Integrated Science

This section presents the requirements for programs in:

- **Integrated Science B.Sc. Honours**
- **Integrated Science B.Sc.**
- **Minor in Integrated Science**

Integrated Science B.Sc. Honours (20.0 credits)

A. Credits Included in the Major CGPA (10.0 credits)		
1. 4.0 credits in:		4.0
ISAP 1001 [0.5]	Introduction to Interdisciplinary Science	
ISAP 1002 [0.5]	Seminar in Interdisciplinary Science	
ISAP 2001 [0.5]	Foundations in Critical Inquiry	
ISAP 2002 [0.5]	Research Principles for Interdisciplinary Science	
ISAP 3001 [0.5]	Applied Data Analysis	
ISAP 3002 [0.5]	Applications in Interdisciplinary Research	
ISAP 3003 [0.5]	Science Communication	
ISAP 3004 [0.5]	Science Policy	
2. 1.0 credit from:		1.0
ISAP 4906 [1.0]	Capstone Course - Group Research Project	
ISAP 4907 [1.0]	Capstone Course - Research Essay	
ISAP 4908 [1.0]	Capstone Course - Individual Research Project	
ISAP 4909 [1.0]	Translational Approach to Indigenous Community Wellness	
3. 0.5 credit in:		0.5
STAT 2507 [0.5]	Introduction to Statistical Modeling I	
4. 0.5 credit from:		0.5
MATH 1007 [0.5]	Elementary Calculus I	
MATH 1107 [0.5]	Linear Algebra I	
5. 2.0 credit from the Faculty of Science at the 2000 level or higher		2.0
6. 2.0 credits from the Faculty of Science at the 3000 level or higher		2.0
B. Credits Not Included in the Major CGPA (10.0 credits)		
7. 1.0 credit in:		1.0
ECON 1001 [0.5]	Introduction to Microeconomics	
ECON 1002 [0.5]	Introduction to Macroeconomics	
8. 2.0 credits in Approved Experimental Science Courses as defined in the Regulations for the Bachelor of Science		2.0
9. 2.0 credits from the Faculty of Science at the 2000 level or higher		2.0
10. 2.0 credit in Approved courses outside the Faculties of Science and Engineering and Design, as defined in the Regulations for the Bachelor of Science. Note: students in the ISAP program may not use ISAP 1000 in this category.		2.0
11. 3.0 credits in free electives		3.0
12. Students are required to complete one minor from the Faculty of Science. A second minor (from any faculty, including Science) is encouraged. Students should consult with their academic advisor to ensure compliance with this requirement.		
Total Credits		**20.0**

Integrated Science B.Sc. (15.0 credits)

A. Credits Included in the Major CGPA (8.0 credits)		
1. 4.0 credits in:		4.0
ISAP 1001 [0.5]	Introduction to Interdisciplinary Science	
ISAP 1002 [0.5]	Seminar in Interdisciplinary Science	
ISAP 2001 [0.5]	Foundations in Critical Inquiry	
ISAP 2002 [0.5]	Research Principles for Interdisciplinary Science	
ISAP 3001 [0.5]	Applied Data Analysis	
ISAP 3002 [0.5]	Applications in Interdisciplinary Research	
ISAP 3003 [0.5]	Science Communication	
ISAP 3004 [0.5]	Science Policy	
2. 0.5 credit in:		0.5
STAT 2507 [0.5]	Introduction to Statistical Modeling I	
3. 0.5 credit from:		0.5
MATH 1007 [0.5]	Elementary Calculus I	
MATH 1107 [0.5]	Linear Algebra I	
4. 2.0 credit from the Faculty of Science at the 2000 level or higher		2.0
5. 1.0 credit from the Faculty of Science at the 3000 level or higher		1.0
B. Credits Not Included in the Major CGPA (7.0 credits)		
6. 1.0 credit in:		1.0
ECON 1001 [0.5]	Introduction to Microeconomics	
ECON 1002 [0.5]	Introduction to Macroeconomics	
7. 2.0 credits in Approved Experimental Science Courses as defined in the Regulations for the Bachelor of Science		2.0
8. 1.0 credit from the Faculty of Science at the 2000 level or higher		1.0
9. 1.0 credit in Approved courses outside the Faculties of Science and Engineering and Design, as defined in the Regulations for the Bachelor of Science. Note: students in the ISAP program may not use ISAP 1000 in this category.		1.0
10. 2.0 credits in free electives		2.0
11. Students are required to complete one Minor from the Faculty of Science. A second Minor from outside the Faculty of Science may be possible. Students should consult with their academic advisor to ensure compliance with this requirement.		
Total Credits		**15.0**

Minor in Integrated Science (4.0 credits)

The Minor in Integrated Science is available to degree students registered in programs other than those offered by the Institute for Environmental and Interdisciplinary Science.

Students are required to present a Minor CGPA of 4.00 or higher at graduation in order to be awarded a Minor in Integrated Science.

Requirements:	
1. 1.5 credits in ISAP at the 1000- or 2000-level	1.5
2. 1.5 credits in ISAP courses at the 3000- or 4000-level	1.5
3. 1.0 credit in Science Continuation or Science Faculty Electives	1.0
4. The remaining requirements of the major discipline(s) and degree must be satisfied	
Total Credits	**4.0**

B.Sc. Regulations

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

Breadth Requirement for the B.Sc.

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

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

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

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

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

Declared and Undeclared Students

Degree students are considered "Undeclared" if they have been admitted to a degree, but have not yet selected and been accepted into a program within that degree. The status "Undeclared" is available only in the B.A. and B.Sc. degrees. Undeclared students must apply to enter a program upon or before completing 3.5 credits.

Change of Program within the B.Sc. Degree

To transfer to a program within the B.Sc. degree, applicants must normally be *Eligible to Continue* (EC) in the new program, by meeting the CGPA thresholds described in Section 3.1.9 of the *Academic Regulations of the University.*

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

Minors, Concentrations, and Specializations

Students may add a Minor, Concentration, or Specialization by completing a Change of Program Elements (COPE) application form online through Carleton Central. Acceptance into a Minor, Concentration, or Specialization normally requires that the student be *Eligible to Continue* (EC) and is meeting the minimum CGPAs described in Section 3.1.9 of the *Academic Regulations of the University*, as well as being subject to any specific requirements of the intended Minor, Concentration, or Specialization as published in the relevant Calendar entry.

Experimental Science Requirement

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

Approved Experimental Science Courses

Biochemistry	
BIOC 2200 [0.5]	Cellular Biochemistry
BIOC 4001 [0.5]	Methods in Biochemistry
BIOC 4201 [0.5]	Advanced Cell Culture and Tissue Engineering
Biology	
BIOL 1103 [0.5]	Foundations of Biology I
BIOL 1104 [0.5]	Foundations of Biology II
BIOL 2001 [0.5]	Animals: Form and Function
BIOL 2002 [0.5]	Plants: Form and Function
BIOL 2104 [0.5]	Introductory Genetics
BIOL 2200 [0.5]	Cellular Biochemistry
BIOL 2600 [0.5]	Ecology
Chemistry	
CHEM 1001 [0.5]	General Chemistry I
CHEM 1002 [0.5]	General Chemistry II
CHEM 2103 [0.5]	Physical Chemistry I
CHEM 2203 [0.5]	Organic Chemistry I
CHEM 2204 [0.5]	Organic Chemistry II
CHEM 2302 [0.5]	Analytical Chemistry I
CHEM 2303 [0.5]	Analytical Chemistry II
CHEM 2800 [0.5]	Foundations for Environmental Chemistry
Earth Sciences	
ERTH 1002 [0.5]	The Earth and Life Odyssey: A Journey Through Billions of Years
ERTH 2102 [0.5]	Mineralogy to Petrology
ERTH 2404 [0.5]	Engineering Geoscience
ERTH 2802 [0.5]	Field Geology I
ERTH 3111 [0.5]	Vertebrate Evolution: Mammals, Reptiles, and Birds
ERTH 3112 [0.5]	Vertebrate Evolution: Fish and Amphibians
ERTH 3204 [0.5]	Mineral Deposits

ERTH 3205 [0.5]	Physical Hydrogeology
Food Sciences	
FOOD 3001 [0.5]	Food Chemistry
FOOD 3002 [0.5]	Food Analysis
FOOD 3005 [0.5]	Food Microbiology
Geography	
GEOG 1010 [0.5]	Global Environmental Systems
GEOG 3108 [0.5]	Soil Properties
Neuroscience	
NEUR 3206 [0.5]	Sensory and Motor Neuroscience
NEUR 3207 [0.5]	Systems Neuroscience
NEUR 4600 [0.5]	Advanced Lab in Neuroanatomy
Physics	
PHYS 1001 [0.5]	Foundations of Physics I
PHYS 1002 [0.5]	Foundations of Physics II
PHYS 1003 [0.5]	Introductory Mechanics and Thermodynamics
PHYS 1004 [0.5]	Introductory Electromagnetism and Wave Motion
PHYS 1007 [0.5]	Elementary University Physics I
PHYS 1008 [0.5]	Elementary University Physics II
PHYS 2202 [0.5]	Wave Motion and Optics
PHYS 2604 [0.5]	Modern Physics I
PHYS 3007 [0.5]	Third Year Physics Laboratory: Selected Experiments and Seminars
PHYS 3606 [0.5]	Modern Physics II
PHYS 3608 [0.5]	Modern Applied Physics

Co-operative Education

For more information about how to apply for the Co-op program and how the Co-op program works please visit the Co-op website.

All students participating in the Co-op program are governed by the Undergraduate Co-operative Education Policy.

Undergraduate Co-operative Education Policy

Admission Requirements

Students can apply to Co-op in one of two ways: directly from high school, or after beginning a degree program at Carleton.

If a student applies to a degree program with a Co-op option from high school, their university grades will be reviewed two terms to one year prior to their first work term to ensure they meet the academic requirements after their first or second year of study. The time at which the evaluation takes place depends on the program of study. Students will automatically receive an admission decision via their Carleton email account.

Students who did not request Co-op at the time they applied to Carleton can request Co-op after they begin their university studies. To view application instructions and deadlines, please visit carleton.ca/co-op.

To be admitted to Co-op, a student must successfully complete 5.0 or more credits that count towards their degree, meet the minimum CGPA requirement(s) for the student's Co-op option, and fulfil any specified course prerequisites. To see the unique admission and continuation requirements for each Co-op option, please refer to the specific degree programs listed in the Undergraduate Calendar.

Participation Requirements

Co-op Participation Agreement

All students must adhere to the policies found within the Co-op Participation Agreement.

COOP 1000

Once a student has been admitted to the Co-op Program, they will be given access to register in COOP 1000. This zero-credit online course must be completed at least two terms prior to the student's first work term.

Communication with the Co-op Office

Students must maintain contact with the Co-op Office during their job search and while on a work term. All email communication will be conducted via the students' Carleton email account.

Employment

Although every effort is made to ensure a sufficient number of job postings for all Co-op students, no guarantee of employment can be made. The Co-op job search process is competitive, and success is dependent upon factors such as current market conditions, academic performance, skills, motivation, and level of commitment to the job search. It is the student's responsibility to apply for positions via the Co-op job board in addition to actively conducting a self-directed job search. Students who do not obtain a co-op work term are expected to continue with their academic studies. It should be noted that hiring priority for positions within the Federal Government of Canada is given to Canadian citizens.

Registration

- Students must be registered as full-time during all fall and winter study terms beginning the term in which they enroll in COOP 1000.
- Students will be registered in a Co-op Work Term course while at work. This course does not carry academic course credit, but is noted on academic transcripts.
- Students may register in a 0.5 credit during a work term, provided the course is offered during the evening or is offered asynchronously online.
- Students must have at least one term of full-time studies left to complete following their final co-op work term. Students cannot end their degree on a work term.

Work Term Assessment and Evaluation

Work Term Evaluation

Employers are responsible for submitting to Carleton University final performance evaluations for their Co-op students at the end of their work terms.

Work Term Assessment

In order to successfully complete the co-op work term, students must receive a Satisfactory (SAT) grade on their

Co-op Work Term Report, which they must submit at the completion of each four-month work term.

Graduation with the Co-op Designation

In order to graduate with the Co-op Designation, students must satisfy all requirements of the degree program in addition to the successful completion of three or four work terms (the number is dependent upon the student's academic program). Students found in violation of the Co-op Participation Agreement may have the Co-op Designation withheld.

Note: Participation in the co-op option will add up to one additional year for a student to complete their degree program.

Voluntary Withdrawal from the Co-op Option

Students who are currently on a co-op work term or who have already committed to a co-op work term either verbally or in writing may not leave the position and/or withdraw from the co-op option until they have completed the work term and all related requirements.

Involuntary or Required Withdrawal from the Co-op Option

Students may be removed from the Co-op Program for any of the following reasons:

1. Failure to achieve a grade of SAT in COOP 1000;
2. Failure to attend all interviews for positions to which the student has applied;
3. Declining more than one job offer during the job search;
4. Reneging on a co-op position that the student has accepted either verbally or in writing;
5. Continuing a job search after accepting a co-op position;
6. Dismissal from a work term by the co-op employer;
7. Leaving a work term without approval from the Co-op Management Team;
8. Receipt of an unsatisfactory work term evaluation;
9. Receiving a grade of UNS on the work term report.

International Students

All international students are required to possess a Co-op Work Permit issued by Immigration, Refugees and Citizenship Canada before they can begin working. The Co-operative Education Office will provide students with a letter of support to accompany their Co-op Work Permit application. Students are advised to discuss the application process and application requirements with the International Student Services Office.

Co-op Fees

All participating Co-op students are required to pay Co-op fees. For full details, please see the Co-op website.

In addition to the following:

1. Registered as a full-time student in the B.Sc. Integrated Science program;
2. Obtained third-year standing;
3. Successfully completed, by the start-date of the first work term, the following 2.0 credits: ISAP 3001, ISAP 3002, ISAP 3003, ISAP 3004;
4. Obtained an Overall CGPA of at least 7.50 and a Major CGPA of at least 9.00. These CGPAs must be maintained throughout the duration of the degree.

B.Sc. Honours Integrated Science students must successfully complete three (3) work terms to obtain the Co-op Designation.

Work Term Course: ISAP 3999
Work/Study Pattern:

Year 1		Year 2		Year 3		Year 4		Year 5	
Term	**Pattern**	**Term**	**Pattern**	**Term**	**Pattern**	**Term**	**Pattern**	**Term**	**Pattern**
Fall	S	Fall	S	Fall	S	Fall	W	Fall	S
Winter	S	Winter	S	Winter	S	Winter	W	Winter	S
Summer		Summer		Summer	W	Summer	W		

Legend
S: Study
W: Work

Admissions Information

Admission Requirements are for the 2025-26 year only, and are based on the Ontario High School System. Holding the minimum admission requirements only establishes eligibility for consideration. The cut-off averages for admission may be considerably higher than the minimum. See also the **General Admission and Procedures** section of this Calendar. An overall average of at least 70% is normally required to be considered for admission. Some programs may also require specific course prerequisites and prerequisite averages and/or supplementary admission portfolios. Higher averages are required for admission to programs for which the demand for places by qualified applicants exceeds the number of places available. The overall average required for admission is determined each year on a program by program basis. Consult admissions.carleton.ca for further details.

Note: Courses listed as *recommended* are not mandatory for admission. Students who do not follow the recommendations will not be disadvantaged in the admission process.

Admissions Information

Admission requirements are based on the Ontario High School System. Prospective students can view the admission requirements through the Admissions website at admissions.carleton.ca. The overall average required for admission is determined each year on a program-by-program basis. Holding the minimum admission requirements only establishes eligibility for consideration; higher averages are required for admission to programs for which the demand for places by qualified applicants exceeds the number of places available. All programs have limited enrolment and admission is not guaranteed. Some programs may also require specific course prerequisites and prerequisite averages and/or supplementary admission portfolios. Consult admissions.carleton.ca for further details.

Note: If a course is listed as *recommended*, it is not mandatory for admission. Students who do not follow the recommendations will not be disadvantaged in the admission process.

Degrees

- B.Sc. (Honours)
- B.Sc. (Major)
- B.Sc.

Admission Requirements

B. Sc. Honours

First Year

The Ontario Secondary School Diploma (OSSD) or equivalent including a minimum of six 4U or M courses. For most programs including Biochemistry, Bioinformatics, Biotechnology, Chemistry, Combined Honours in Biology and Physics, Chemistry and Physics, Computational Biochemistry, Food Science, Nanoscience, Neuroscience and Biology, Neuroscience and Mental Health, and Psychology, the six 4U or M courses must include Advanced Functions, and two of Biology, Chemistry, Earth and Space Sciences, or Physics. (Calculus and Vectors is strongly recommended).

Specific Honours Admission Requirements

For the Honours programs in Earth Sciences, Environmental Science, Geomatics, Integrated Science, and Physical Geography, Calculus and Vectors may be substituted for Advanced Functions.

For the Honours programs in Physics and Applied Physics, and for double Honours in Mathematics and Physics, Calculus and Vectors is required in addition to Advanced Functions and one of 4U Physics, Chemistry, Biology, or Earth and Space Sciences. For all programs in Physics, 4U Physics is strongly recommended.

For Honours in Psychology, a 4U course in English is recommended.

For Honours in Environmental Science, a 4U course in Biology and Chemistry is recommended.

Advanced Standing

Applications for admission beyond first year will be assessed on their merits. Applicants must normally be *Eligible to Continue* in their year level, in addition to meeting the CGPA thresholds described in Section 3.1.9 of the Academic Regulations of the University. Advanced standing will be granted only for those subjects deemed appropriate for the program and stream selected.

B.Sc. Major and B.Sc.

First Year

The Ontario Secondary School Diploma (OSSD) or equivalent including a minimum of six 4U or M courses. The six 4U or M courses must include Advanced Functions and two of Calculus and Vectors, Biology, Chemistry, Earth and Space Science, or Physics (Calculus and Vectors is strongly recommended). For the B.Sc. Major in Physics, 4U Physics is strongly recommended.

Advanced Standing

Applications for admission beyond first year will be assessed on their merits. Applicants must normally be *Eligible to Continue* (EC) in their year level. Advanced standing will be granted only for those subjects deemed appropriate for the program and stream selected.

Co-op Option

Direct Admission to the First Year of the Co-op Option

Applicants must:

1. meet the required overall admission cut-off average and prerequisite course average. These averages may be higher than the stated minimum requirements;
2. be registered as a full-time student in the Bachelor of Science Honours program;
3. be eligible to work in Canada (for off-campus work placements).

Note that meeting the above requirements only establishes eligibility for admission to the program. The prevailing job market may limit enrolment in the co-op option.

Note: continuation requirements for students previously admitted to the co-op option and admission requirements for the co-op option after beginning the program are described in the Co-operative Education Regulations section of this Calendar.

Interdisciplinary Science and Practice (ISAP) Courses

ISAP 1000 [0.5 credit]
Seminar in Science
Interdisciplinary survey of current issues in science. Students will develop knowledge and skills in scientific inquiry, critical thinking, and communication. Structured around seminars, oral, and written presentations. Lectures and workshop three hours a week.
Precludes additional credit for ISAP 1001 or NSCI 1000 (no longer offered).
Lectures and workshop, three hours a week.

ISAP 1001 [0.5 credit]
Introduction to Interdisciplinary Science
Interdisciplinary survey of current issues in science, focusing on the challenges and opportunities for collaboration across scientific disciplines and beyond. Students will develop knowledge and skills in scientific inquiry, critical thinking, and communication, including an introduction to applied data science.
Precludes additional credit for ISAP 1000 and NSCI 1000 (no longer offered).
Lectures and discussion three hours per week.

ISAP 1002 [0.5 credit]
Seminar in Interdisciplinary Science
Exploring the role of interdisciplinarity in discovery and innovation, and discussion of selected issues facing society and the role of science. Topics include finding information, collaboration and science communication tools.
Seminar three hours per week.

ISAP 2000 [0.5 credit]
Seminar in Science II
Survey of current issues in science, with a focus on applying interdisciplinary approaches to solving scientific problems. Structured around seminars, oral and written presentations. Focus on Equity, diversity and inclusion, community outreach, and experiential learning.
Includes: Experiential Learning Activity
Precludes additional credit for NSCI 2000 (no longer offered).
Prerequisite(s): Second year standing.
Lecture three hours a week

ISAP 2001 [0.5 credit]
Foundations in Critical Inquiry
What is science and the scientific method? Topics include the scientific method, credible sources of information, knowledge gaps, the impact of scientific discoveries, and discussion of their local and global implications.
Includes: Experiential Learning Activity
Prerequisite(s): Second year standing.
Lecture, three hours per week.

ISAP 2002 [0.5 credit]
Research Principles for Interdisciplinary Science
Exploring how research is conducted. Topics include publicly available databases, the role of communication in research, stakeholders and participants, and the process of identifying knowledge gaps and developing research questions.
Prerequisite(s): Second year standing.
Lecture three hours per week.

ISAP 3001 [0.5 credit]
Applied Data Analysis
Data analysis strategies to tackle real-world, wicked problems. Includes a hands-on applied environmental data science project with a variety of partners. Topics include: obtaining and working with data, exploring causal relationships, data ethics, communicating data, and moving from data to information to action.
Includes: Experiential Learning Activity
Also listed as ENSC 3002.
Prerequisite(s): STAT 2507.
Lecture, three hours per week.

ISAP 3002 [0.5 credit]
Applications in Interdisciplinary Research
Application of skills from Interdisciplinary Science and Practice (ISAP) courses to develop a research proposal. Topics include: research ethics; identification of stakeholders; inclusive consultation, collaboration and dissemination strategies.
Prerequisite(s): Third year standing.
Lecture three hours per week.

ISAP 3003 [0.5 credit]
Science Communication
How is science perceived and how has science been communicated? Students will use case studies to assess examples of science communication with varying outcomes. Topics include the principles of effective science communication, the range of tools available, and knowing the audience.
Includes: Experiential Learning Activity
Prerequisite(s): Third year standing.
Lecture three hours per week.

ISAP 3004 [0.5 credit]
Science Policy
Exploration of how science-related policy is developed and the impact of policy on science. Topics include policy frameworks, stakeholder roles, power relationships, commercialization and the funding of science.
Prerequisite(s): Third year standing.
Lecture three hours per week.

ISAP 3700 [0.5 credit]
Topics in Interdisciplinary Science
Specific topics of current interest. Topics may vary from year to year.
Includes: Experiential Learning Activity
Prerequisite(s): Second year standing in the Interdisciplinary Science and Practice program or permission of the Institute.
Seminar/workshop three hours per week.

ISAP 3999 [0.0 credit]
Co-operative Work Term
Includes: Experiential Learning Activity

ISAP 4004 [0.5 credit]
Museum Science
The integral role of science in museums will be explored. Topics include: science is communicated in museums, scientific research taking place at museums, and the science behind preservation and conservation. Students will engage with museum experts.
Includes: Experiential Learning Activity
Prerequisite(s): Third year standing.
Field trips, lectures and seminar, three hours a week.

ISAP 4700 [0.5 credit]
Topics in Interdisciplinary Science
Specific topics of current interest. Topics may vary from year to year.
Includes: Experiential Learning Activity
Prerequisite(s): Third year standing in the Interdisciplinary Science and Practice program or permission of the Institute.
Seminar three hours per week.

ISAP 4901 [0.5 credit]
Directed Studies
Independent or group study, open to third- and fourth-year students to explore a particular topic, in consultation with a Faculty supervisor. May include directed reading, written assignments, tutorials, laboratory or field work.
Includes: Experiential Learning Activity
Prerequisite(s): third-year standing in the Interdisciplinary Science and Practice (ISAP) program and permission of the instructor.

ISAP 4906 [1.0 credit]
Capstone Course - Group Research Project
Students will collaborate on a project that addresses a real-world issue in a team environment. Focus includes: design and completion of a research project; development of communication, critical inquiry, data analysis and research skills; and the opportunity to develop initiative, creativity and self-reliance.
Includes: Experiential Learning Activity
Precludes additional credit for ISAP 4907, ISAP 4908.
Prerequisite(s): fourth-year standing in the Interdisciplinary Science and Practice (ISAP) Honours program and permission of the Institute.
Lecture, seminar and workshop four hours per week, as scheduled by the instructor.

ISAP 4907 [1.0 credit]
Capstone Course - Research Essay
A substantial, independent essay or research proposal-based critical review and research proposal, using library, database and/or bioinformatic resources, under the direct supervision of the instructor. Topics include identification and critical review of resources, development of writing skills and formulation of research question and strategy.
Includes: Experiential Learning Activity
Precludes additional credit for ISAP 4906, ISAP 4908.
Prerequisite(s): fourth-year standing in the Interdisciplinary Science and Practice (ISAP) Honours program or permission of the Institute.
Lecture, seminar and workshop four hours per week, as scheduled by the instructor.

ISAP 4908 [1.0 credit]
Capstone Course - Individual Research Project
An independent research project under the direct supervision of a faculty adviser. Evaluation is based on a written thesis and a poster presentation.
Includes: Experiential Learning Activity
Precludes additional credit for ISAP 4906, ISAP 4907.
Prerequisite(s): fourth-year standing in the Interdisciplinary Science and Practice (ISAP) Honours program, a major CGPA of 9.0 or higher, and permission of the Institute.
Lectures and discussion as scheduled by the course coordinator; other hours as arranged with the faculty advisor.

ISAP 4909 [1.0 credit]
Translational Approach to Indigenous Community Wellness
This course involves co-developing an Indigenous community-led process or product that addresses a current and specific mental health issue. Involves working in interdisciplinary groups with a community partner.
Includes: Experiential Learning Activity
Also listed as ENSC 4909, MPAD 4906, NEUR 4906.
Precludes additional credit for ENSC 4906, ISAP 4906, ISAP 4907, ISAP 4908, NEUR 4906, NEUR 4907, NEUR 4908.
Prerequisite(s): Fourth-year standing with a minimum Major CGPA of 10.0 in the Interdisciplinary Science and Practice (ISAP) Honours program and permission of the instructor.
Seminars or workshops three hours a week. A field trip to the partner community is typically required.

ISAP 4999 [0.0 credit]
Science Communication Certificate Professional Development Workshop
A one-day workshop providing practical skills development for becoming an effective science communicator. Topics for discussion will include defining the audience and framing of information, reviews of effective science communication, career opportunities for science communicators, and one-to-one analysis of participants writing skills. Graded SAT/UNS.
Includes: Experiential Learning Activity
Also listed as JOUR 4999.
Prerequisite(s): This course is restricted to students enrolled in the Certificate of Science Communication, and who have completed at least 2.0 credits towards the certificate, including one of COMS 2500 or ISAP 3003.
A one-day workshop