC/MATH 1025 3.00, SC/MATH 2221 3.00 and SC/MATH 2222 3.00 will be accepted in this program, but are not recommended.

### Honours Major/Minor Programs

An Honours major in statistics may be combined with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the minor;
- the statistics Honours major requirements (for BSc Honours Major/Minor programs) below;
- the course requirements for the minor;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

### Honours Major (for BSc Honours Major/Minor Programs)

- SC/COSC 1520 3.00 and SC/COSC 1530 3.00, or SC/COSC 1540 3.00, or SC/COSC 1020 3.00 and SC/COSC 1030 3.00, or equivalents;
- SC/MATH 1000 3.00\*; SC/MATH 1010 3.00\*;
- SC/MATH 1021 3.00\*; SC/MATH 2022 3.00\*;
- SC/MATH 1131 3.00; SC/MATH 2030 3.00; SC/MATH 2131 3.00;
- SC/MATH 2015 3.00 or SC/MATH 2310 3.00;
- SC/MATH 3033 3.00 or SC/MATH 3330 3.00; one of SC/MATH 3034 3.00 or SC/MATH 3430 3.00;
- SC/MATH 3131 3.00; SC/MATH 3132 3.00;
- 12 credits from 4000-level science mathematics courses with third digit 3, for an overall total of at least 48 credits from major science mathematics courses.

\*Note: For calculus and linear algebra, the courses SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1300 3.00, SC/MATH 1310 3.00, SC/MATH 1025 3.00, SC/MATH 2221 3.00 and SC/MATH 2222 3.00 will be accepted in this program, but are not recommended.

### Honours Minor

- first-year calculus (six credits at the 1000 level without second digit 5);
- SC/MATH 1021 3.00\*; SC/MATH 2022 3.00\*;
- SC/MATH 1131 3.00; SC/MATH 2030 3.00; SC/MATH 2131 3.00;
- nine additional credits from 2000- or higher-level science mathematics courses with third digit 3, for an overall total of at least 30 science mathematics credits.

\* Note: SC/MATH 1025 3.00, SC/MATH 2221 3.00 and SC/MATH 2222 3.00 will be accepted in this program, but are not recommended.

## Physics and Astronomy

Note: The following BSc and BSc Honours degree requirements do not apply to students in the Space and Communication Sciences Stream of Specialized Honours physics and astronomy - for requirements for that stream, see Space and Communication Sciences in the Faculty of Pure and Applied Science Programs of Study section of this Calendar.

- With the exception noted above, all BSc and BSc Honours degree candidates must complete the program core: SC/PHYS 1010 6.00; SC/PHYS 2010 3.00; SC/PHYS 2020 3.00; SC/PHYS 2040 3.00; SC/PHYS 2060 3.00; SC/PHYS 2211 1.00; SC/PHYS 3040 6.00. (Note: All program core courses require mathematics prerequisites or corequisites.)
- All BSc and BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science

Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to SC/PHYS 1010 6.00 from the program core):

- SC/COSC 1540 3.00 or SC/COSC 1020 3.00;
- SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1025 3.00;
- SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00 (or six credits from course(s) with laboratories required for the second major or the minor in BSc Honours Double Major or Honours Major/Minor programs - see departmental mini-calendars or Faculty checklists);
- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

iii) All BSc and BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 5 or 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

### Bachelor Program

**To Graduate in a Bachelor Program.** For students admitted to York University for 2001-2002 and subsequent years, the Senate of York University requires a minimum overall grade point average of 4.0 (C) in order to be eligible to graduate with a BSc degree (bachelor program).

Students may follow a stream emphasizing physics or astronomy.

Students in both streams must take the following courses:

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/MATH 2015 3.00; SC/MATH 2270 3.00;
- six credits from SC/PHYS 3010 3.00, SC/PHYS 3020 3.00, SC/PHYS 3030 3.00.

In addition, there are the following stream-dependent course requirements:

#### Physics Stream

- SC/PHYS 2212 1.00; SC/PHYS 3210 6.00;
- SC/CHEM 2011 3.00 or SC/PHYS 2030 3.00;
- at least three additional credits from 3000- or 4000-level science courses;
- additional elective credits, chosen in consultation with the Department of Physics and Astronomy, as required for an overall total of at least 90 credits.

#### Astronomy Stream

- SC/PHYS 1070 3.00; SC/PHYS 2070 3.00; SC/PHYS 4270 4.00;
- SC/PHYS 3220 3.00;
- additional elective credits, chosen in consultation with the Department of Physics and Astronomy, as required for an overall total of at least 90 credits.

### Honours Programs

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

Notes:

1. In addition, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed is required to declare, proceed and graduate in (i) the Space and Communication Sciences Stream of Specialized Honours, (ii) the Honours Double Major program

where biology is the other major, and (iii) the Honours Major/Minor program where biology is the major. (The minimum 6.0 (B) science grade point average is not required where biology is the minor.)

2. Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.

### Specialized Honours Program

Students may follow a stream emphasizing physics, applied physics or astronomy.

Students in all three streams must take the following courses:

- the program core, as specified in i) above;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/CHEM 2011 3.00 (may be taken in Year 3) or SC/PHYS 2030 3.00; SC/MATH 2015 3.00; SC/MATH 2270 3.00; SC/PHYS 2212 1.00;
- SC/MATH 3271 3.00; SC/MATH 3410 3.00; SC/PHYS 3010 3.00; SC/PHYS 3020 3.00; SC/PHYS 3030 3.00; SC/PHYS 3210 6.00; SC/PHYS 4020 3.00.

In addition, there are the following stream-dependent course requirements:

#### Physics Stream

- SC/PHYS 4010 3.00; two of SC/PHYS 4011 3.00, SC/PHYS 4040 3.00, SC/PHYS 4050 3.00;
- either SC/PHYS 4210 3.00 and SC/PHYS 4211 3.00; or SC/MATH 3241 3.00, one of SC/MATH 3242 3.00 or SC/MATH 4270 3.00, and one of SC/PHYS 4210 3.00 or SC/PHYS 4211 3.00;
- three additional credits in PHYS courses at the 3000 level or higher;
- additional elective credits, chosen in consultation with the Department of Physics and Astronomy, as required for an overall total of at least 120 credits.

#### Applied Physics Stream

- SC/PHYS 3050 3.00; SC/PHYS 3150 3.00; SC/PHYS 4050 3.00; SC/PHYS 4210 3.00; SC/PHYS 4211 3.00; SC/PHYS 4310 3.00;
- six credits from SC/MATH 3241 3.00, SC/MATH 3242 3.00, SC/PHYS 3250 3.00, SC/PHYS 3280 3.00, SC/PHYS 4120 3.00, SC/PHYS 4250 3.00, SC/PHYS 4450 3.00;
- additional credits from 3000- and 4000-level science courses, chosen in consultation with the Department of Physics and Astronomy, as required for an overall total of at least 120 credits.

#### Astronomy Stream

- SC/PHYS 1070 3.00; SC/PHYS 2070 3.00; SC/PHYS 3070 3.00; SC/PHYS 4070 3.00; SC/PHYS 4270 4.00;
- SC/MATH 3241 3.00; SC/MATH 3242 3.00 or SC/PHYS 4210 3.00 or SC/PHYS 4211 3.00; SC/PHYS 4010 3.00; one of SC/PHYS 4011 3.00, SC/PHYS 4040 3.00, SC/PHYS 4050 3.00;
- three additional credits from PHYS courses at the 3000 level or higher;
- additional elective credits, chosen in consultation with the Department of Physics and Astronomy, as required for an overall total of at least 120 credits.

The Department of Physics and Astronomy also offers a BSc Specialized Honours degree Stream in Space and Communication Sciences whose degree requirements are specified in a separate entry in the Faculty of Pure and Applied Science Programs of Study section of this Calendar.

### Honours Double Major and Honours Major/Minor Programs

An Honours major in physics and astronomy may be combined with an Honours major in another subject area in a BSc Honours Double Major degree program, or with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.



Early planning of courses in all combined programs is strongly advised so that the necessary prerequisites for courses in both departments are met.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the second major or the minor;
- the physics and astronomy Honours major requirements below;
- the course requirements for the second major or the minor;
- additional elective credits, chosen in consultation with the Department of Physics and Astronomy, as required for an overall total of at least 120 credits, including at least 42 credits at the 3000 or higher level.

### Honours Major

Students may follow a stream emphasizing physics or astronomy.

Students in both streams must take the following courses:

- the program core, as specified in i) above;
- six credits from SC/PHYS 3010 3.00, SC/PHYS 3020 3.00, SC/PHYS 3030 3.00.

*Note: The following courses are required as prerequisites or corequisites for the courses above: SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1025 3.00; SC/MATH 2015 3.00; SC/MATH 2270 3.00. SC/MATH 3271 3.00 is a prerequisite or corequisite for SC/PHYS 3020 3.00.*

In addition, there are the following stream-dependent course requirements:

#### Physics Stream

- SC/PHYS 2212 1.00; SC/PHYS 3210 6.00;
- at least six credits from PHYS courses at the 4000 level, for an overall total of at least 44 credits from PHYS courses;

#### Astronomy Stream

- SC/PHYS 1070 3.00; SC/PHYS 2070 3.00; SC/PHYS 3220 3.00; SC/PHYS 4270 4.00; for an overall total of at least 44 credits from PHYS courses.

### Honours Minor

Students may follow a Stream in Physics or a Stream in Astronomy in the minor subject area.

Students in both streams must take the following courses:

- the program core, as specified in i) above;
- three credits from SC/PHYS 3010 3.00, SC/PHYS 3020 3.00, SC/PHYS 3030 3.00.

*Note: The following courses are required as prerequisites or corequisites for the courses above: SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1025 3.00; SC/MATH 2015 3.00; SC/MATH 2270 3.00. SC/MATH 3271 3.00 is a prerequisite or corequisite for SC/PHYS 3020 3.00.*

In addition, there are the following stream-dependent course requirements:

#### Physics Stream

- SC/PHYS 2212 1.00; SC/PHYS 3220 3.00; for an overall total of 32 credits from PHYS courses;

#### Astronomy Stream

- SC/PHYS 1070 3.00; SC/PHYS 2070 3.00; SC/PHYS 3070 3.00 or SC/PHYS 4270 4.00; for an overall total of at least 37 credits from PHYS courses.

## Psychology

i) All BSc and BSc Honours degree candidates must complete SC/PSYC 1010 6.00. (Note: Students must obtain a minimum grade of C (4.0) in SC/PSYC 1010 6.00 to be permitted to pursue a degree in psychology as well as to take psychology courses for which SC/PSYC 1010 6.00 is a prerequisite.)

ii) All BSc and BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to SC/PSYC 1010 6.00):

- SC/COSC 1520 3.00 or SC/COSC 1540 3.00;
- six credits from SC/MATH 1505 6.00, SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1025 3.00;
- 12 credits from SC/BIOL 1010 6.00 or SC/BIOL 1410 6.00, SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, SC/EATS 1010 3.00 and SC/EATS 1011 3.00, SC/PHYS 1410 6.00 or SC/PHYS 1010 6.00; (Note: Only six credits are required in this category for Honours Double Major and Honours Major/Minor combinations of psychology and kinesiology and health science.)
- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

iii) All BSc and BSc Honours degree candidates, in accordance with their declared programs, must comply with general regulation 5 or 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

## Bachelor Program

**To Graduate in a Bachelor Program.** Students who were admitted to York University for 2001-2002 and subsequent years are required to have a minimum overall grade point average of 4.0 (C) in order to be eligible to graduate with a BSc degree (bachelor program).

- SC/PSYC 1010 6.00 with a minimum grade of C;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/PSYC 2021 3.00 (or SC/PSYC 2020 6.00); SC/PSYC 2030 3.00;
- three credits from the following courses: SC/PSYC 2110 3.00, SC/PSYC 2120 3.00, SC/PSYC 2130 3.00, SC/PSYC 3140 3.00, SC/PSYC 3170 3.00;
- three credits from the following courses: SC/PSYC 2210 3.00, SC/PSYC 2220 3.00, SC/PSYC 2230 3.00, SC/PSYC 2240 3.00, SC/PSYC 3260 3.00, SC/PSYC 3265 3.00;
- at least 12 additional credits from psychology courses (including at least six credits from science psychology courses), for an overall total of at least 30 credits from psychology courses (including at least 12 credits at the 3000 level);
- additional elective credits, as required for an overall total of at least 90 credits, including at least 66 credits from science courses and at least 18 credits at the 3000 or higher level.

*Note: At least half (50 per cent) of the psychology requirements above must be satisfied by psychology courses offered by the Psychology departments at York (Faculties of Arts, Atkinson, Glendon).*

## Honours Programs

To declare Honours requires successful completion of at least 24 credits and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exceptions in the notes below.

*Notes:*

1. In addition, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed is required to declare, proceed and graduate in (i) the Honours Double Major program where biology is the other major, and (ii) the Honours Major/Minor program where biology is the major. (The minimum 6.0 (B) science grade point average is not required where biology is the minor.)

2. Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.

### Specialized Honours Program

- SC/PSYC 1010 6.00 with a minimum grade of C;
- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above;
- SC/PSYC 2020 6.00, or SC/PSYC 2021 3.00 and SC/PSYC 2022 3.00, or SC/MATH 1131 3.00 and SC/MATH 2570 3.00, or SC/MATH 2560 3.00 and SC/MATH 2570 3.00;
- SC/PSYC 2030 3.00;
- one of SC/PSYC 3010 3.00, SC/PSYC 3030 6.00, SC/PSYC 3090 3.00, or alternate courses approved by the Department of Psychology;
- six credits from the SC/PSYC 21XX/31XX series;
- six credits from the SC/PSYC 22XX/32XX series;
- SC/PSYC 4000 6.00 or SC/PSYC 4170 6.00; six additional credits from psychology courses at the 4000 level;
- additional credits from psychology courses, as required for an overall total of at least 54 credits from psychology courses;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

Notes:

1. The statistics courses listed above as acceptable substitutes for SC/PSYC 2020 6.00 are counted as psychology course credits.
2. At least half (50 per cent) of the psychology requirements above must be satisfied by psychology courses offered by the Psychology departments at York (Faculties of Arts, Atkinson, Glendon).

### Honours Double Major and Honours Major/Minor Programs

An Honours major in psychology may be combined with an Honours major in another subject area in a BSc Honours Double Major degree program, or with an Honours minor in another subject area in a BSc Honours Major/Minor degree program. Possible subject combinations are listed under Undergraduate Degree Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

- the Faculty of Pure and Applied Science general education and 1000-level science requirements, as specified in ii) above and including courses appropriate for the second major or the minor;
- the psychology Honours major requirements below;
- the course requirements for the second major or the minor;
- additional elective credits, as required for an overall total of at least 120 credits, including at least 90 credits from science courses and at least 42 credits at the 3000 or higher level.

### Honours Major

- SC/PSYC 1010 6.00 with a minimum grade of C;
- SC/PSYC 2020 6.00, or SC/PSYC 2021 3.00 and SC/PSYC 2022 3.00, or SC/MATH 1131 3.00 and SC/MATH 2570 3.00, or SC/MATH 2560 3.00 and SC/MATH 2570 3.00;
- SC/PSYC 2030 3.00;
- three credits from the following courses: SC/PSYC 2110 3.00, SC/PSYC 2120 3.00, SC/PSYC 2130 3.00, SC/PSYC 3140 3.00, SC/PSYC 3170 3.00;
- three credits from the following courses: SC/PSYC 2210 3.00, SC/PSYC 2220 3.00, SC/PSYC 2230 3.00, SC/PSYC 2240 3.00, SC/PSYC 3260 3.00, SC/PSYC 3265 3.00;
- SC/PSYC 4000 6.00 or SC/PSYC 4170 6.00; six additional credits from psychology courses at the 4000 level;
- at least nine additional credits from psychology courses, for an overall total of at least 42 credits from psychology courses.

Notes:

1. The statistics courses listed above as acceptable substitutes for SC/PSYC 2020 6.00 are counted as psychology course credits.

2. At least half (50 per cent) of the psychology requirements above must be satisfied by psychology courses offered by the Psychology departments at York (Faculties of Arts, Atkinson, Glendon).

### Honours Minor

- SC/PSYC 1010 6.00 with a minimum grade of C;
- six credits from psychology courses at the 4000 level;
- at least 18 additional credits from psychology courses, for an overall total of at least 30 credits from psychology courses.

Note: At least half (50 per cent) of the psychology requirements above must be satisfied by psychology courses offered by the Psychology departments at York (Faculties of Arts, Atkinson, Glendon).

### Joint York/Seneca Certificate Program in Rehabilitation Services

See Certificate Programs in the Faculty of Pure and Applied Science Undergraduate Degree and Certificate Programs section of this Calendar.

## BSc Honours Science and BSc Science

The BSc Honours Science and the BSc Science programs have no declared major. These programs are appropriate for a student who wishes to enrol in a broader range of courses at the 3000 and 4000 levels than can normally be undertaken in Honours or BSc programs.

To declare Honours Science or BSc Science requires successful completion of at least 24 credits and permission of the Faculty honours and BSc science adviser. The candidate is expected to provide a rationale for this choice of program and a study plan. The study plan must conform to Faculty of Pure and Applied Science general regulations.

To proceed in each year of the Honours Science Program requires a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed (subject to the exception in the note below), and permission of the Faculty honours and BSc science adviser.

To graduate in the Honours Science Program requires successful completion of the Faculty 1000-level requirements (see general regulation 4 in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and the Faculty Honours requirements (see general regulation 6 in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) excluding the major requirement, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To graduate in the BSc Science program requires successful completion of the Faculty 1000-level requirements (see general regulation 4 in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and the Faculty bachelor program requirements (see general regulation 5 in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of

this Calendar) excluding the major requirement, and a minimum cumulative credit-weighted grade point average of 4.0 (C) over all courses completed, subject to the exception in the note below.

Note: Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.

## Space and Communication Sciences (Applied Science Streams)

Each of the departments of Earth and Space Science and Engineering, and Physics and Astronomy offers a Specialized Honours degree Stream in Space and Communication Sciences.

- i) All BSc Honours degree candidates must complete the space and communication sciences core: SC/COSC 1020 3.00; SC/COSC 1030

3.00; SC/MATH 1013 3.00; SC/MATH 1014 3.00; SC/MATH 1025 3.00; SC/MATH 1090 3.00; SC/PHYS 1010 6.00; SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, or SC/EATS 1010 3.00 and SC/EATS 1011 3.00; SC/COSC 2011 3.00; SC/COSC 2021 4.00; SC/MATH 2015 3.00; SC/MATH 2090 3.00; SC/MATH 2270 3.00; SC/PHYS 2010 3.00 or SC/EATS 2470 3.00; SC/PHYS 2020 3.00; SC/PHYS 2040 3.00; SC/PHYS 2211 1.00; SC/COSC/EATS/PHYS 3001 1.00; SC/COSC 3121 3.00; SC/COSC 3213 3.00; SC/EATS/PHYS 3280 3.00; SC/PHYS 3050 3.00; SC/PHYS 3250 3.00; SC/COSC/EATS/PHYS 4001 6.00.

ii) All BSc Honours degree candidates must comply with general regulation 4 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) by completing the following (in addition to the 1000-level courses specified in the program core):

- 12 general education credits (see General Education Requirements in the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar).

iii) All BSc Honours degree candidates, in accordance with their declared program, must comply with general regulation 6 (see the Faculty of Pure and Applied Science Regulations Governing Undergraduate Degree Requirements section of this Calendar) and, in so doing, must also satisfy the course, credit and standing requirements specified below.

iv) All BSc Honours degree candidates must complete a non-credit industrial internship (normally salaried) approved by the departmental space and communication sciences coordinator. The minimum experience requirement is a four-month placement, normally after the third year of study, though terms of eight, 12 or 16 months are preferred.

### Honours Programs

To declare Honours requires successful completion of at least 24 credits, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To proceed in each year of an Honours program requires a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses, a minimum cumulative credit-weighted grade point average of 6.0 (B) over all science (SC) courses completed, and a minimum cumulative credit-weighted grade point average of 5.0 (C+) over all courses completed, subject to the exception in the note below.

*Note: Students admitted to York University prior to 1999-2000 may declare Honours and proceed and graduate in Honours programs according to the academic standards of the year in which they were admitted.*

### Specialized Honours in Earth and Atmospheric Science

- the space and communication sciences core, including SC/EATS 2470 3.00;
- the Faculty of Pure and Applied Science general education requirements, as specified in ii) above;
- SC/EATS 2010 3.00; SC/EATS 2030 3.00;
- SC/EATS 3020 3.00; SC/EATS 3030 3.00; SC/EATS 4220 3.00; SC/EATS 4230 3.00; SC/EATS 4250 3.00; SC/MATH 3271 3.00;
- at least six credits from courses approved by the Department of Earth and Space Science and Engineering (see departmental handbook for list of approved courses), including at least two credits at the 3000 or 4000 level, for an overall total of at least 35 credits in earth and atmospheric science;
- additional elective credits, approved by the Department of Earth and Space Science and Engineering, as required for an overall total of at least 120 credits.

### Specialized Honours in Physics and Astronomy

- the space and communication sciences core, including SC/PHYS 2010 3.00;

- the Faculty of Pure and Applied Science general education requirements, as specified in ii) above;
- two of SC/CHEM 2011 3.00, SC/COSC 2001 3.00, SC/EATS 2010 3.00, SC/EATS 2030 3.00, SC/PHYS 1070 3.00, SC/PHYS 2060 3.00, SC/PHYS 2070 3.00, SC/PHYS 3070 3.00;
- SC/MATH 3271 3.00; SC/PHYS 3020 3.00; SC/PHYS 3040 6.00;
- one of SC/COSC 3401 3.00, SC/EATS 3020 3.00, SC/MATH 3410 3.00, SC/PHYS 3010 3.00, SC/PHYS 3030 3.00, SC/PHYS 3070 3.00, SC/PHYS 3150 3.00, SC/PHYS 3220 3.00, SC/PHYS 4120 3.00, other courses approved by the Department of Physics and Astronomy;
- SC/PHYS 4110 3.00; SC/PHYS 4250 3.00; SC/PHYS 4450 3.00;
- one of SC/COSC 4421 3.00, SC/COSC 4422 3.00, SC/EATS 4220 3.00, SC/EATS 4230 3.00, SC/PHYS 3070 3.00, SC/PHYS 4020 3.00, SC/PHYS 4060 3.00, SC/PHYS 4270 4.00, SC/PHYS 4410 3.00, SC/PHYS 4550 3.00.

### Statistics

*See the Mathematics and Statistics section.*