SFU OFFICE OF THE ASSOCIATE VICE-PRESIDENT, ACADEMIC

8888 University Drive, Burnaby, BC Canada V5A 1S6
TEL: 778.782.6654 FAX: 778.782.5876
avpacad@sfu.ca www.sfu.ca/vpacademic

MEMORANDUM

ATTENTION Senate
FROM Wade Parkhouse, Chair Senate Committee on Undergraduate Studies
RE: Program Changes

DATE June 5, 2020
PAGES 1/2

For information:

Acting under delegated authority at its meeting of June 4, 2020 SCUS approved the following curriculum revisions effective Spring 2021.

a. Faculty of Applied Sciences (SCUS 20-48)

1. School of Computing Science

(i) Changes to internal transfer and continuation requirements for the Computing Science Linguistics Joint Major

b. Faculty of Arts and Social Sciences (SCUS 20-49)

1. Department of French

(i) Upper division requirement changes adding the Accelerated Master's Degree option to the:

- French Honours
- French Major
- French Major with Concentration for Prospective Teachers
- French Extended Minor
- French Cohort Programs (Major and Extended Minor)
- French, History and Politics Joint Major
- French and Humanities Joint Major
- English and French Literatures Joint Major

c. Faculty of Environment (SCUS 20-50)

1. Department of Geography

(i) Upper division requirement changes to the Physical Geography Major and Honours programs

d. Faculty of Health Sciences (SCUS 20-51)

(i) Changes to internal transfer and the upper and lower division requirements for the:

- Health Sciences Major
- Health Sciences Honours
- Philosophy and Health Sciences Joint Major
- Health Sciences Minor programs

e. Faculty of Science (SCUS 20-52)

1. Department of Biological Sciences

(i) Upper and lower division requirement changes to the Biological Sciences Major and Honours program
(ii) Program requirement changes to the Biological Sciences Minor program
(iii) Lower division requirement changes to the Environmental Toxicology Minor program

Senators wishing to consult a more detailed report of curriculum revisions may do so on the Senate Docushare repository at https://docushare.sfu.ca/dsweb/View/Collection-12682.

SFU SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Name of Program or Name of Faculty Computing Science
Rationale for change: Bring the internal requirements in line with all other CS programs.
Effective term and year: Spring 2021
The following program(s) will be affected by these changes: Computing Science and Linguistics Joint Major

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample.~~ All additions should be marked by a **bold.**

INTERNAL TRANSFER

~~Internal transfer allows students to transfer, within Simon Fraser University, from one faculty to another. Once students have completed the three qualifying courses (see below) they can apply for internal transfer into the School of Computing Science. Simon Fraser University students applying for School of Computing Science admission are selected on the basis of an admission computing-related grade point average (CRGPA). The CRGPA is calculated over the best three courses chosen as follows.~~

~~one mathematics course chosen from MACM 101, 201, MATH 150 (or 151), 152 and 240 (or 232)~~
~~one computing course chosen from CMPT 125 (or 126, 128, 130 or 135), 150, (or ENSC 150), 225, 250 (or ENSC 250) and 275 (or 276)~~
~~one additional mathematics or computing science course chosen from the above lists~~

~~No course may be included in the average if it is a duplicate of any previous course completed at Simon Fraser University or elsewhere. All three courses must be completed prior to application. Consult an Applied Sciences Advisor regarding internal transfer.~~

Internal transfer allows students to transfer, within Simon Fraser University, from one faculty to another.

Simon Fraser University students applying for School of Computing Science admission are selected on the basis of an admission Computing Related Grade Point Average (CRGPA) and Cumulative Grade Point Average (CGPA). The CRGPA is computed from all courses the student has taken from the following: (CMPT 120, 128 or 130), (CMPT 125, 129 or 135), CMPT 225, (CMPT 275 or 276), CMPT 295, CMPT 300, CMPT 307, MACM 101, MACM 201, MACM 316. Applicants must have completed at least one MACM course and at least two CMPT courses from this list before applying. At least two courses used in the CRGPA calculation must have been taken at SFU.

No course may be included in the average if it is a duplicate of any previous course completed at Simon Fraser University or elsewhere.

The average for admission based on internal transfer is competitive and the school sets competitive averages each term.

The CRGPA minimum average is 2.67 and the CGPA minimum average is 2.40 - the competitive averages will never be below these minima.

Continuation Requirements

~~Students who do not maintain at least a 2.40 CGPA will be placed on the school's probation. Courses available to probationary students may be limited. Each term, these students must consult an advisor prior to enrolment and must achieve either a 2.40 term GPA or an improved CGPA. Reinstatement from probationary standing occurs when the CGPA improves to 2.40 or better and is maintained.~~

Students who do not maintain at least a 2.40 CGPA will be placed on probation within the School. Courses available to probationary students may be limited. Each term, these students must consult an advisor prior to enrollment and must achieve either a term 2.40 term GPA or an improved CGPA. Students who fail to do so may be removed from the program.

Reinstatement from probationary standing occurs when the CGPA improves to 2.40 or better and is maintained.

Accelerated Master
Department of French (FASS)

To add the Accelerated Master's Degree option to the calendar entries of the French (Joint) Majors, Extended Minor and Honours programs.
Effective term and year: Spring 2021
The following program(s) will be affected by these changes: The Accelerated Master option would be available for students registered in a French program requiring the completion of 400-level French courses, namely: • Honours in French; • Major in French; • Major in French with Concentration for Prospective Teachers; • Extended Minor in French; • French Cohort Programs (Major and Extended Minor); • French, History and Politics Joint Major; • French and Humanities Joint Major • English and French Literatures Joint Major

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample.~~ All additions should be marked by a **bold.**

NB. The following statement to be added at the end of French upper division requirement sections of all cited programs above: **NOTE: SFU students enrolled in the Accelerated Master's program within the Department of French may apply a maximum of 10 graduate course units taken while completing the bachelor's degree to the requirements of the master's degree. For more information go to: https://www.sfu.ca/dean-gradstudies/future/academicprograms/AcceleratedMasters.html and https://www.sfu.ca/french/en/undergrad/programs/FrenchAcceleratedMaster.html**

Calendar Entry Change: Physical Geography Major (Bachelor of Science)
Faculty of Environment, Department of Geography

Rationale for change: GEOG 418 (Ecohydrology) has been proposed as a new course by a new faculty member (Jesse Hahm). This course would be very beneficial for BSc Physical Geography Major students and thus it is proposed to be added to the major program.
Effective term and year: Spring 2021
The following program(s) will be affected by these changes: Physical Geography Major (Bachelor of Science)

Calendar Change: **"**to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold.**

Physical Geography Major

….

Upper Division Requirements

Biogeophysical Science Stream
(...)

and four of the following (at least one of which must be at the 400 division)

GEOG 310 - Physical Geography Field Course (4)
GEOG 313 - River Geomorphology (4)
GEOG 314 - The Climate System (4)
GEOG 315 – World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)
GEOG 411 - Advanced Hydrology (4)
GEOG 412W - Glacial Processes and Environments (4)
GEOG 414 - Climate Change (4)
GEOG 417/417W - Advanced Soil Science (4)
GEOG 418 – Ecohydrology (4)
(...)

Geoscience Stream

(...)

and three (12 units) of the following, including at least one (4 units) from Physical Geography (GEOG 31x or 41x courses) and at least one (4 units) from GIScience (GEOG 35x or 45x courses)

GEOG 314 - The Climate System (4)
GEOG 351 - Multimedia Cartography (4)
GEOG 352 - Spatial Analysis (4)
GEOG 353 - Advanced Remote Sensing (4)
GEOG 355 - Geographical Information Science II (4)
GEOG 356 - 3D Geovisualization (4)
GEOG 411 - Advanced Hydrology (4)
GEOG 414 - Climate Change (4)
GEOG 417/417W - Advanced Soil Science (4)
GEOG 418 – Ecohydrology (4)
GEOG 451 - Spatial Modeling (4)
GEOG 453 - Theoretical and Applied Remote Sensing (4)
GEOG 455 - Theoretical and Applied GIS (4)
GEOG 457 - Geovisualization Interfaces (4)
(...)
Geosystems and GIScience Stream

(...)

GEOG 310 - Physical Geography Field Course (4)
GEOG 311 - Hydrology (4)
GEOG 313 - River Geomorphology (4)
GEOG 314 - The Climate System (4)
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)
GEOG 317 - Soil Science (4)
GEOG 411 - Advanced Hydrology (4)
GEOG 412W - Glacial Processes and Environments (4)
GEOG 414 - Climate Change (4)
GEOG 417/417W - Advanced Soil Science (4)
GEOG 418 – Ecohydrology (4)
(...)

Calendar Entry Change
Name of Program or Name of Faculty: BSc Physical Geography Honours
Faculty of Environment

Rationale for change: GEOG 418 (Ecohydrology) has been proposed as a new course by a new faculty member (Jesse Hahm). This course would be very beneficial for BSc Physical Geography Honours students and thus it is proposed to be added to the honours program.
Effective term and year: Spring 2021
The following program(s) will be affected by these changes: BSc Physical Geography Honours

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: sample. All additions should be marked by a bold.

Physical Geography Honours

Bachelor of Science
(…)

Upper Division Requirements

Biogeophysical Science Stream
(…)
and four of the following (at least one of which must be at the 400 division)
GEOG 310 - Physical Geography Field Course (4)
GEOG 313 - River Geomorphology (4)
GEOG 314 - The Climate System (4)
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)
GEOG 411 - Advanced Hydrology (4)
GEOG 412W - Glacial Processes and Environments (4)
GEOG 414 - Climate Change (4)
GEOG 417/417W - Advanced Soil Science (4)
GEOG 418 – Ecohydrology (4)
(…)

Geoscience Stream

(...)

and three (12 units) of the following, including at least one (4 units) from Physical Geography (GEOG 31x or 41x courses) and including at least one (4 units) from GIScience (GEOG 35x or 45x courses)

GEOG 314 - The Climate System (4)
GEOG 351 - Multimedia Cartography (4)
GEOG 352 - Spatial Analysis (4)
GEOG 353 - Advanced Remote Sensing (4)
GEOG 355 - Geographical Information Science II (4)
GEOG 356 - 3D Geovisualization (4)
GEOG 411 - Advanced Hydrology (4)
GEOG 414 - Climate Change (4)
GEOG 417/417W - Advanced Soil Science (4)
GEOG 418 – Ecohydrology (4)
GEOG 451 - Spatial Modeling (4)
GEOG 453 - Theoretical and Applied Remote Sensing (4)
GEOG 455 - Theoretical and Applied GIS (4)
GEOG 457 - Geovisualization Interfaces (4)
(...)
Geosystems and GIScience Stream

Students who choose this stream will complete a minimum total of 28 units, including three (12units) of the following (at least one of which must be at the 400 division)

GEOG 310 - Physical Geography Field Course (4)
GEOG 311 - Hydrology (4)
GEOG 313 - River Geomorphology (4)
GEOG 314 - The Climate System (4)
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)
GEOG 317 - Soil Science (4)
GEOG 411 - Advanced Hydrology (4)
GEOG 412W - Glacial Processes and Environments (4)
GEOG 414 - Climate Change (4)
GEOG 417W - Advanced Soil Science (4)
GEOG 418 – Ecohydrology (4)
(...)

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Calendar Entry Change
Faculty of Health Sciences

Rationale for change: HSCI 304 has been re-numbered to HSCI 204, and HSCI 210 has been added to the lower division program requirements.
Effective term and year: Spring 2021

The following program(s) will be affected by these changes:
 	
• Health Sciences Major
  o Bachelor of Arts
  o Bachelor of Science, Life Sciences Concentration and Population and Quantitative Health Sciences Concentration
 	
• Health Sciences Honours
  o Bachelor of Arts
  o Bachelor of Science, Life Sciences Concentration and Population and Quantitative Health Sciences Concentration
 	
• Philosophy and Health Sciences Joint Major
 	
• Health Sciences Minor

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample.~~ All additions should be marked by a **bold.**

• For Bachelor of Arts Major: Internal Transfer Internal transfer allows students to transfer, within Simon Fraser University, from one faculty to another. Students can apply for internal transfer into the Bachelor of Arts program in the Faculty of Health Sciences with a minimum CGPA of 2.5 and the following with a minimum grade of C: HSCI 130 HSCI 100 or BISC 101, and one of **HSCI 204, HSCI 210,** HSCI 211, HSCI 212, HSCI 214, HSCI 216

Lower Division Requirements

~~and all of~~
and at least four of

HSCI 204 - Perspectives on Human Health and the Environment (3)
HSCI 210 - Special Topics in Health Sciences (3)
HSCI 211 - Perspectives on Cancer, Cardiovascular, and Metabolic Diseases (3)
HSCI 212 - Perspectives on Infectious and Immunological Diseases (3)
HSCI 214 - Perspectives on Mental Health and Illness (3)
HSCI 216 - Ecological Determinants of Human Growth, Development and Health

Upper Division Requirements

Students complete all of

~~HSCI 304 - Perspectives on Human Health and the Environment (3)~~
HSCI 305 - The Canadian Health System (3)
HSCI 307 - Research Methods in Health Sciences (3)
HSCI 312 - Health Promotion: Individuals and Communities (3)
HSCI 319W - Applied Health Ethics (3)
HSCI 330 - Exploratory Strategies in Epidemiology (3)
HSCI 340 - Social Determinants of Health (3)

- For Bachelor of Arts Honours:

Internal Transfer

Internal transfer allows students to transfer, within Simon Fraser University, from one faculty to another. Students can apply for internal transfer into the Faculty of Health Sciences with a minimum CGPA of 2.5, and completion of HSCI 130 and one of the following 200-level HSCI courses: **HSCI 204-3, HSCI 210-3,** HSCI 211-3, HSCI 212-3, HSCI 214-3, or HSCI 216-3 with a minimum grade of C- in these courses.

Lower Division Requirements

~~and all of~~
and at least four of

HSCI 204 - Perspectives on Human Health and the Environment (3)
HSCI 210 - Special Topics in Health Sciences (3)

HSCI 211 - Perspectives on Cancer, Cardiovascular, and Metabolic Diseases (3)
HSCI 212 - Perspectives on Infectious and Immunological Diseases (3)
HSCI 214 - Perspectives on Mental Health and Illness (3)
HSCI 216 - Ecological Determinants of Human Growth, Development and Health

Upper Division Requirements

Students complete all of

~~HSCI 304 - Perspectives on Human Health and the Environment (3)~~
HSCI 305 - The Canadian Health System (3)
HSCI 307 - Research Methods in Health Sciences (3)
HSCI 312 - Health Promotion: Individuals and Communities (3)
HSCI 319W - Applied Health Ethics (3)
HSCI 330 - Exploratory Strategies in Epidemiology (3)
HSCI 340 - Social Determinants of Health (3)

- For Bachelor of Science Major:

Internal Transfer

Internal transfer allows students to transfer, within Simon Fraser University, from one faculty to another. Students can apply for internal transfer into the Bachelor of Science program in the Faculty of Health Sciences with a minimum CGPA of 2.5 and the following with a minimum grade of C:

HSCI 130
BISC 101 or BISC 102
one of **HSCI 204, HSCI 210,** HSCI 211, HSCI 212, HSCI 214, HSCI 216, and
MATH 100 or equivalent. Students with only BC Pre-Calculus 12 require a grade of B or satisfactory grade on Calculus Readiness Test.

Life Sciences Concentration Lower Division Requirements

and two of

HSCI 204 - Perspectives on Human Health and the Environment (3)
HSCI 210 - Special Topics in Health Sciences (3)
HSCI 211 - Perspectives on Cancer, Cardiovascular, and Metabolic Diseases (3)
HSCI 212 - Perspectives on Infectious and Immunological Diseases (3)
HSCI 214 - Perspectives on Mental Health and Illness (3)
HSCI 216 - Ecological Determinants of Human Growth, Development and Health (3)

Population and Quantitative Health Sciences Concentration Lower Division Requirements

and at least three of

HSCI 204 - Perspectives on Human Health and the Environment (3)
HSCI 210 - Special Topics in Health Sciences (3)
HSCI 211 - Perspectives on Cancer, Cardiovascular, and Metabolic Diseases (3)
HSCI 212 - Perspectives on Infectious and Immunological Diseases (3)
HSCI 214 - Perspectives on Mental Health and Illness (3)
HSCI 216 - Ecological Determinants of Human Growth, Development and Health (3)

- For Bachelor of Science Honours:

Internal Transfer

Internal transfer allows students to transfer, within Simon Fraser University, from one faculty to another. Students can apply for internal transfer into the Faculty of Health Sciences with a minimum CGPA of 3.0 and completion of HSCI 130-4 and one of the following 200-level HSCI courses: **HSCI 204-3, HSCI 210-3,** HSCI 211-3, HSCI 212-3, HSCI 214-3, or HSCI 216-3 with a minimum grade of C- in these courses.

Life Sciences Concentration Lower Division Requirements

and two of

HSCI 204 - Perspectives on Human Health and the Environment (3)
HSCI 210 - Special Topics in Health Sciences (3)
HSCI 211 - Perspectives on Cancer, Cardiovascular, and Metabolic Diseases (3)
HSCI 212 - Perspectives on Infectious and Immunological Diseases (3)
HSCI 214 - Perspectives on Mental Health and Illness (3)
HSCI 216 - Ecological Determinants of Human Growth, Development and Health (3)

Population and Quantitative Health Sciences Concentration Lower Division Requirements

and at least three of

HSCI 204 - Perspectives on Human Health and the Environment (3)
HSCI 210 - Special Topics in Health Sciences (3)
HSCI 211 - Perspectives on Cancer, Cardiovascular, and Metabolic Diseases (3)

HSCI 212 - Perspectives on Infectious and Immunological Diseases (3)
HSCI 214 - Perspectives on Mental Health and Illness (3)
HSCI 216 - Ecological Determinants of Human Growth, Development and Health (3)

- For Philosophy and Health Sciences Joint Major:

Admission Requirements

To be admitted to the joint major in Philosophy and Health Sciences, students must complete (A) one of the following HSCI courses with a minimum grade of C-: **HSCI 204-3, HSCI 210-3,** HSCI 211- 3, HSCI 212-3, HSCI 214-3, or HSCI 216-3; and (B) one of the following PHIL courses with a minimum grade of C-: PHIL 201 or PHIL 203.

Lower Division Health Sciences Requirements

and at least two of

HSCI 204 - Perspectives on Human Health and the Environment (3)
HSCI 210 - Special Topics in Health Sciences (3)
HSCI 211 - Perspectives on Cancer, Cardiovascular, and Metabolic Diseases (3)
HSCI 212 - Perspectives on Infectious and Immunological Diseases (3)
HSCI 214 - Perspectives on Mental Health and Illness (3)
HSCI 216 - Ecological Determinants of Human Growth, Development and Health (3)

- For Health Sciences Minor:

Admission Requirements

Students can apply for admission into the Health Sciences minor with a minimum CGPA of 2.5 and the following with a minimum grade of C:

HSCI 130
BISC 101 or HSCI 100
one of **HSCI 204, HSCI 210,** HSCI 211, HSCI 212, HSCI 214, HSCI 216

Program Requirements

and three of

HSCI 204 - Perspectives on Human Health and the Environment (3)

HSCI 210 - Special Topics in Health Sciences (3)
HSCI 211 - Perspectives on Cancer, Cardiovascular, and Metabolic Diseases (3)
HSCI 212 - Perspectives on Infectious and Immunological Diseases (3)
HSCI 214 - Perspectives on Mental Health and Illness (3)
HSCI 216 - Ecological Determinants of Human Growth, Development and Health (3)

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Calendar Entry Change
Name of Program or Name of Faculty BIOLOGICAL SCIENCES HONOURS

Rationale for change: Biological Sciences has introduced a new second year course (BISC 205-Principles of Physiology) that will provide all students in Biological Science a strong background in this fundamental area of biological sciences. The new course replaces a required third year course in either animal or plant physiology, that become electives within each of the streams.
Effective term and year: Spring 2021
The following program(s) will be affected by these changes: Biological Sciences Honors Programs

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample.~~ All additions should be marked by a **bold.**

Biological Sciences Honours

BACHELOR OF SCIENCE

The Honours program is intended for academically strong students who wish to combine in-depth study and research-based courses in Biological Sciences. Like the Majors program, the Honours program combines a broad foundation in the lower division with specialization in upper division in one of 3 concentrations: Cells, Molecules, Physiology (CMP); Ecology, Evolution, Conservation (EEC); or Open concentration.

In addition to the Major Program Requirements, Honours students complete an Independent Study Semester (ISS) under the supervision of a faculty member, maintain a GPA of 3.0, complete 60 upper division units in BISC (or a related discipline), and graduate with a minimum of 124 units.

Admission Requirements

Students may apply once they have completed all Lower Division Requirements and at least 15 upper division units in Biological Sciences. Entry requires a CGPA of 3.0 or higher. Interested students who meet the criteria should meet with the Undergraduate Program Advisor to apply.

Grade Requirements

Prerequisites. Students are normally required to obtain at least a C- on all course prerequisites, but in some cases the minimum grade requirement may be higher. Students are encouraged to plan ahead and consult the course calendar. In some cases, prerequisites may be waived for BISC courses with the approval of the Department.

Continuation. To remain in the program, students must be in good academic standing, must maintain a CGPA of 3.0 in the Honours Program Requirements (i.e, excluding electives), and must not exceed SFU's limits on course repeats.

Program Requirements

Students must complete a minimum of 124 units, including 60 at the upper division level.

Lower Division Requirements

Students complete all of

BISC 101 - General Biology (4)
BISC 102 - General Biology (4)
BISC 202 - Genetics (3)
BISC 204 - Introduction to Ecology (3)
BISC 205 - Principles of Physiology (3)
CHEM 121 - General Chemistry and Laboratory I (4)
CHEM 122 - General Chemistry II (2)
CHEM 281 - Organic Chemistry I (4)
MBB 222 - Molecular Biology and Biochemistry (3)
MBB 231 - Cellular Biology and Biochemistry (3)
STAT 201 - Statistics for the Life Sciences (3)

and one of

CHEM 282 - Organic Chemistry II (2)
CHEM 283 - Organic Chemistry IIb (3)

and one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Calculus I for the Biological Sciences (3)

and one of

MATH 152 - Calculus II (3)
MATH 155 - Calculus II for the Biological Sciences (3)

and one of

PHYS 101 - Physics for the Life Sciences I (3)
PHYS 120 - Mechanics and Modern Physics (3)
PHYS 125 - Mechanics and Special Relativity (3)
PHYS 140 - Studio Physics - Mechanics and Modern Physics (4)

and one of

PHYS 102 - Physics for the Life Sciences II (3)
PHYS 121 - Optics, Electricity and Magnetism (3)
PHYS 126 - Electricity, Magnetism and Light (3)
PHYS 141 - Studio Physics - Optics, Electricity and Magnetism (4)

Students are encouraged to complete all lower division requirements before registering for upper division courses. Students who intend to apply for medical, dental, veterinary, or other professional program may need additional courses and are encouraged to consult with the Biological Sciences Undergraduate Advisor.

Upper Division Requirements

Students complete a minimum 60 upper division units in BISC, consisting of 4 core courses, concentration specific courses, and a 3 course Independent Study Semester (ISS), as outline below. Students may need to take additional course(s) to satisfy the 60 units requirement. Students must obtain a C- or better on all Upper Division Requirements.

All students complete ~~4~~ **three** core courses, as follows.

BISC 300 - Evolution (3)
BISC 333 - Developmental Biology (3)

~~and one of~~

~~BISC 305 - Animal Physiology (3)~~
~~BISC 366 - Plant Physiology (3)~~

and at least one of

BISC 303 - Microbiology (4)
BISC 306 - Invertebrate Biology (4)
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 318 - Parasitology (3)
BISC 326 - Biology of Algae and Fungi (3)
BISC 337 - Plant Biology (4)

Cells, Molecules, and Physiology (CMP) Concentration

This concentration is for students who wish to specialize in Cell Biology, Molecular Biology, and Physiology. The program provides flexibility for students to pursue their interests across these disciplines.

Students who choose this concentration will complete two of the following techniques courses

BISC 302W - Genetic Analysis (3)
BISC 303 - Microbiology (4)
BISC 357 - Genetic Engineering (4)
BPK 408W - Cellular Physiology Laboratory (3)

and at least ~~four~~ **five** additional stream electives from

BISC 302W - Genetic Analysis (3)
BISC 303 - Microbiology (4)
BISC 305 - Animal Physiology (3)
BISC 313 - Environmental Toxicology: A Mechanistic Perspective (3)
BISC 357 - Genetic Engineering (4)
BISC 366 - Plant Physiology (3)
BISC 403 - Current Topics in Cell Biology (3)
BISC 405 - Neurobiology (3)
BISC 421 - Models in Biology: From Molecules to Migration (3)
BISC 423 - Developmental Neurobiology (3)
BISC 424 - Applied Genomics (3)
BISC 425 - Sensory Biology (3)
BISC 428 – Cell Anatomy (3)
BISC 439 - Industrial Microbiology (4)
BISC 445 - Environmental Physiology of Animals (3)
BISC 455 - Endocrinology (3)
BISC 457 - Plant Molecular Biology and Biotechnology (3)
BISC 471 - Special Topics in Cells, Molecules and Physiology (3)
BISC 472 - Special Topics in Cells, Molecules and Physiology (3)
BISC 475 - Special Topics in Biology (3)

BISC 497W - Undergraduate Research: Writing Intensive (3)
BISC 498 - Undergraduate Research I (3)
BISC 499 - Undergraduate Research II (3)
BPK 408W - Cellular Physiology Laboratory (3)

and two upper division elective courses (minimum of six units) from BISC, BPK, HSCI, MBB, PHYS, or STAT, subject to approval by the department. Normally no more than two research intensive courses (such as BISC 497W, 498, or 499) may be used to satisfy stream requirements. Students complete a total of five lab courses (which may include one of BISC 497W, 498, 499) among their upper division courses. A minimum of 3 CMP stream courses must be at the 400 level.

Ecology, Evolution and Conservation (EEC) Concentration

This concentration integrates theoretical and applied approaches to Ecology, Evolution, and Conservation. Students interested in obtaining additional field biology experience may also take courses at Bamfield Marine Sciences Centre, listed under Marine Sciences (MASC) in the course calendar. The EEC concentration is accredited by the College of Applied Biology (see the Biological Sciences website for details).

Students who choose this concentration will complete both

STAT 302 - Analysis of Experimental and Observational Data (3)
BISC 360W - Techniques in Ecology and Evolution (3)

and at least one additional organismal course from:

BISC 306 - Invertebrate Biology (4)
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 326 - Biology of Algae and Fungi (3)
BISC 337 - Plant Biology (4)

and at least one applied course from

BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 309 - Conservation Biology (3)
BISC 413 - Fisheries Ecology (3)
BISC 435 - Introduction to Pest Management (3)

and at least two conceptual courses from

BISC 407 - Population Dynamics (3)
BISC 410 - Behavioral Ecology (3)

BISC 420 - Community Ecology (3)
BISC 422 - Population Genetics (3)
BISC 440W - Biodiversity (3)

and at least ~~two~~ **three** additional stream electives from

BISC 305 - Animal Physiology (3)
BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 309 - Conservation Biology (3)
BISC 366 - Plant Physiology (3)
BISC 407 - Population Dynamics (3)
BISC 410 - Behavioral Ecology (3)
BISC 412 - Aquatic Ecology (3)
BISC 413 - Fisheries Ecology (3)
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
BISC 421 - Models in Biology: From Molecules to Migration (3)
BISC 422 - Population Genetics (3)
BISC 434 - Paleoecology and Palynology (3)
BISC 435 - Introduction to Pest Management (3)
BISC 440W - Biodiversity (3)
BISC 441 - Evolution of Health and Disease (3)
BISC 445 - Environmental Physiology of Animals (3)
BISC 473 - Special Topics in Ecology, Evolution and Conservation (3)
BISC 474 - Special Topics in Ecology, Evolution and Conservation (3)
BISC 497W - Undergraduate Research: Writing Intensive (3)
BISC 498 - Undergraduate Research I (3)
BISC 499 - Undergraduate Research II (3)

Courses from other units such as the Faculty of Environment and MASC courses may count as options toward these stream electives, subject to approval by the department. Students complete a total of five lab courses (which may include BISC 491 and one of BISC 497W, 498, 499) among their upper division courses.

Open Concentration

This concentration allows students to build their own program and combine interests spanning the full diversity of courses offered in the Department.

Students who choose this concentration will complete one of the following techniques courses

BISC 302W - Genetic Analysis (3)
BISC 303 - Microbiology (4)

BISC 357 - Genetic Engineering (4)
BISC 360W - Techniques in Ecology and Evolution (3)
BPK 408W - Cellular Physiology Laboratory (3)

and an additional ~~7~~ **8** upper division BISC courses (totaling a minimum of ~~21~~ 24units). Students may substitute up to 2 upper division courses from other units (e.g., BPK, FENV, HSCI, MASC, MBB, PHYS, or STAT), subject to approval by the department. Normally no more than two research intensive courses (such as BISC 497W, 498, or 499) may be used to satisfy stream requirements. Students complete a total of five lab courses (which may include one of BISC 497W, 498, 499) among their upper division courses. A minimum of 3 BISC courses must be at the 400 level.

Independent Study Semester (ISS)

The ISS is a research-based thesis, completed under the supervision of a faculty member in Biological Sciences. It consists of 3 integrated courses, as follows

BISC 490 - Research Design (5)
BISC 491 - Research Technique (5)
BISC 492W - Research Reporting (5)

Residency Requirements and Transfer Credit

At least half of the program's total units must be earned through Simon Fraser University study.
At least two thirds of the program's total upper division units must be earned through Simon Fraser University study.

Students who transfer into the Biological Sciences Major from other institutions may count a maximum of 2 transfer courses toward their upper division program requirements. Transfer students are encouraged to meet with the Undergraduate Advisor for further details.

Calendar Entry Change

Name of Program or Name of Faculty BIOLOGICAL SCIENCES MAJOR

Rationale for change: Biological Sciences has introduced a new second year course (BISC 205-Principles of Physiology) that will provide all students in Biological Science a strong background in this fundamental area of biological sciences. The new course replaces a required third year course in either animal or plant physiology, that become electives within each of the streams.
Effective term and year: Spring 2021
The following program(s) will be affected by these changes: Biological Sciences Major Program

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample.~~ All additions should be marked by a **bold.**

Biological Sciences Major

BACHELOR OF SCIENCE

The Biological Sciences Major combines a broad foundation in the lower division with specialization in upper division. After completing their lower division courses, students select one of 3 concentrations: Cells, Molecules, Physiology (CMP); Ecology, Evolution, Conservation (EEC); or Open concentration.

Admission Requirements

Students meeting the admission requirements to the Faculty of Science may receive direct entry to the BISC Major upon acceptance to SFU either from high school or as a transfer student. Students already at SFU may apply to the BISC Major once they have completed all Lower Division Requirements (details below). Students must have a GPA of 2.0 or higher on the Lower Division Requirements to be accepted into the program.

Grade Requirements

Prerequisites. Students are normally required to obtain at least a C- on all course prerequisites, but in some cases the minimum grade requirements may be higher. Students

are encouraged to plan ahead and consult the course calendar. In some cases, prerequisites may be waived for BISC courses with the approval of the Department.

Continuation. To remain in the program, students must be in good academic standing, must maintain a CGPA of 2.0 in the Major Program Requirements (i.e., excluding electives), and must not exceed SFU's limits on course repeats. Students who do not meet these requirements will be dropped from the Major Program. Students may apply for readmission to the Major Program if they complete all Lower Division Requirements (details below) with a GPA of 2.0 or higher, without exceeding the course repeat limit. Students may also apply for admission to the General Science Double Minor Program within the Faculty of Science or other programs across the university.

Program Requirements

Students must complete a minimum of 120 units, including 44 units at the upper division level.

Lower Division Requirements

Students complete all of

BISC 101 - General Biology (4)
BISC 102 - General Biology (4)
BISC 202 - Genetics (3)
BISC 204 - Introduction to Ecology (3)
BISC 205 – Principles of Physiology (3)
CHEM 121 - General Chemistry and Laboratory I (4)
CHEM 122 - General Chemistry II (2)
CHEM 281 - Organic Chemistry I (4)
MBB 222 - Molecular Biology and Biochemistry (3)
MBB 231 - Cellular Biology and Biochemistry (3)
STAT 201 - Statistics for the Life Sciences (3)

and one of

CHEM 282 - Organic Chemistry II (2)
CHEM 283 - Organic Chemistry IIb (3)

and one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Calculus I for the Biological Sciences (3)

and one of

MATH 152 - Calculus II (3)
MATH 155 - Calculus II for the Biological Sciences (3)

and one of

PHYS 101 - Physics for the Life Sciences I (3)
PHYS 120 - Mechanics and Modern Physics (3)
PHYS 125 - Mechanics and Special Relativity (3)
PHYS 140 - Studio Physics - Mechanics and Modern Physics (4)

and one of

PHYS 102 - Physics for the Life Sciences II (3)
PHYS 121 - Optics, Electricity and Magnetism (3)
PHYS 126 - Electricity, Magnetism and Light (3)
PHYS 141 - Studio Physics - Optics, Electricity and Magnetism (4)

Students are encouraged to complete all lower division requirements before registering for upper division courses. Students who intend to apply for medical, dental, veterinary, or other professional program may need additional courses and are encouraged to consult with the Biological Sciences Undergraduate Advisor.

Upper Division Requirements

Students complete a minimum of 12 upper division courses (a minimum of 36 units), consisting of 4 core courses plus 8 concentration specific courses, as specified below. Once students have completed their lower division requirements, they should meet with the Undergraduate Advisor to declare their concentration. Students must obtain a C- or better on all Upper Division Requirements.

All students complete ~~4~~ **three** core courses, as follows.

BISC 300 - Evolution (3)
BISC 333 - Developmental Biology (3)

~~and one of~~

~~BISC 305 - Animal Physiology (3)~~
~~BISC 366 - Plant Physiology (3)~~

and at least one of

BISC 303 - Microbiology (4)
BISC 306 - Invertebrate Biology (4)
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 318 - Parasitology (3)
BISC 326 - Biology of Algae and Fungi (3)
BISC 337 - Plant Biology (4)

Cells, Molecules, and Physiology (CMP) Concentration

This concentration is for students who wish to specialize in Cell Biology, Molecular Biology, and Physiology. The program provides flexibility for students to pursue their interests across these disciplines.

Students who choose this concentration will complete two of the following techniques courses

BISC 302W - Genetic Analysis (3)
BISC 303 - Microbiology (4)
BISC 357 - Genetic Engineering (4)
BPK 408W - Cellular Physiology Laboratory (3)

and at least ~~four~~ **five** additional stream electives from

BISC 302W - Genetic Analysis (3)
BISC 303 - Microbiology (4)
BISC 305 - Animal Physiology (3)
BISC 313 - Environmental Toxicology: A Mechanistic Perspective (3)
BISC 357 - Genetic Engineering (4)
BISC 366 - Plant Physiology (3)
BISC 403 - Current Topics in Cell Biology (3)
BISC 405 - Neurobiology (3)
BISC 421 - Models in Biology: From Molecules to Migration (3)
BISC 423 - Developmental Neurobiology (3)
BISC 424 - Applied Genomics (3)
BISC 425 - Sensory Biology (3)
BISC 428 - Cell Anatomy (3)
BISC 439 - Industrial Microbiology (4)
BISC 445 - Environmental Physiology of Animals (3)
BISC 455 - Endocrinology (3)
BISC 457 - Plant Molecular Biology and Biotechnology (3)

BISC 471 - Special Topics in Cells, Molecules and Physiology (3)
BISC 472 - Special Topics in Cells, Molecules and Physiology (3)
BISC 475 - Special Topics in Biology (3)
BISC 497W - Undergraduate Research: Writing Intensive (3)
BISC 498 - Undergraduate Research I (3)
BISC 499 - Undergraduate Research II (3)
BPK 408W - Cellular Physiology Laboratory (3)

and two upper division elective courses (minimum of six units) from BISC, BPK, HSCI, MBB, PHYS, or STAT, subject to approval by the department. Normally no more than two research intensive courses (such as BISC 497W, 498, or 499) may be used to satisfy stream requirements. Students complete a total of five lab courses (which may include one of BISC 497W, 498, 499) among their upper division courses. A minimum of 3 CMP stream courses must be at the 400 level.

Ecology, Evolution, and Conservation (EEC) Concentration

This concentration integrates theoretical and applied approaches to Ecology, Evolution, and Conservation. Students interested in obtaining additional field biology experience may also take courses at Bamfield Marine Sciences Centre, listed under Marine Sciences (MASC) in the course calendar. The EEC concentration is accredited by the College of Applied Biology (see the Biological Sciences website for details).

Students who choose this concentration will complete both

STAT 302 - Analysis of Experimental and Observational Data (3)
BISC 360W - Techniques in Ecology and Evolution (3)

and at least one additional organismal course from

BISC 306 - Invertebrate Biology (4)
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 326 - Biology of Algae and Fungi (3)
BISC 337 - Plant Biology (4)

and at least one applied course from

BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 309 - Conservation Biology (3)
BISC 413 - Fisheries Ecology (3)
BISC 435 - Introduction to Pest Management (3)

and at least two conceptual courses from

BISC 407 - Population Dynamics (3)
BISC 410 - Behavioral Ecology (3)
BISC 420 - Community Ecology (3)
BISC 422 - Population Genetics (3)
BISC 440W - Biodiversity (3)

and at least ~~two~~ **three** additional stream electives from

BISC 305 - Animal Physiology (3)
BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 309 - Conservation Biology (3)
BISC 366 - Plant Physiology (3)
BISC 407 - Population Dynamics (3)
BISC 410 - Behavioral Ecology (3)
BISC 412 - Aquatic Ecology (3)
BISC 413 - Fisheries Ecology (3)
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
BISC 421 - Models in Biology: From Molecules to Migration (3)
BISC 422 - Population Genetics (3)
BISC 434 - Paleoecology and Palynology (3)
BISC 435 - Introduction to Pest Management (3)
BISC 440W - Biodiversity (3)
BISC 441 - Evolution of Health and Disease (3)
BISC 445 - Environmental Physiology of Animals (3)
BISC 473 - Special Topics in Ecology, Evolution and Conservation (3)
BISC 474 - Special Topics in Ecology, Evolution and Conservation (3)
BISC 497W - Undergraduate Research: Writing Intensive (3)
BISC 498 - Undergraduate Research I (3)
BISC 499 - Undergraduate Research II (3)

Courses from other units such as the Faculty of Environment and MASC courses may count as options toward these stream electives, subject to approval by the department. Students complete a total of five lab courses (which may include one of BISC 497W, 498, 499) among their upper division courses.

Open Concentration

This concentration allows students to build their own program and combine interests spanning the full diversity of courses offered in the Department.

Students who choose this concentration will complete one of the following techniques courses

BISC 302W - Genetic Analysis (3)
BISC 303 - Microbiology (4)
BISC 357 - Genetic Engineering (4)
BISC 360W - Techniques in Ecology and Evolution (3)
BPK 408W - Cellular Physiology Laboratory (3)

and an additional ~~7~~ **8** upper division BISC courses (totaling a minimum of ~~21~~ **24** units). Students may substitute up to 2 upper division courses from other units (e.g., BPK, FENV, HSCI, MASC, MBB, PHYS, or STAT), subject to approval by the department. Normally no more than two research intensive courses (such as BISC 497W, 498, or 499) may be used to satisfy stream requirements. Students complete a total of five lab courses (which may include one of BISC 497W, 498, 499) among their upper division courses. A minimum of 3 BISC courses must be at the 400 level.

(…)

Calendar Entry Change
Name of Program or Name of Faculty BIOLOGICAL SCIENCES MINOR

Rationale for change: The program is being changed to reflect the introduction of the new course Principles of Physiology that will provide a strong foundation in Physiology. The changes do not alter the number of courses required for the Biology Minor.
Effective term and year: Spring 2021
The following program(s) will be affected by these changes: Biological Sciences Minor

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample.~~ All additions should be marked by a **bold.**

Biological Sciences Minor

Program Requirements

Students complete all of

BISC 101 - General Biology (4)
BISC 102 - General Biology (4)

and at least two of

BISC 202 - Genetics (3)
BISC 204 - Introduction to Ecology (3)
BISC 205- Principles of Physiology (3)
MBB 222 - Molecular Biology and Biochemistry (3)
MBB 231 - Cellular Biology and Biochemistry (3)

and a minimum of 15 units, consisting of five upper division BISC courses (including MASC courses), as approved by the department

Residency Requirements and Transfer Credits

Students who transfer into the Biological Sciences Program from other institutions may count a maximum of 1 transfer course toward their upper division program requirements. Transfer students are encouraged to meet with the Undergraduate Advisor for further details.

Calendar Entry Change
Name of Program or Name of Faculty

Rationale for change: BISC 205 has been introduced as a new course in order to reduce the course load in BISC 101 and provide a strong background in Physiology needed for upper division courses in this field. The course is being added to the Lower Division requirements of this program as it is a pre-requisite for two of the elective 3rd year Physiology courses (BISC 305 and BISC 366)
Effective term and year: Spring 2021
The following program(s) will be affected by these changes: Environmental Toxicology Minor

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample.~~ All additions should be marked by a **bold.**

Environmental Toxicology Minor

This program provides a thorough overview of environmental toxicology. Students who complete this program will be more qualified and eligible for employment with various businesses, governmental and non-governmental agencies, and academia engaged in environmental monitoring, assessment, and research.

Students who are interested in an environmental toxicology minor should contact the department early.

Program Requirements

A 2.00 or higher grade point average (GPA) is required.

Lower Division Requirements

The following courses are required. Most students who are pursuing science degree programs will already have credit for most of these courses.

Students complete all of

BISC 101 - General Biology (4)
BISC 102 - General Biology (4)
BISC 204 - Introduction to Ecology (3)
BISC 205 – Principles of Physiology (3)
CHEM 121 - General Chemistry and Laboratory I (4)
CHEM 122 - General Chemistry II (2)
CHEM 126 - General Chemistry Laboratory II (2)
CHEM 281 - Organic Chemistry I (4)
MBB 222 - Molecular Biology and Biochemistry (3)
MBB 231 - Cellular Biology and Biochemistry (3)
STAT 201 - Statistics for the Life Sciences (3)

and one of

CHEM 282 - Organic Chemistry II (2)
CHEM 283 - Organic Chemistry IIb (3)

and one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Calculus I for the Biological Sciences (3)

and one of

MATH 152 - Calculus II (3)
MATH 155 - Calculus II for the Biological Sciences (3)

and one of

PHYS 101 - Physics for the Life Sciences I (3)
PHYS 120 - Mechanics and Modern Physics (3)
PHYS 125 - Mechanics and Special Relativity (3)
PHYS 140 - Studio Physics - Mechanics and Modern Physics (4)

and one of

PHYS 102 - Physics for the Life Sciences II (3)
PHYS 121 - Optics, Electricity and Magnetism (3)

PHYS 126 - Electricity, Magnetism and Light (3)
PHYS 141 - Studio Physics - Optics, Electricity and Magnetism (4)

Upper Division Requirements

Students complete both of

BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 313 - Environmental Toxicology: A Mechanistic Perspective (3)

and one of

BISC 305 - Animal Physiology (3)
BISC 366 - Plant Physiology (3)
BPK 305 - Human Physiology I (3)
BPK 306 - Human Physiology II (3)

and three of

BISC 309 - Conservation Biology (3)
BISC 435 - Introduction to Pest Management (3)
BISC 439 - Industrial Microbiology (4)
BISC 445 - Environmental Physiology of Animals (3)
CHEM 371 - Chemistry of the Aqueous Environment (3)
BPK 431 - Integrative Cancer Biology (3)
HSCI 304 - Perspectives on Human Health and the Environment (3)
HSCI 323 - Principles of Pharmacology and Toxicology (3)
REM 311 - Applied Ecology and Sustainable Environments (3)
REM 350 - Sustainable Energy and Materials Management (4)
REM 412 - Environmental Modeling (4)
REM 445 - Environmental Risk Assessment (4)

and their prerequisites. Students may receive permission to have the two HSCI 200 division course prerequisites waived for the HSCI courses (contact the Faculty of Health Sciences undergraduate program assistant). Students missing REM prerequisites for REM courses may apply to the REM undergraduate program assistant for **a** waiver.