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MEMORANDUM

ATTENTION:	Senate
FROM:	Elizabeth Elle, Vice-Chair, Senate Committee on Undergraduate Studies
RE:	Program Changes
DATE:	March 3, 2023

For information:

Acting under delegated authority at its meeting of March 2, 2023, SCUS approved the following curriculum revisions effective Fall 2023.

a. Faculty of Applied Sciences *(SCUS 23-34)*

1. School of Computing Science

(i) Lower division requirement changes to the:

- Computing Science Honours
- Computing Science Major

2. School of Mechatronic Systems Engineering

(i) Requirement changes to the Agriculture Technology (AgriTech) Concentration

- Mechatronic Systems Engineering Major
- Mechatronic Systems Engineering and Business Double Degree Program
- Mechatronic Systems Engineering Honours

b. Faculty of Arts and Social Sciences *(SCUS 23-35)*

1. Department of Economics

(i) Requirement changes to the:

- Economics Major
- Economics Minor
- Economics Extended Minor
- Economics Honours
- Business and Economics Joint Major
- Business and Economics Joint Honours
- Political Science and Economics Joint Major

2. Global Asia Program ***(SCUS 23-08(3)***

(i) Upper division requirement changes to the Global Asia Minor

3. Labour Studies Program

(i) Requirement changes to the:

- Labour Studies Major
- Labour Studies Minor
- Labour Studies Certificate in Workplace Rights

4. Department of Philosophy

(i) Requirement changes to the Philosophy Honours

5. Department of Sociology and Anthropology

(i) Requirement changes to the:

- Anthropology Major
- Anthropology Minor
- Anthropology Extended Minor
- Anthropology and Archaeology Joint Major
- Anthropology and Communication Joint Major
- Anthropology and Criminology Joint Major
- Anthropology and Gender, Sexuality, and Women's Studies Joint Major
- Anthropology and Sociology Joint Major
- Linguistics and Anthropology Joint Major
- Sociology Major
- Sociology Minor
- Sociology Extended Minor
- Sociology and Communication Joint Major
- Sociology and Criminology Joint Major
- Sociology and Gender, Sexuality, and Women's Studies Joint Major
- Anthropology Honours
- Sociology and Anthropology Joint Honours
- Sociology Honours

6. Department of World Languages and Literatures

(i) Requirement changes to the:

- Italian Studies Minor
- World Literature Honours
- World Literature Extended Minor
- World Literature Minor
- World Literature and History Joint Major
- World and Literature and International Studies Joint Major
- World Literature Major

c. Beedie School of Business *(SCUS 23-36)*

(i) Requirement changes for the Business and Geography Joint Major

(ii) Requirement changes to the Business Concentration

- Mechatronic Systems Engineering and Business Double Degree Program
- Business and Communication Joint Major
- Business and Economics Joint Major
- Business and Geography Joint Major
- Business and Psychology Joint Major
- Business, Philosophy and the Law Joint Major
- Information Systems in Business Administration and Computing Science Joint Major
- Interactive Arts and Technology and Business Joint Major BA or BBA
- Interactive Arts and Technology and Business Joint Major BSc
- Molecular Biology and Biochemistry and Business Administration Joint Major
- Sustainable Business Joint Major
- Business and Economics Joint Honours
- Molecular Biology and Biochemistry and Business Administration Joint Honours

(iii) Upper division requirement changes to the Human Resource Management Concentration:

- Business Major
- Business Honours

(iv) Upper division requirement changes to the Innovation and Entrepreneurship Concentration:

- Business Major
- Business Honours

(v)Program requirement changes to the Innovation and Entrepreneurship Certificate

(vi) Lower division requirement changes to the Sustainable Business Joint Major

(vii) Requirement changes to the:

- Business Major
- Business Honours
- Course Access Information and Grade Requirements

d. Faculty of Environment

1. Department of Geography

(i) Upper and lower division requirement changes to the Business and Geography Joint Major ***(SCUS 23-38)***

(ii) Upper and lower division requirement changes to the:

- Human Geography Major
- Human Geography Honours
- Global Environmental Systems Major
- Global Environmental Systems Honours

(iii) Lower division requirement changes to the:

- Physical Geography Major
- Physical Geography Honours

(iv) Upper division requirement changes to the Climate Change and Society Minor

2. School of Environmental Science ***(SCUS 23-39)***

(i) Requirement changes to the:

- Environmental Science Major
- Environmental Science Honours

e. Faculty of Science

1. Department of Biomedical Physiology and Kinesiology

(i) Requirement changes to the: ***(SCUS 23-41)***

- Kinesiology Major
- Kinesiology Honours
- Professional Kinesiology Certificate

2. Department of Chemistry ***(SCUS 23-42)***

(i) Upper and lower division requirement changes to the:

- Chemistry and Earth Sciences Joint Major
- Chemistry and Earth Science Joint Honours

3. Department of Statistics and Actuarial Science ***(SCUS 23-43)***

(i) Requirement changes to the:

- Actuarial Science Major
- Actuarial Science Honours

(ii) Upper and lower division requirement changes to the:

- Data Science Major
- Data Science Honours

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

PROGRAM MODIFICATION TEMPLATE

Calendar Entry Change
Name of Program or Name of Faculty

Rationale for change: Requiring our new computing-specific courses CMPT 210/STAT 271 in place of the MACM 201/STAT 270 stream.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: • Computing Science Honours • Computing Science 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.**

Computing Science Honours & Computing Science Major

Lower Division Requirements

[…]

Students complete all of

CMPT 105W - Social Issues and Communication Strategies in Computing Science (3)
CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 210 - Probability and Computing (3)
CMPT 225 - Data Structures and Programming (3)
CMPT 276 - Introduction to Software Engineering (3)
CMPT 295 - Introduction to Computer Systems (3)
MACM 101 - Discrete Mathematics I (3)
STAT 271 - Probability and Statistics for Computing Science (3)

~~and one of~~
~~CMPT 210 - Probability and Computing (3)~~

~~MACM 201 - Discrete Mathematics II (3)~~

and one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3) **
MATH 157 - Calculus I for the Social Sciences (3) **

and one of

MATH 152 - Calculus II (3)
MATH 155 - Mathematics for the Life Sciences II (3) **
MATH 158 - Calculus II for the Social Sciences (3) **

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3)

~~and one of~~

~~STAT 270 - Introduction to Probability and Statistics (3)~~
~~STAT 271 - Probability and Statistics for Computing Science (3)~~
** with a grade of at least B+, and with school permission.

Name of Program or Name of Faculty School of Mechatronic Systems Engineering (MSE) in the Faculty of Applied Sciences (FAS).
Rationale for change: BISC 106: Biology for Engineers has been recently approved at Senate. We wish to have this course as part of the new AgriTech Concentration, replacing BISC 100: Introduction to Biology. BISC 106 has been designed specifically for this concentration and to provide the knowledge and skills needed for Engineers who have an interest in biology.
Effective term and year: Fall, 2023
The following program(s) will be affected by these changes: Mechatronic Systems Engineering Major Mechatronic Systems Engineering and Business Double Degree Program Mechatronic Systems Engineering 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.**

Mechatronic Systems Engineering Major

Agriculture Technology (AgriTech) Concentration

This concentration is for students who wish to specialize in agriculture technology.

Students who choose this concentration will complete all of:

~~BISC 100 - Introduction to Biology~~
BISC 106 – Biology for Engineers
MSE 360- Introduction to Biosystems Engineering (3)
MSE 460 – Precision Agri-Tech Engineering (3)
MSE 480 – Manufacturing Systems (3)
SEE 351 - Bioprocess Engineering Systems (3)

Students do not need to complete the following from the program requirements:

MSE 311 - Introduction to Microelectromechanical Systems (3)

Students also complete three mechatronic systems engineering elective courses selected from a pre-approved MSE electives list instead of six courses.

Mechatronic Systems Engineering and Business Double Degree Program

Agriculture Technology (AgriTech) Concentration

This concentration is for students who wish to specialize in agriculture technology.

Students who choose this concentration will complete all of:

~~BISC 100 - Introduction to Biology~~
BISC 106 – Biology for Engineers
MSE 360- Introduction to Biosystems Engineering (3)
MSE 460 – Precision Agri-Tech Engineering (3)
MSE 480 – Manufacturing Systems (3)
SEE 351 - Bioprocess Engineering Systems (3)

Students do not need to complete the following from the program requirements:

MSE 311 - Introduction to Microelectromechanical Systems (3)

Students also complete three mechatronic systems engineering elective courses selected from a pre-approved MSE electives list instead of six courses.

Mechatronic Systems Engineering Honours

Agriculture Technology (AgriTech) Concentration

This concentration is for students who wish to specialize in agriculture technology.

Students who choose this concentration will complete all of:

~~BISC 100 - Introduction to Biology~~
BISC 106 – Biology for Engineers
MSE 360- Introduction to Biosystems Engineering (3)
MSE 460 – Precision Agri-Tech Engineering (3)
MSE 480 – Manufacturing Systems (3)
SEE 351 - Bioprocess Engineering Systems (3)

Students do not need to complete the following from the program requirements:
MSE 311 - Introduction to Microelectromechanical Systems (3)

Students also complete four mechatronic systems engineering elective courses selected from a pre-approved MSE electives list instead of six courses.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

PROGRAM MODIFICATION TEMPLATE

Name of Program or Name of Faculty Economics Major
Rationale for change: Replacing references to "Admission" with "Declaration" or "Entry" to be consistent with other FASS programs and SFU terminology generally: students are "admitted" to SFU whereas they "declare" specific programs at SFU. Also taking the opportunity to remove some old language: in actual practice there is no 'formal department application' and no 'appropriate documentation' filed. Students simply contact an advisor and indicate that they want to declare.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Economics 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.**

Economics Major

BACHELOR OF ARTS

~~Admission~~ **Declaration** Requirements

~~Program admission is limited. Entry is via a formal department application.~~ Students ~~may~~ **are eligible to** apply for ~~admission~~ **entry** to ~~a~~ **the** program once 30 units have been completed, ECON 201 is completed with at least a C- grade, ~~and~~ the minimum cumulative grade point average (CGPA) is met and the ECON program GPA is met.

The department announces the minimum CGPA below which students will not normally be considered for ~~admission~~ **entry** to ~~its programs~~ **the program**.

~~Applications with appropriate documentation should be filed with the~~ **Students should contact a** departmental advisor **to apply**. Students not accepted upon initial application may reapply.

...

Lower Division Requirements

Students complete the following prior to program ~~admission~~ **declaration** with at least a C- grade (unless otherwise indicated).

[...]

Name of Program or Name of Faculty Economics Minor
Rationale for change: Replacing references to "Admission" with "Declaration" or "Entry" to be consistent with other FASS programs and SFU terminology generally: students are "admitted" to SFU whereas they "declare" specific programs at SFU. Also taking the opportunity to remove some old language: in actual practice there is no 'formal department application' and no 'appropriate documentation' filed. Students simply contact an advisor and indicate that they want to declare.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Economics 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.**

Economics Minor

~~Admission~~ **Declaration** Requirements

~~Program admission is limited. Entry is via a formal department application.~~ Students ~~may~~ **are eligible to** apply for ~~admission~~ **entry** to the minor program once the minimum cumulative grade point average (CGPA) is met, the ECON program GPA is met, and they have completed

- 30 units
- ECON 103 - Principles of Microeconomics (4) with a minimum grade of C- or ECON 113 - Introduction to Microeconomics (3) with a minimum grade of A- on first attempt
- ECON 105 - Principles of Macroeconomics (4) with a minimum grade of C- or ECON 115 - Introduction to Macroeconomics (3) with a minimum grade of A- on first attempt

The department announces the minimum CGPA below which students will not normally be considered for ~~admission~~ **entry** to ~~its programs~~ **the program**.

~~Applications with appropriate documentation should be filed with the~~ **Students should contact a** departmental advisor **to apply**. Students not accepted upon initial application may reapply.

[...]

Name of Program or Name of Faculty Economics Extended Minor
Rationale for change: Replacing references to "Admission" with "Declaration" or "Entry" to be consistent with other FASS programs and SFU terminology generally: students are "admitted" to SFU whereas they "declare" specific programs at SFU. Also taking the opportunity to remove some old language: in actual practice there is no 'formal department application' and no 'appropriate documentation' filed. Students simply contact an advisor and indicate that they want to declare.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Economics Extended 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.**

Economics Extended Minor ~~Admission~~ **Declaration** Requirements ~~Program admission is limited. Entry is via a formal department application.~~ Students ~~may~~ **are eligible to** apply for ~~admission~~ **entry to the program** once 30 units have been completed, ECON 201 is completed with at least a C- **grade**, the minimum cumulative grade point average (CGPA) is met and the ECON program GPA is met. The department announces the minimum CGPA below which students will not normally be considered for ~~admission~~ **entry** to ~~its programs~~ **the program**. ~~Applications with appropriate documentation should be filed with the~~ **Students should contact a** departmental advisor **to apply**. Students not accepted upon initial application may reapply. … Lower Division Requirements

Students complete the following prior to program ~~admission~~ **declaration** with a minimum grade of C- (unless otherwise indicated).

[...]

Name of Program or Name of Faculty Economics Honours
Rationale for change: Replacing references to "Admission" with "Declaration" or "Entry" to be consistent with other FASS programs and SFU terminology generally: students are "admitted" to SFU whereas they "declare" specific programs at SFU. Also taking the opportunity to remove some old language: in actual practice there is no 'formal department application' and no 'appropriate documentation' filed. Students simply contact an advisor and indicate that they want to declare.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Economics 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.**

Economics Honours

BACHELOR OF ARTS

~~Admission~~ **Declaration** Requirements

~~Program admission is limited. Entry is via a formal department application.~~ Students ~~may~~ **are eligible to** apply for ~~admission~~ **entry** to ~~a~~ **the** program once 30 units have been completed, ECON 201 is completed with at least a C- grade, and the minimum cumulative grade point average (CGPA) is met and the ECON program GPA is met.

The department announces the minimum CGPA below which students will not normally be considered for ~~admission~~ **entry** to ~~its programs~~ **the program**.

~~Applications with appropriate documentation should be filed with the~~ **Students should contact a** departmental advisor **to apply**. Students ~~who are~~ not accepted upon initial application may reapply.

...

Lower Division Requirements

Students complete the following with at least a C- grade in each course prior to program ~~admission~~ **declaration**.

[...]

Name of Program or Name of Faculty
Business and Economics Joint Major

Rationale for change:
Replacing references to "Admission" with "Declaration" or "Entry" to be consistent with other FASS programs and SFU terminology generally: students are "admitted" to SFU whereas they "declare" specific programs at SFU.

Also taking the opportunity to remove some old language: in actual practice there is no 'formal department application' and no 'appropriate documentation' filed. Students simply contact an advisor and indicate that they want to declare.

Effective term and year: Fall 2023

The following program(s) will be affected by these changes:

Business and Economics 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.**

Admission Requirements

Economics ~~Admission~~ **Declaration** Requirements

~~Program admission is limited. Entry is via a formal department application.~~ Students ~~may~~ **are eligible to** apply for ~~admission~~ **entry** to ~~an economics~~ **the** program once 30 units have been completed, ECON 201 is completed with at least a C- grade, the minimum cumulative grade point average (CGPA) is met and the ECON program GPA is met.

The ~~economics department~~ **Department of Economics** announces the minimum CGPA below which students will not normally be considered for ~~admission~~ **entry** to ~~its programs~~ **the program**.

~~Applications with appropriate documentation should be filed with the~~ **Students should contact a** departmental advisor **to apply**. Students ~~who are~~ not accepted upon initial application may reapply.

[...]

Name of Program or Name of Faculty Business and Economics Joint Honours
Rationale for change: Replacing references to "Admission" with "Declaration" or "Entry" to be consistent with other FASS programs and SFU terminology generally: students are "admitted" to SFU whereas they "declare" specific programs at SFU. Also taking the opportunity to remove some old language: in actual practice there is no 'formal department application' and no 'appropriate documentation' filed. Students simply contact an advisor and indicate that they want to declare.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Business and Economics Joint 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.**

Economics ~~Admission~~ **Declaration** Requirements ~~Program admission is limited. Entry is via a formal department application.~~ Students ~~may~~ **are eligible to** apply for ~~admission~~ **entry** to ~~an economics~~ **the** program once 30 units have been completed, ECON 201 is completed with at least a C- grade, the minimum cumulative grade point average (CGPA) is met and the ECON program GPA is met. The ~~economics department~~ **Department of Economics** announces the minimum CGPA below which students will not normally be considered for ~~admission~~ **entry** to ~~its programs~~ **the program**. ~~Applications with appropriate documentation should be filed with the~~ **Students should contact a** departmental advisor **to apply**. Students ~~who are~~ not accepted upon initial application may reapply. [...]

Name of Program or Name of Faculty
Political Science and Economics Joint Major

Rationale for change:
Replacing references to "Admission" with "Declaration" or "Entry" to be consistent with other FASS programs and SFU terminology generally: students are "admitted" to SFU whereas they "declare" specific programs at SFU.

Also taking the opportunity to remove some old language: in actual practice there is no 'formal department application' and no 'appropriate documentation' filed. Students simply contact an advisor and indicate that they want to declare.

Effective term and year: Fall 2023

The following program(s) will be affected by these changes:

Political Science and Economics 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.**

~~Admission~~ **Declaration** Requirements

Economics ~~Admission~~ **Declaration** Requirements

~~Program admission is limited. Entry is via a formal department application.~~ Students ~~may~~ **are eligible to** apply for ~~admission~~ **entry** to ~~an economics~~ **the** program once 30 units have been completed, ECON 201 is completed with at least a C- grade, the minimum cumulative grade point average (CGPA) is met and the ECON program GPA is met.

The ~~economics department~~ **Department of Economics** announces the minimum CGPA below which students will not normally be considered for ~~admission~~ **entry** to ~~its programs~~ **the program**.

~~Applications with appropriate documentation should be filed with the~~ **Students should contact a** departmental advisor **to apply**. Students ~~who are~~ not accepted upon initial application may reapply.

...

Lower Division Economics Requirements

Prior to ~~admission to~~ **declaring** this joint major program, students complete, with a grade of at least C- (unless otherwise indicated), all of
[...]

SFU SENATE COMMITTEE ON UNDERGRADUATE STUDIES

PROGRAM MODIFICATION TEMPLATE

Calendar Entry Change
Global Asia, Faculty of Arts and Social Sciences

Rationale for change: we are adding two courses to the list of electives that students can take to fulfill their upper-division requirements for the GA minor: **Global Asia 388: Queer Global Asias** and **GSWS 388: Queer Global Asias**. Both are new courses being proposed this cycle and will sometimes be offered cross-listed.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Global Asia 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.**

Upper Division Requirements

…

TRANS-GLOBAL
[…]
GA 300 - Asians and North Americans in Public Discourse (3)
GA 301- Asia Canada Identities: Experiences and Perspectives (3)
GA 388 – Topics in Queer Global Asias (4)
GA 400 - Selected Topics in Asia-Canada Studies (3)
GSWS 312 - Immigrants, Women and Transnational Migration*
GSWS 388 – Topics in Queer Global Asias (4)
HIST 322 - Atlantic & Pacific Migration (4)
HIST 358 - Development, Aid and Difference in Historical Perspective (4)*

…

Calendar Entry Change

Labour Studies Major

Rationale for change: Providing clarity to students on how we calculate LBST course CGPA and CUDGPA (including all LBST courses completed at SFU) for graduation requirements.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Labour Studies 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.**

Program Requirements

[…]

Graduation Requirements:
In addition to the normal university degree requirements, the Labour Studies program requires a minimum 2.00 LBST cumulative grade point average (CGPA) (calculated on all LBST courses completed at SFU), and a minimum 2.00 LBST CUDGPA (calculated on all upper division LBST courses completed at SFU) for graduation with a Labour Studies Major.

Faculty of Arts and Social Sciences Degree Requirements

[…]

Calendar Entry Change

Labour Studies Minor

Rationale for change: Providing clarity to students on how we calculate LBST course CGPA and CUDGPA (including all LBST courses completed at SFU) for graduation requirements.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Labour Studies 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.**

Program Requirements

[…]

Graduation Requirements:
In addition to the normal university degree requirements, the Labour Studies program requires a minimum 2.00 LBST cumulative grade point average (CGPA) (calculated on all LBST courses completed at SFU), and a minimum 2.00 LBST CUDGPA (calculated on all upper division LBST courses completed at SFU) for graduation with a Labour Studies Minor.

Faculty of Arts and Social Sciences Degree Requirements

[…]

Calendar Entry Change
Name of Program or Name of Faculty

Rationale for change: This is to reflect the new course addition of LBST 401.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Labour Studies 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.**

Upper Division Requirements

Students complete a minimum of 30 units, including

LBST 301W - Labour Movements: Issues, Images and Popular Culture (3)

plus 21 units taken from the following

LBST 305 - Gendering Economy: Paid and Unpaid Labour (4)
LBST 306 - The Political Economy of Labour Markets: Critical and Radical Approaches (3)
LBST 307 - Unfree Labour and Modern Slavery: Understanding Coercion and Exploitation in Contemporary Labour Markets (3)
LBST 308 - The Labour Process: Technological Change and the Future of Work (3)
LBST 309 - Labour and Collective Bargaining (3)
LBST 310 - The Politics of Labour (3)
LBST 311 - Labour and the Environment (3)
LBST 312 - Global Labour Migration (3)
LBST 313 - Introduction to Canadian Labour Law (3)
LBST 328 - Labour Geographies (4) or GEOG 328 - Labour Geographies (4)
LBST 330 - Selected Topics in Labour Studies (3) *
LBST 331 - Selected Topics in Labour Studies (4) *

LBST 401 - How to make change: Community-labour organizing and action (4)
LBST 431 - Selected Topics in Labour Studies (4) *
[...]

Calendar Entry Change
Name of Program or Name of Faculty

Rationale for change: This is to reflect the new course addition of LBST 401.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Labour Studies Certificate in Workplace Rights

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.**

Program Requirements

Students complete a minimum of 18 units including
(...)
LBST 310 - The Politics of Labour (3)
LBST 311 - Labour and the Environment (3)
LBST 312 - Global Labour Migration (3)
LBST 330 - Selected Topics in Labour Studies (3) ***
LBST 331 - Selected Topics in Labour Studies (4) *
LBST 401 - How to make change: Community-labour organizing and action (4)
LBST 431 - Selected Topics in Labour Studies (4) *
POL 222 - Introduction to Canadian Politics (3)
POL 343 - Global Political Economy (4)
SA 321 - Social Movements (S) (4)
SA 340 - Social Issues and Social Policy Analysis (SA) (4)
SA 362 - Society and the Changing Global Division of Labour (S) (4)
(...)

Calendar Entry Change
Name of Program or Name of Faculty: Department of Philosophy

Rationale for change:

(1) We wish to create *Honours in Philosophy: Concentration in Law and Philosophy* — a version of the honours program corresponding to the popular *Major in Philosophy: Concentration in Law and Philosophy*. The two versions of the honours program will be substantially the same, though of course there will be some differences in the course requirements.

Effective term and year:
Fall 2023

The following program(s) will be affected by these changes:

Honours in Philosophy

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.**

Philosophy Honours

BACHELOR OF ARTS

Admission Requirements

Entering students must first complete 60 units including 12 upper division philosophy units, and must fulfil the lower division requirements as listed below.

A **cumulative** grade point average of 3.5 or higher in upper division philosophy courses, and a **cumulative** grade point average of 3.0 or higher in all philosophy courses, is required for entrance and continuance, but does not by itself guarantee acceptance or continuance.

To enrol, students should write to the Philosophy Department's Undergraduate Chair, who will provide an application form. The Philosophy Department's Undergraduate Curriculum Committee decides who is admitted to the program.

Program Requirements

Students complete 120 units, as specified below.

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.**

[...]
Upper Division Requirements
[...]
Each student's upper division philosophy courses should include at least three 400-level courses. (In exceptional cases, students in the Honours Program may be permitted to take one or more 800-level courses in place of an equal number of 400-level courses.)

Finally, honours students must complete with a grade B or higher
PHIL 479 - Honours Tutorial (3)

In PHIL 479, the student will work with a faculty supervisor to write an honours thesis. This will normally be a development of a paper previously written for a 400-level philosophy seminar, though in exceptional circumstances a paper from a 300-level philosophy course can be used. Optionally, PHIL 479 will culminate in a public presentation of the Honours Thesis, with audience Q&A.

Honours in Philosophy: Concentration in Law and Philosophy

A cumulative grade point average of 3.5 or higher in upper division philosophy courses, and a cumulative grade point average of 3.0 or higher in all philosophy courses, is required for entrance and continuance, but does not by itself guarantee acceptance or continuance.

To enrol, students should write to the Philosophy Department's Undergraduate Chair, who will provide an application form. The Philosophy Department's Undergraduate Curriculum Committee decides who is admitted to the program.

Students may qualify for this concentration by completing the philosophy honours lower division requirements listed above and the following upper division requirements.

Students must complete at least 48 philosophy upper division units, with a minimum philosophy cumulative grade point average (CGPA) of 3.0 and philosophy cumulative upper division grade point average (UDGPA) of 3.5 (calculated on all SFU PHIL courses), including

PHIL 326 - Topics in Law and Philosophy (3)
PHIL 329 - Law and Justice (3)

and at least two of

PHIL 320 - Social and Political Philosophy (3)
PHIL 321 - Topics in Moral Philosophy (3)
PHIL 322 - History of Ethics (3)
PHIL 327 - Global Health Ethics (3)
PHIL 328 - Environmental Philosophy (3)
PHIL 421W - Advanced Topics in Ethical Theory (4)

and at least two of

PHIL 302 - Topics in Epistemology and Metaphysics (3)
PHIL 341 - Philosophy of Science (3)
PHIL 343 - Topics in the Philosophy of Mind (3)
PHIL 344 - Topics in the Philosophy of Language (3)
PHIL 345W - Philosophy of Mathematics (3)
PHIL 350 - Ancient Philosophy (3)
PHIL 352 - 17th Century Philosophy (3)
PHIL 356 - 18th Century Philosophy (3)
PHIL 357 - Topics in the History of Philosophy (3)
PHIL 358 - 19th Century Philosophy (3)
PHIL 451W - Advanced Topics in the History of Philosophy (4)
PHIL 455W - Contemporary Issues in Epistemology and Metaphysics (4)

PHIL 300 may not be used to satisfy the upper division requirements of this program.

Each student's upper division philosophy courses should include at least three 400-level courses. (In exceptional cases, students in the Honours Program may be permitted to take one or more 800-level courses in place of an equal number of 400-level courses.)

Finally, honours students must complete with a grade B or higher

PHIL 479 - Honours Tutorial (3)

In PHIL 479, the student will work with a faculty supervisor to write an honours thesis. This will normally be a development of a paper previously written for a 400-level philosophy seminar, though in exceptional circumstances a paper from a 300-level philosophy course can be used. Optionally, PHIL 479 will culminate in a public presentation of the Honours Thesis, with audience Q&A.
[...]

Name of Program or Name of Faculty

Department of Sociology and Anthropology

Rationale for change:

Providing clarity to students on how we calculate SA course CGPA and CUDGPA (including all SA courses completed at SFU) for graduation requirements.

Effective term and year:

Fall 2023

The following program(s) will be affected by these changes:

Anthropology Major
Anthropology Minor
Anthropology Extended Minor
Anthropology and Archaeology Joint Major
Anthropology and Communication Joint Major
Anthropology and Criminology Joint Major
Anthropology and Gender, Sexuality, and Women's Studies Joint Major
Anthropology and Sociology Joint Major
Linguistics and Anthropology Joint Major
Sociology Major
Sociology Minor
Sociology Extended Minor
Sociology and Communication Joint Major
Sociology and Criminology Joint Major
Sociology and Gender, Sexuality, and Women's Studies 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.**

Anthropology Major, Extended Minor, Anthropology and Archaeology Joint Major, Anthropology and Communication Joint Major, Anthropology and Gender, Sexuality, and Women's Studies Joint Major; Anthropology and Sociology Joint Major; Linguistics and Anthropology Joint Major; Sociology Major, Extended Minor; Sociology and Communication Joint Major; Sociology and Gender, Sexuality, and Women's Studies Joint Major

Program Requirements
[...]
Graduation Requirements
In addition to the normal university degree requirements, the Department of Sociology and Anthropology requires a minimum 2.00 SA cumulative grade point average (CGPA) (calculated on all SA courses completed at SFU), and a minimum 2.00 SA CUDGPA (calculated on all upper division SA courses completed at SFU) for graduation with an SA program.
Faculty of Arts and Social Sciences Degree Requirements
[...]

Anthropology and Criminology Joint Major:

[...]

Graduation Requirements

Students must obtain a minimum grade of C- in all required courses. In addition to normal university grade point average requirements, the School of Criminology requires the following: for graduation, students must obtain a minimum 2.25 CGPA, 2.25 UDGPA, 2.25 criminology course CGPA (calculated on all CRIM courses completed at SFU), and 2.25 criminology course UDGPA (calculated on all upper division CRIM courses completed at SFU). **In addition to the normal university degree requirements, the Department of Sociology and Anthropology requires a minimum 2.00 SA cumulative grade point average (CGPA) (calculated on all SA courses completed at SFU), and a minimum 2.00 SA CUDGPA (calculated on all upper division SA courses completed at SFU) for graduation with an SA program.**

Anthropology Minor:

Program Requirements

SA GPA and UD GPA must be 2.0 or higher for admission to ~~and completion of~~ the program. In order to declare the minor, student must have completed or be enrolled in the last of the lower division requirements.

[...]

Graduation Requirements

In addition to the normal university degree requirements, the Department of Sociology and Anthropology requires a minimum 2.00 SA cumulative grade point average (CGPA) (calculated on all SA courses completed at SFU), and a minimum 2.00 SA CUDGPA (calculated on all upper division SA courses completed at SFU) for graduation with an SA program.

Faculty of Arts and Social Sciences Degree Requirements

[...]

Sociology and Criminology Joint Major:

[...]

Graduation Requirements

Students must obtain a minimum grade of C- in all required courses. In addition to normal university grade point average requirements, the School of Criminology requires the following: for graduation, students must obtain a minimum 2.25 CGPA, 2.25 UDGPA, 2.25 criminology course CGPA (calculated on all CRIM courses completed at SFU), and 2.25 criminology course UDGPA (calculated on all upper division CRIM courses completed at SFU).**In addition to the normal university degree requirements, the Department of Sociology and Anthropology requires a minimum 2.00 SA cumulative grade point average (CGPA) (calculated on all SA courses completed at SFU), and a minimum 2.00 SA CUDGPA (calculated on all upper division SA courses completed at SFU) for graduation with an SA program.**

Sociology Minor:

Program Requirements

SA GPA and UD GPA must be 2.0 or higher for admission to ~~and completion of~~ the program. In order to declare the minor, student must have completed or be enrolled in the last of the lower division requirements.

[...]
Graduation Requirements

In addition to the normal university degree requirements, the Department of Sociology and Anthropology requires a minimum 2.00 SA cumulative grade point average (CGPA) (calculated on all SA courses completed at SFU), and a minimum 2.00 SA CUDGPA (calculated on all upper division SA courses completed at SFU) for graduation with an SA program.

Faculty of Arts and Social Sciences Degree Requirements
[...]

Calendar Entry Change
Anthropology Honours
Sociology and Anthropology Joint Honours
Sociology Honours

Rationale for change: Providing clarity to students on how we calculate SA course CGPA and CUDGPA (including all SA courses completed at SFU) for graduation requirements.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Anthropology Honours Sociology and Anthropology Joint Honours Sociology 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.**

Graduation Requirements

~~Students must achieve an SA GPA and upper division CGPA of 3.33 to graduate from the honours program.~~ **In addition to the normal university degree requirements, the department of Sociology and Anthropology requires a minimum 3.33 SA cumulative grade point average (CGPA) (calculated on all SA courses completed at SFU), and a minimum 3.33 SA CUDGPA (calculated on all upper division SA courses completed at SFU) for graduation with an Honours program.**

Program Requirements

[…]

Name of Program or Name of Faculty: Department of World Languages and Literatures
Rationale for change: To clarify the language of WLL's calculation of Program GPA including CGPA and CUDGPA for degree requirements in the Academic Calendar
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: World Literature 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.**

Upper Division Requirements
[...]
plus 24 additional upper division WL units, of which at least eight must be taken at the 400 level

Grade Requirements

In addition to the normal university degree requirements, students must obtain a minimum 2.00 WL cumulative grade point average (CGPA) (calculated on all WL courses completed at SFU), and a minimum 2.00 WL CUDGPA (calculated on all upper division WL courses completed at SFU).

Name of Program or Name of Faculty:
Department of World Languages and Literatures
Rationale for change: To clarify the language of WLL's calculation of Program GPA (including CGPA and CUDGPA) for degree requirements in the Academic Calendar
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: World Literature and International Studies 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.**

Required Grades   Students must obtain C- or higher in all courses used toward the program. For graduation, students must obtain a minimum 2.00 CGPA, 2.00 UDGPA, 2.00 international studies subject CGPA (calculated on all IS courses completed at SFU), and 2.00 international studies subject UDGPA (calculated on all upper division IS courses completed at SFU).   **In addition to the normal university degree requirements, students must obtain a minimum 2.00 WL cumulative grade point average (CGPA) (calculated on all WL courses completed at SFU), and a minimum 2.00 WL CUDGPA (calculated on all upper division WL courses completed at SFU).**

Name of Program or Name of Faculty: Department of World Languages & Literatures
Rationale for change: To clarify the language of WLL's calculation of Program GPA (including CGPA and CUDGPA) for degree requirements in the Academic Calendar
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: World Literature and History 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.**

Upper Division Requirements
[...]
plus 12 additional upper division WL units, of which at least four must be taken at the 400 level

Grade Requirements

In addition to the normal university degree requirements, students must obtain a minimum 2.00 WL cumulative grade point average (CGPA) (calculated on all WL courses completed at SFU), and a minimum 2.00 WL CUDGPA (calculated on all upper division WL courses completed at SFU).

Name of Program or Name of Faculty: Department of World Languages and Literatures
Rationale for change: To clarify the language of WLL's calculation of Program GPA including CGPA and CUDGPA for degree requirements in the Academic Calendar
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: World Literature 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.**

Upper Division Requirements

Students complete a minimum total of 16 upper division units in WL courses, of which at least four must be taken at the 400 level.

Grade Requirements

In addition to the normal university degree requirements, students must obtain a minimum 2.00 WL cumulative grade point average (CGPA) (calculated on all WL courses completed at SFU), and a minimum 2.00 WL CUDGPA (calculated on all upper division WL courses completed at SFU).

Name of Program or Name of Faculty: Department of World Languages and Literatures
Rationale for change: To clarify the language of WLL's calculation of Program GPA including CGPA and CUDGPA for degree requirements in the Academic Calendar
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: World Literature Extended 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.**

Upper Division Requirements

Students complete a minimum total of 16 upper division units in WL courses, of which at least four must be taken at the 400 level.

Grade Requirements

In addition to the normal university degree requirements, students must obtain a minimum 2.00 WL cumulative grade point average (CGPA) (calculated on all WL courses completed at SFU), and a minimum 2.00 WL CUDGPA (calculated on all upper division WL courses completed at SFU).

Name of Program or Name of Faculty: Department of World Languages and Literatures
Rationale for change: To clarify the language of WLL's calculation of Program GPA including CGPA and CUDGPA for degree requirements in the Academic Calendar
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Italian Studies 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.**

Transfer Credits

Approved transfer credits for Italian courses completed at another post-secondary institution (subject to University transfer credit regulations) may be obtained up to a maximum of 6 units.

Grade Requirements

In addition to the normal university degree requirements, students must obtain a minimum 2.00 ITAL cumulative grade point average (CGPA) (calculated on all ITAL courses completed at SFU), and a minimum 2.00 ITAL CUDGPA (calculated on all upper division ITAL courses completed at SFU).

Name of Program or Name of Faculty: Department of World Languages and Literatures
Rationale for change: To clarify the language of WLL's calculation of Program GPA including CGPA and CUDGPA for degree requirements in the Academic Calendar
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: World Literature 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.**

Study Abroad

Students are encouraged to study abroad, through field schools or exchanges. World literature major students may complete up to 15 upper division units at other universities or other universities' field schools and exchanges with prior approval. Submit the relevant course description to the world languages and literatures advisor well in advance of the course.

Grade Requirements

In addition to the normal university degree requirements, students must obtain a minimum 3.67 WL cumulative grade point average (CGPA) (calculated on all WL courses completed at SFU), a minimum 3.67 WL CUDGPA (calculated on all upper division WL courses completed at SFU), and a minimum 3.33 overall cumulative grade point average (CGPA) and upper division CGPA.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

PROGRAM MODIFICATION TEMPLATE

Name of Program or Name of Faculty Beedie School of Business
Rationale for change: The Business and Geography Joint Major was created a while ago, and over the past decade it has had very low numbers of students. The concept of this joint major should be appealing for students, but the perceived number of units to complete the major, along with an outdated and unfocused Geography component underlie the lack of student uptake. The changes on the business components are in support/alignment to the changes occurring on the geography components. The goal is to enhance Business education by adding Geographic elements of Social Responsibility and Justice, Spatial Analysis Innovation achievable from modern Geographic Information Systems, and Global Perspectives from geographic views of our modern world. Business and Geography are optimistic that the revised version of this joint major being proposed will be more attractive to students.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Business and Geography 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.**

BUSINESS LOWER DIVISION REQUIREMENTS Students must complete all of BUS 217W - Critical Thinking in Business (3) BUS 237 - Introduction to Business Technology Management (3) BUS 251 - Financial Accounting I (3) BUS 254 - Managerial Accounting I (3) BUS 272 - Behaviour in Organizations (3)

and one of

BUS 232 - Business Statistics (3)
ECON 233 - Introduction to Economic Data and Statistics (3)
GEOG 251 - Quantitative Geography (3)
STAT 270 - Introduction to Probability and Statistics (3)

and one of

BUS 207 - Managerial Economics (3)
ECON 201 - Microeconomic Theory I: Competitive Behavior (4)

and one of

ECON 103 - Principles of Microeconomics (4)
ECON 113 - Introduction to Microeconomics (3)

and one of

ECON 105 - Principles of Macroeconomics (4)
ECON 115 - Introduction to Macroeconomics (3)

and one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

and one of*

ENGL 111W - Literary Classics in English (3)
ENGL 112W - Literature Now (3)
ENGL 113W - Literature and Performance (3)
ENGL 114W - Language and Purpose (3)
ENGL 115W - Literature and Culture (3)
ENGL 199W - Writing to Persuade (3)
GEOG 266W - Geography in Practice (3)
PHIL 100W - Knowledge and Reality (3)
PHIL 105 - Critical Thinking (3)
PHIL 110 - Introduction to Logic and Reasoning (3)
PHIL 120W - Moral and Legal Problems (3)
PHIL 150 - Great Works in the History of Philosophy (3)

WL 101W - Writing in World Literature (3)
WL 103W - Early World Literatures (3)
WL 104W - Modern World Literatures (3)
WL 105W - World Literature Lab (3)

[…]

Name of Program or Name of Faculty

Beedie School of Business

Rationale for change:

Many joint major programs are undergoing reviews and updates and from this as well as advisor feedback, there is unclarity around student's concentration requirements in the programs listed below. These programs do not require the completion of a business concentration and the adjusted wording should assist in clarifying.

Effective term and year:

Fall 2023

The following program(s) will be affected by these changes:

- Mechatronic Systems Engineering and Business Double Degree Program
- Business and Communication Joint Major
- Business and Economics Joint Major
- Business and Geography Joint Major
- Business and Psychology Joint Major
- Business, Philosophy and the Law Joint Major
- Information Systems in Business Administration and Computing Science Joint Major
- Interactive Arts and Technology and Business Joint Major BA or BBA
- Interactive Arts and Technology and Business Joint Major BSc
- Molecular Biology and Biochemistry and Business Administration Joint Major
- Sustainable Business Joint Major
- Business and Economics Joint Honours
- Molecular Biology and Biochemistry and Business Administration Joint Honours

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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.**

Business Concentration ~~Requirement~~

[…]

Name of Program or Name of Faculty

Beedie School of Business

Rationale for change:

To remove BUS 432 as an accepted course for the MOS concentration. This course no longer aligns with the focus of our concentration.

Remove the option paths from the Calendar, as they only reflect recommendations that are not required by students. No other concentration presents these recommendations. We will continue presenting these options on the Beedie website.

Effective term and year:
Fall 2023

The following program(s) will be affected by these changes:

Business Major
Bachelor 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.**

Business Major

Human Resource Management

For this concentration, students complete both of

BUS 374 - Organization Theory (3)
BUS 381 - Introduction to Human Resource Management (3)

and three of

~~BUS 432 - International Human Resource Management (3)~~
BUS 481 - Recruitment and Selection (3)
BUS 482 - Performance Management (3)
BUS 483 - Introduction to Employment Law For Business (3)

BUS 484 - Employment Systems (3)
BUS 485 - Negotiations and Conflict Management (3)
BUS 486 - Leadership (3)
BUS 487 - Organizational Development and Change Management (3)
BUS 488 - Group Dynamics and Teamwork (3)
BUS 489 - Management Practices for Sustainability (3)
BUS 490 - Selected Topics in Business Administration (1) **
BUS 491 - Selected Topics in Business Administration (2) **
BUS 492 - Selected Topics in Business Administration (3) **
BUS 493 - Selected Topics in Business Administration (3) **
BUS 494 - Selected Topics in Business Administration (3) **
BUS 495 - Selected Topics in Business Administration (4) **

~~***OPTION A***~~

~~It is recommended that students who wish to become a personnel specialist in a human resource function complete three of~~

~~BUS 432 - International Human Resource Management (3)~~
~~BUS 481 - Recruitment and Selection (3)~~
~~BUS 482 - Performance Management (3)~~
~~BUS 484 - Employment Systems (3)~~
~~***OPTION B***~~

~~It is recommended that students who wish to develop skills in managing people, including employment systems design, change and organizational leadership, complete three of~~

~~BUS 485 - Negotiations and Conflict Management (3)~~
~~BUS 486 - Leadership (3)~~
~~BUS 487 - Organizational Development and Change Management (3)~~
~~BUS 488 - Group Dynamics and Teamwork (3)~~
~~BUS 489 - Management Practices for Sustainability (3)~~

** When offered as a selected topics course in Human Resource Management.

Business Honours

For this concentration, students complete both of

BUS 374 - Organization Theory (3)
BUS 381 - Introduction to Human Resource Management (3)

and three of

~~BUS 432 - International Human Resource Management (3)~~
BUS 481 - Recruitment and Selection (3)
BUS 482 - Performance Management (3)
BUS 483 - Introduction to Employment Law For Business (3)
BUS 484 - Employment Systems (3)
BUS 485 - Negotiations and Conflict Management (3)
BUS 486 - Leadership (3)
BUS 487 - Organizational Development and Change Management (3)
BUS 488 - Group Dynamics and Teamwork (3)
BUS 489 - Management Practices for Sustainability (3)
BUS 490 - Selected Topics in Business Administration (1) **
BUS 491 - Selected Topics in Business Administration (2) **
BUS 492 - Selected Topics in Business Administration (3) **
BUS 493 - Selected Topics in Business Administration (3) **
BUS 494 - Selected Topics in Business Administration (3) **
BUS 495 - Selected Topics in Business Administration (4) **

~~***OPTION A***~~

~~It is recommended that students who wish to become a personnel specialist in a human resource function complete three of~~

~~BUS 432 - International Human Resource Management (3)~~
~~BUS 481 - Recruitment and Selection (3)~~
~~BUS 482 - Performance Management (3)~~
~~BUS 483 - Introduction to Employment Law For Business (3)~~
~~BUS 484 - Employment Systems (3)~~

~~***OPTION B***~~

~~It is recommended that students who wish to develop skills in managing people, including employment systems design, change and organizational leadership, complete three of~~

~~BUS 485 - Negotiations and Conflict Management (3)~~
~~BUS 486 - Leadership (3)~~
~~BUS 487 - Organizational Development and Change Management (3)~~
~~BUS 488 - Group Dynamics and Teamwork (3)~~
~~BUS 489 - Management Practices for Sustainability (3)~~

** When offered as a selected topics course in Human Resource Management.

Name of Program or Name of Faculty Beedie School of Business
Rationale for change: The addition of BUS 39X to the concentration is to foster innovative course offerings in partnership between faculties. This recognizes intersections of innovation & entrepreneurship and provides a variety of options for students to study.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Business Major Business 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.**

Areas of Concentration Students choose one or more of the following areas of concentration and complete all the requirements as specified below. […] Innovation and Entrepreneurship For this concentration, students complete all of BUS 314 - Resourcing New Ventures (3) BUS 338 - Foundations of Innovation (3) BUS 361 - Project Management (3) BUS 477 - Startup Experience (4) and one of

BUS 339 - Make Change Studio II - Iteration and Prototyping (4)
BUS 394 – Selected Topics in Business Administration (3) **
BUS 395 – Selected Topics in Business Administration (3) **
BUS 406 - Startup Accelerator (3)
BUS 443 - New Product Development and Design (3)
BUS 450 - Managing Emerging Opportunities (3)
BUS 453 - Sustainable Innovation (3)
BUS 490 - Selected Topics in Business Administration (1) **
BUS 491 - Selected Topics in Business Administration (2) **
BUS 492 - Selected Topics in Business Administration (3) **
BUS 493 - Selected Topics in Business Administration (3) **
BUS 494 - Selected Topics in Business Administration (3) **
BUS 495 - Selected Topics in Business Administration (4) **

** When offered as a selected topics course in innovation and entrepreneurship.

Name of Program or Name of Faculty Beedie School of Business
Rationale for change: In Fall 2022 a new core course, BUS 240 Introduction to Innovation, was approved and added to the BBA to support the innovation pillar of our vision and provides the foundation for our innovation learning goal. In Fall 2023 it becomes a core requirement to the BBA, and as it aligns to the learning objectives of the certificate, it makes sense to include here as well. The addition of BUS 39X is to align with the intent of this certificate as it was passed by Senate in 2015. The certificate is a partnership between many faculties and its collaborative design focuses on intersections of innovation & entrepreneurship to provide a variety of options for students to study from across the university.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Innovation and Entrepreneurship – Certificate

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.**

Innovation and Entrepreneurship

CERTIFICATE

Admission Requirements

A student in any faculty at SFU may declare this certificate through the Beedie School of Business.

Limitations

Units applied to one certificate may be applied also to major or minor programs of a bachelor's degree under the normal regulations governing those programs but may not be applied to another Simon Fraser University certificate or diploma.

Grade Requirements

In addition to normal university grade point average requirements, the Beedie School of Business requires a minimum 2.30 overall SFU Business course grade point average for entry into all 300 and 400 division business courses.

For a course to be accepted as fulfilling a prerequisite, or for a lower division requirement, or for a core course to be accepted in a student's program in business, a student must have obtained a minimum grade of C- (C minus).

A minimum grade point average of 2.00 calculated on all courses applied towards the certificate is required for graduation from a business certificate.

Program Requirements

Students must complete the following, including foundational business courses, a capstone course, and additional coursework from a variety of disciplines.

Core Courses

Students complete one of

BUS 240 – Introduction to Innovation (3)
BUS 238 – Introduction to Entrepreneurship and Innovation (3)

~~Students will complete~~ **and** all of

~~BUS 238 - Introduction to Entrepreneurship and Innovation (3)~~
BUS 314 - Resourcing New Ventures (3)
BUS 338 - Foundations of Innovation (3)
BUS 361 - Project Management (3)

and one of*

BUS 477 - Startup Experience (4)
ENV 495 - Environmental Capstone (4) **
HSCI 495 - Applied Health Science Project (4)

IAT 430 - Make Change Studio III: Refinement and Production (3) ^ and BUS 476 - Make Change Studio IV - Promotion, Packaging and Launch - Launching a Design-Led Business (4) ^
IAT 499 - Graduation Project (6)
MSE 410 - Capstone Design Technical Project I (3) ^^ and MSE 411 - Capstone Design Technical Project II (3) ^^

Elective Coursework

Students# will complete two of*

BISC 373 - Brewing Science (3)
BUS 291 - Selected Topics in Business Administration (3) ***
BUS 292 - Selected Topics in Business Administration (3) ***
BUS 339 - Make Change Studio II - Iteration and Prototyping (4)
BUS 394 – Selected Topics in Business Administration (3) ***
BUS 395 – Selected Topics in Business Administration (3) ***
BUS 406 - Startup Accelerator (3)
BUS 443 - New Product Development and Design (3)
BUS 450 - Managing Emerging Opportunities (3)
BUS 453 - Sustainable Innovation (3)
BUS 490 - Selected Topics in Business Administration (1) ***
BUS 491 - Selected Topics in Business Administration (2) ***
BUS 492 - Selected Topics in Business Administration (3) ***
BUS 493 - Selected Topics in Business Administration (3) ***
BUS 494 - Selected Topics in Business Administration (3) ***
BUS 495 - Selected Topics in Business Administration (4) ***
CA 381 - Thriving as a Cultural Entrepreneur (3)
CMNS 425 - Applied Communication for Social Issues (4)
CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 320 - Social Implications - Computerized Society (3)
HSCI 130 - Foundations of Health Science (4)
HSCI 305 - The Canadian Health System (3)
HSCI 312 - Health Promotion: Individuals and Communities (3)
IAT 330 - Make Change Studio I: Introduction (3)
IAT 333 - Interaction Design Methods (3)
IAT 431 - Speculative Design (3)
IAT 481 - Special Topics in Interactive Arts and Technology (Science) (3)
MSE 110 - Mechatronics Design I (3) or MSE 111 - Mechatronics for non-Engineers (3)
POL 150 - Science, Policy, and Innovation (3)
POL 457W - Technology and Innovation Policy (4)
PUB 101 - Publication of Self in Everyday Life (3)
PUB 201 - The Publication of Professional Self (3)
PUB 212 - Public Relations and Public Engagement (3)

PUB 456 - Institutional and International Event Planning and Management (4)

Students completing a bachelor of business administration may not use business courses to meet the requirements of this section.

* Substitutions with appropriate course content may be possible with permission from the Beedie School of Business.

** ENV 495 will only count toward this certificate when offered as part of Change Lab. Students are to consult with a Faculty of Environment advisor before enrolling in this course.

*** When offered as a selected topics course in innovation and entrepreneurship.

^ Make Change Studio

^^ Technology Entrepreneurship @ SFU

Name of Program or Name of Faculty Beedie School of Business
Rationale for change: In Fall 2022 a new core course, BUS 275 Business in a Sustainable Society, was approved and added to the BBA to support the responsibility pillar of our vision and provides the foundation for our responsibility learning goal. In Fall 2023 it becomes a core requirement to the BBA. In consultation with the Faculty of Environment it aligns to the learning objectives of the joint major and will be included here as well.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Sustainable Business 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.**

Sustainable Business Joint Major

BACHELOR OF BUSINESS ADMINISTRATION OR BACHELOR OF ENVIRONMENT

[...]

Lower Division Requirements

Students complete all of

Business Lower Division Requirements

Students must complete all of

BUS 217W - Critical Thinking in Business (3)
BUS 251 - Financial Accounting I (3)
BUS 254 - Managerial Accounting I (3)

BUS 272 - Behaviour in Organizations (3)
BUS 275 – Business in a Sustainable Society (3)

and one of

BUS 232 - Business Statistics (3)
ECON 233 - Introduction to Economic Data and Statistics (3)
REM 225 - Quantitative Toolkit for Social-Ecological Systems (3)
STAT 270 - Introduction to Probability and Statistics (3)

and one of

BUS 237 - Introduction to Business Technology Management (3)
GEOG 255 - Geographical Information Science I (3)

and one of

ECON 103 - Principles of Microeconomics (4)
ECON 113 - Introduction to Microeconomics (3)

and one of

ECON 105 - Principles of Macroeconomics (4)
ECON 115 - Introduction to Macroeconomics (3)

and one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

[…]

Name of Program or Name of Faculty

Beedie School of Business

Rationale for change:

The current requirements for the Accounting concentration have become a barrier to entry. They are being adjusted to what they were prior to the introduction of the Honours program in 2008. Further, this change allows students who may not wish to become professional accountants a more accessible pathway through the accounting concentration.

Effective term and year:

Fall 2023

The following program(s) will be affected by these changes:

- Business Bachelor of Business Administration – Major
- Business Bachelor of Business Administration – Honours
- Course Access Information and Grade Requirements https://www.sfu.ca/students/calendar/faculties-research/faculty-business/course-access-info-and-grade-requirements.html

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.**

Business Major
Business Honours

Area of Concentration

Students choose one or more of the following areas of concentration and complete all the requirements as specified below.

Accounting

~~Admission to this concentration requires a cumulative grade point average of 2.70 or higher. Students may apply once they have completed their lower division requirements and have either completed or enrolled in BUS 320. Students must have a minimum grade of C+ in BUS 320 before they are admitted to the concentration and BUS 320 may be repeated once for admission. Only students admitted to this concentration will be permitted to~~

~~enroll in upper division (300- and 400-level) accounting courses required for this concentration (with the exception of BUS 320).~~

[…]

and at least ~~two~~ **one*** of

BUS 420 - Advanced Accounting (3)
BUS 424 - Advanced Managerial Accounting (3)
BUS 426 - Auditing and Assurance: Concepts and Methods (3)
BUS 428 - Forensic Accounting and Data Analytics (3)
BUS 490 - Selected Topics in Business Administration (1) **
BUS 491 - Selected Topics in Business Administration (2) **
BUS 492 - Selected Topics in Business Administration (3) **
BUS 493 - Selected Topics in Business Administration (3) **
BUS 494 - Selected Topics in Business Administration (3) **
BUS 495 - Selected Topics in Business Administration (4) **

* Must be completed at SFU.

** When offered as a selected topics course in accounting.

[…]

Course Access Information and Grade Requirements

Information About Access to Business Courses
[…]
Registration in BUS 300, ~~BUS 320,~~ BUS 360W, and BUS 496 is limited to students who are in a business major, joint major, honours, or joint honours program, or as indicated below.

~~***ACCOUNTING STUDENTS***~~
~~Only business students admitted to the Accounting concentration will be permitted to enroll in upper division (300- and 400-level) accounting courses (with the exception of BUS 320).~~

[…]

SFU SENATE COMMITTEE ON UNDERGRADUATE STUDIES

PROGRAM MODIFICATION TEMPLATE

Calendar Entry Change
Name of Program or Name of Faculty – Department of Geography / Faculty of Environment

Rationale for change: The Business and Geography Joint Major was created a while ago, and over the past decade has had very low numbers of students. We think the concept of this joint major should be quite appealing for students, but the perceived number of units to complete the major, along with an outdated and unfocused Geography component may underlie the lack of student uptake. The geography component in this revision has been revised to enhance Business education by adding Geographic elements of Social Responsibility and Justice, Spatial Analysis Innovation achievable from modern Geographic Information Systems, and Global Perspectives from geographic views of our modern world. We have also clarified that in the case of joint majors with Business, the upper division Business concentrations normally required for the general Business degree, are an optional rather than a strictly required element. We think the prior Calendar entry was unclear and created a perception that the upper division stream was a firm requirement for the joint major, and thus, may have dissuaded some students from taking this joint major because of the number of units that would be involved. We are optimistic that the revised version of this joint major being proposed will now be more attractive to students.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Business and Geography Joint Major **Requesting title change to: Geo Business (Business and Geography) 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.**

[…] GEOGRAPHY LOWER DIVISION REQUIREMENTS ~~Students are required to successfully complete a minimum of 15 lower division geography units including~~ ~~GEOG 100 - Our World: Introducing Human Geography (3)~~ ~~GEOG 111 - Earth Systems (3)~~ ~~GEOG 221 - Economic Worlds (3)~~

~~and six units from any lower division GEOG courses.~~

Students must complete all of

GEOG 111 - Earth Systems (3)
GEOG 162 – Canada (3)
GEOG 255 - Geographical Information Science I (3)

and one of
GEOG 100 - Our World: Introducing Human Geography (3)
GEOG 161 - Urban Change: An Introduction to Dynamic Places (3)

and one of
GEOG 104 – Climate Change, Water & Society (3)
GEOG 118 – The Water Planet (3)

and two of
BUS 275 - Business in a Sustainable Society (3)
GEOG 221 - Economic Worlds (3)
GEOG 241 – People, Place, Society (3)
GEOG 261 – Encountering the City (3)

and two of
ARCH 286 - Cultural Heritage Management (4)
INDG 101 - Introduction to Indigenous Studies (3)
INDG 286 - Indigenous Peoples and British Columbia: An Introduction (3)
REM 207 - Indigenous People and Resource Management (3)

Upper Division Requirements

BUSINESS CORE COURSES

Students complete all of

BUS 303 - Business, Society and Ethics (3)
BUS 312 - Introduction to Finance (3)
BUS 343 - Introduction to Marketing (3)
BUS 393 - Commercial Law (3)
BUS 478 - Strategy (3) ^

and one of

BUS 374 - Organization Theory (3)
BUS 381 - Introduction to Human Resource Management (3)

BUS 360W is recommended but not required. BUS 360W will be waived as a prerequisite for 400 division business courses for those in approved business joint programs, provided that an alternative approved upper division W course is in progress, or has been completed. Students should consult with a Beedie School of Business Academic Advisor for further information on obtaining a waiver.

BUS 360W must be completed at Simon Fraser University in accordance with the WQB requirements.

^ Must be completed at Simon Fraser University.

BUSINESS 400 DIVISION REQUIREMENTS

Students must complete at least one 400 division BUS course, worth a minimum of three units (excluding BUS 478 and practicum courses).

BUSINESS CONCENTRATION ~~REQUIREMENT~~

Students may choose to complete one or more business concentrations by meeting the concentration requirements listed on the business major page of the calendar.

GEOGRAPHY UPPER DIVISION REQUIREMENTS

~~Students are required to successfully complete a minimum of 24 units of upper division geography courses including~~

~~12 units at the 300 division courses~~
~~12 units at the 400 division courses~~

Students are required to successfully complete a minimum of 24 units of upper division geography courses to expand their understanding in the areas of spatial innovation, social responsibility and justice, and global perspectives, as follows.

Students must complete
GEOG 355 - Geographical Information Science II (4)

and one of
GEOG 325 - Geographies of Consumption (4)
GEOG 364 – Cities and Crisis (4)

and one of

GEOG 321 - Geographies of Global Capitalism (4)
GEOG 333 – Climate Crisis: Understanding a World on Fire (4)
GEOG 389W – Nature and Society (4)

Students must also complete an additional three courses from any of the following course groupings. Courses that appear both in the required options above and in the course groupings below cannot be double counted towards the degree.

SPATIAL INNOVATION

BUS 336 - Data and Decisions II (4)
GEOG 351 - Multimedia Cartography (4)
GEOG 352 - Spatial Analysis (4)
GEOG 356 - 3D Geovisualization (4)
GEOG 451 - Spatial Modeling (4)
GEOG 455/455W - Theoretical and Applied GIS (4)
GEOG 457 - Geovisualization Interfaces (4)

SOCIAL RESPONSIBILITY AND JUSTICE

GEOG 324 - Geography of Transportation (4)
GEOG 325 - Geographies of Consumption (4)
GEOG 328 - Labour Geographies (4)
GEOG 340 – Queer Geographies (4)
GEOG 362W - Geography of Urban Built Environments (4)
GEOG 363 - Urban Planning and Policy (4)
GEOG 364 – Cities and Crisis (4)
GEOG 365 – Race, Resistance and Urban Space (4)
GEOG 385 - Food and the City (4)
GEOG 387 - Geography and Gender (4)
GEOG 421 Geographical Political Economy (4)
GEOG 424 - Cities, Transportation, Infrastructure (4)
GEOG 440 - Property, Land, Society (4)
GEOG 486 - Health Care Geographies (4)
INDG 433 - Indigenous Environmental Justice and Activism (4)

GLOBAL PERSPECTIVES

GEOG 321 - Geographies of Global Capitalism (4)
GEOG 333 – Climate Crisis: Understanding a World on Fire (4)
GEOG 381/381W - Territory, Power, State (4)
GEOG 382 - World on the Move (4)
GEOG 386 - Health Geography (4)
GEOG 389W – Nature and Society (4)

GEOG 423 - Capitalist Natures (4)
GEOG 429 - Racial Capitalism and Beyond (4)
GEOG 442 - A World of Cities (4)
GEOG 465 - Geographies of Conquest and Liberation (4)
GEOG 497 - International Field Study (5)

Calendar Entry Change
Name of Program or Name of Faculty – Department of Geography / Faculty of Environment

Rationale for change: Course scheduling constraints can make it challenging for students to complete the lower division requirements of the Human Geography Major and Honours degrees in a timely fashion. The proposed course additions provides more flexibility in the choice of lower division courses and also provide more choice in indigenous content in the degrees, while maintaining the integrity of the program. Course scheduling constraints also make it challenging for students to complete the upper division requirements of the Human Geography Major and Honours degrees in a timely fashion. The proposed course addition in the upper division provides more flexibility in the choice of courses, while maintaining the integrity of the program.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: BA Human Geography Major BA Human 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.**

…
Lower Division Requirements

Students complete all of
~~GEOG 100 - Our World: Introducing Human Geography (3)~~
GEOG 111 - Earth Systems (3)
GEOG 221 - Economic Worlds (3)
GEOG 241 - People, Place, Society (3)
GEOG 261 - Encountering the City (3)
GEOG 266W - Geography in Practice (3)

and one of
GEOG 100 - Our World: Introducing Human Geography (3)
GEOG 161 - Urban Change: An Introduction to Dynamic Places (3)

and one of

GEOG 213 - Introduction to Geomorphology (3)
GEOG 214 - Weather and Climate (3)
GEOG 215 - The Biosphere (3)

and both of
GEOG 251 - Quantitative Geography (3)
GEOG 255 - Geographical Information Science I (3)

and one of
INDG 101 - Introduction to Indigenous Studies (3)
INDG 286 - Indigenous Peoples and British Columbia: An Introduction (3)
REM 207 - Indigenous People and Resource Management (3)

Upper Division Requirements
[...]

Urbanization & Urbanism (choose 2)
GEOG 324 - Geography of Transportation (4)
GEOG 362W - Gentrification and Urban Change (4)
GEOG 363 - Urban Planning and Policy (4)
GEOG 364 - Cities and Crisis (4)
GEOG 365 - Race, Resistance and Urban Space (4)
GEOG 385 - Food and the City (4)
GEOG 424 - Cities, Transportation, Infrastructure (4)
GEOG 442 - A World of Cities (4)
GEOG 449 - City and Environment (4)
GEOG 461 - Urban Change Studio (6)

plus an additional 12 upper division units from any of the three lists above.

[...]

Calendar Entry Change
Name of Program or Name of Faculty – Department of Geography / Faculty of Environment

Rationale for change: Course scheduling constraints can make it challenging for students to complete the lower division requirements of the Global Environmental Systems Major and Honours degrees in a timely fashion. The proposed course addition provides more flexibility in the choice of lower division courses that provide indigenous content in the degrees, while maintaining the integrity of the program. Course scheduling constraints also make it challenging for students to complete the upper division requirements of the Global Environmental Systems Major and Honours degrees in a timely fashion. The proposed course addition in the upper division is a new course that provides more flexibility in the choice of courses, while maintaining the integrity of the program.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: BEnv Global Environmental Systems Major BEnv Global Environmental Systems 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.**

… Lower Division Requirements Students complete all of GEOG 100 - Our World: Introducing Human Geography (3) GEOG 111 - Earth Systems (3) GEOG 214 - Weather and Climate (3) GEOG 215 - The Biosphere (3) GEOG 255 - Geographical Information Science I (3) GEOG 266W - Geography in Practice (3) REM 221 - Systems Thinking and the Environment (4) and one of EVSC 100 - Introduction to Environmental Science (3) GEOG 104 - Climate Change, Water, and Society (3)

REM 100 - Global Change (3)

and one of
GEOG 251 - Quantitative Geography (3)
STAT 201 - Statistics for the Life Sciences (3)
STAT 203 - Introduction to Statistics for the Social Sciences (3)
STAT 205 - Introduction to Statistics (3)

and one of
ARCH 286 - Cultural Heritage Management (3)
INDG 101 - Introduction to Indigenous Studies (3)
INDG 286 - Indigenous Peoples and British Columbia: An Introduction (3)
REM 207 - Indigenous People and Resource Management (3)

and one of
GEOG 221 - Economic Worlds (3)
GEOG 241 - People, Place, Society (3)
GEOG 261 - Encountering the City (3)
Upper Division Requirements
[...]
Socio-economic and Political Systems (choose one)
ARCH 389 - Ethnoecology (3)
GEOG 304 - Geography of Wine (4)
GEOG 321 - Geographies of Global Capitalism (4)
GEOG 325 - Geographies of Consumption (4)
GEOG 327 - Geography of Tourism (4)
GEOG 333 - Climate Crisis: Understanding a World on Fire (4)
GEOG 340 - Queer Geographies (4)
GEOG 362W - Gentrification and Urban Change (4)
GEOG 363 - Urban Planning and Policy (4)
GEOG 365 - Race, Resistance and Urban Space (4)
GEOG 377 - Environmental History (4)
GEOG 381W - Territory, Power, State (4)
GEOG 382 - World on the Move (4)
GEOG 386 - Health Geography (4)
GEOG 387 - Geography and Gender (4)
GEOG 421 - Geographical Political Economy (4)
GEOG 423 - Capitalist Natures (4)
GEOG 429 – Racial Capitalism and Beyond (4)
GEOG 432 - Problems in Environmental History (4)
GEOG 461 - Urban Change Studio (6)
GSWS 314 - Race, Class and Gender (4)
REM 319 - Environmental and Planning Law (3)
REM 321 - Ecological Economics (4)

[...]

Communication (choose one)

~~CMNS 349 - Environment, Media and Communication (4)~~
CMNS 311 - Topics in Social Justice and Communication: Environmental Communication (4)
GEOG 351 - Multimedia Cartography (4)
GEOG 356 - 3D GIScience (4)
SA 315 - New Information Technology and Society (SA) (4)

Capstone Experience (choose one)

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)
GEOG 421 - Geographical Political Economy (4)
GEOG 423 - Capitalist Natures (4)
GEOG 429 – Racial Capitalism and Beyond (4)
GEOG 432 - Problems in Environmental History (4)
GEOG 440 - Property, Land, Society (4)
GEOG 442 - A World of Cities (4)
GEOG 449 - City and Environment (4)
GEOG 451 - Spatial Modeling (4)
GEOG 453 - Theoretical and Applied Remote Sensing (4)
GEOG 455W - Theoretical and Applied GIS (4)
GEOG 457 - Geovisualization Interfaces (4)
GEOG 461 - Urban Change Studio (6)
GEOG 465 - Geographies of Conquest and Liberation (4)
GEOG 497 - International Field Study (5)
[...]

Calendar Entry Change
Name of Program or Name of Faculty – Department of Geography / Faculty of Environment

Rationale for change: Course scheduling constraints can make it challenging for students to complete the lower division common requirements of the Physical Geography Major and Honours degrees in a timely fashion. The proposed course addition provides more flexibility in the choice of lower division courses that provide indigenous content in the degrees, while maintaining the integrity of the program.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: BSc Physical Geography Major 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.**

… Lower Division Requirements COMMON REQUIREMENTS All students, regardless of the stream they choose, will complete a total of 31-34 units, including all of CHEM 121 - General Chemistry and Laboratory I (4) EASC 101 - Dynamic Earth (3) GEOG 100 - Our World: Introducing Human Geography (3) GEOG 111 - Earth Systems (3) GEOG 266W - Geography in Practice (3) and one of MATH 150 - Calculus I with Review (4) * MATH 151 - Calculus I (3) * MATH 154 - Mathematics for the Life Sciences I (3) and one of MATH 152 - Calculus II (3) * MATH 155 - Mathematics for the Life Sciences II (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
GEOG 251 - Quantitative Geography (3) **
STAT 201 - Statistics for the Life Sciences (3)
STAT 270 - Introduction to Probability and Statistics (3)

and one of
ARCH 286 - Cultural Heritage Management (3)
INDG 101 - Introduction to Indigenous Studies (3)
INDG 286 - Indigenous Peoples and British Columbia: An Introduction (3)
REM 207 - Indigenous People and Resource Management (3)

*Students in the geoscience stream must take MATH 150 or 151; and 152.

**Students pursuing the GIScience certificate are required to take GEOG 251.

Calendar Entry Change
Name of Program or Name of Faculty – Department of Geography / Faculty of Environment

Rationale for change: Course scheduling constraints can make it challenging for students to complete the upper division requirements of the Climate Change and Society Minor in a timely fashion. The proposed course addition provides more flexibility in the choice of upper division courses in the Climate Change Solutions Group, while maintaining the integrity of the program.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Climate Change and Society 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.**

… Upper Division Requirements CLIMATE SCIENCE GROUP Complete two of EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4) GEOG 314 - The Climate System (4) GEOG 414 - Climate Change (4) REM 370 - Global Resource Issues in Oceanography (4) CLIMATE JUSTICE GROUP Complete one of GEOG 333 - Climate Crisis: Understanding a World on Fire (4) GEOG 389W - Nature and Society (4) INDG 433 - Indigenous Environmental Justice and Activism (4) LBST 311 - Labour and the Environment (3) CLIMATE CHANGE SOLUTIONS GROUP Complete one of

CMNS 311 - Topics in Social Justice and Communication: Environmental Communication (4)
IS 373 - Global Environmental Politics (4)
POL 452W - Energy Policy (4)
REM 350 - Energy Management for a Sustainable Climate and Society (4)
REM 355 - Sustainable Transportation Management (3)
REM 356W - Environmental Policy (3)

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

PROGRAM MODIFICATION TEMPLATE

Name of Program or Name of Faculty
School of Environmental Science

Rationale for change:

The term "concentration" has been changed to the term "stream" throughout the program description for consistency with most other programs at SFU and to provide clarity for students.

Various changes have been made to improve clarity for students, including: the wording in the preamble has been revised to more clearly describe the process that students need to carry out to declare their stream and to manage course substitution requests; inclusion of internal transfer requirements; and a blurb indicating that students may need more units to meet the 44 upper division units requirement to graduate.

A new grouping of courses (ARCH 286 and REM 207) dedicated to Indigenous perspectives has been added into all streams.

It was necessary to make space in the program for the addition of courses with an Indigenous perspective. REM 100/GEOG 111/EASC 101 have been removed from the overarching requirements shared by all streams and have been converted to an 'and one of' requirement within each stream. If one or more of these courses are necessary for the pre-requisite needs of a specific stream that course has been made required within that stream and the students will take 'and one of' the other courses. The result is that now there is room in the program to incorporate the new course grouping in Indigenous perspectives.

REM 407 has been added as an option to the 'and two of' REM section to give students more exposure to the context of working relationships between Indigenous groups and the natural resources sector.

The "general stream" has been renamed the "general environmental science stream" for clarity.

To provide more clarity and options for students, the upper division EVSC course section and 12 UD units in the General Environmental Science Stream were combined, and more courses in BISC and EVSC were added to the list.

A requirement has been changed within the Environmetrics stream from '8 Upper Division science-based units from the Faculty of Environment or the Faculty of Science with approval of the Director….' to 'and 3 of' where 3 courses will be selected. We have also added a list of common courses taken for this requirement historically for students to choose from, to provide clarity for students.

GEOG 418 has been added in all places where GEOG 411 was previously listed to provide more options for students. GEOG 411 has been removed as it is no longer offered.

BISC 327 (Algal Biology) and 328 (Fungal Biology and Ecology) have been added to the Applied Biology Stream as BISC 326 (Biology of Algae and Fungi) is no longer offered.

EVSC 395 was removed from the Applied Biology Stream as the content of this course varies and is not always suitable for this stream.

EVSC 320, EVSC 460, EVSC 445 have been added to the Applied Biology stream as these are new courses that are relevant for this stream.

The wording has been changed in the Environmental Archaeology Stream description as suggested by the ARCH department to make the wording more appropriate to an environmental science stream.

PHYS 346 (3) – Energy and the Environment and REM 431 (4) – Climate Change and Environmental Management have been added to the General Environmental Science stream and included in the new 'and 3 of' list of courses created for the Environmetrics streams as these courses are suitable for those streams.

Effective term and year: Fall 2023

The following program(s) will be affected by these changes:

Bachelor of Science, Major in Environmental 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.**

Environmental Science Major

Bachelor of Science

This bachelor of science (BSc) degree offers students the option of completing either the general **environmental science stream** ~~program~~ or one of five specialized **streams** ~~concentrations~~ that include applied biology, environmental archaeology, environmental earth systems, environmetrics, and water science. **Students declare their stream by meeting with their academic advisor or submitting the online form.** ~~Students should meet with their advisor to declare one of these areas of concentration.~~

Minimum Grades

…

Program Requirements

Students complete 120 units including 44 units at the upper division. University and Faculty of Environment regulations also apply.

~~Visit the program overview for a suggested course sequence and for lists of course groupings.~~

Internal Transfer Requirements

A CGPA of 2.0 or above is required to complete an internal transfer, as well as two of the science courses from the lower division requirements below completed with a final grade of C or above, in separate disciplines (BISC, CHEM, MATH, PHYS, or STAT).

Course Substitutions

Substitutions of program requirements, including courses deemed equivalent to these required courses, are not allowed without written permission **obtained** from the **academic advisor** ~~program~~. Such courses taken without approval will not be applied to graduation requirements. Students should consult their academic advisor for details on obtaining permission for substitutions. Students should contact their academic advisor to determine how special topics courses (EVSC 395 - Special Topics in Environmental Science (3) and EVSC 495 - Special Topics in Environmental Science (3)) can be substituted into their **stream** ~~concentration~~.

Upper Division Units

Additional upper division units may be required to reach the graduation requirement of 44 UD units. Recommended to select from BISC, CHEM, EASC, EVSC, GEOG, INDG, MATH, PHYS, REM, or STAT to further scientific and natural resources related knowledge

Lower Division Requirements

Students complete all of

BISC 101 - General Biology (4)
BISC 102 - General Biology (4)
CHEM 121 - General Chemistry and Laboratory I (4)
CHEM 122 - General Chemistry II (2)
CHEM 126 - General Chemistry Laboratory II (2)
EVSC 100 - Introduction to Environmental Science (3)
EVSC 201W - Environmental Science in Practice (3)
~~REM 100 - Global Change (3)~~

and one of

BISC 204 - Introduction to Ecology (3)
GEOG 215 - The Biosphere (3)

~~and one of~~

~~EASC 101 - Dynamic Earth (3)~~
~~GEOG 111 - Earth Systems (3)~~

and one of
ARCH 286 – Cultural Heritage Management (3)
REM 207 – Indigenous Peoples and Resource Management (3)

and one of
MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3)

and one of
MATH 152 - Calculus II (3)
MATH 155 - Mathematics for the Life Sciences II (3)

and one of
PHYS 101 - Physics for the Life Sciences I (3)
PHYS 120 - Mechanics and Modern Physics (3)

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

and one of
STAT 201 - Statistics for the Life Sciences (3)
STAT 270 - Introduction to Probability and Statistics (3)

Upper Division Requirements

Students complete all of

EVSC 300 - Seminar in Environmental Science (3)
EVSC 305 - Methods in Environmental Science (4)
EVSC 400 - Environmental Science Capstone (4)

and two of
REM 319 - Environmental and Planning Law (3)
REM 320W - Ethics and the Environment (3)
REM 321 - Ecological Economics (4)
REM 356W - Environmental Policy (3)

REM 407 – Indigenous Governance and Resource Relationships

General **Environmental Science Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students who wish to explore the broad field of environmental science, without specializing in any one area. This provides students with the flexibility to pursue their own interests across environmental disciplines.

Students who choose this stream will also complete one of

EASC 101 - Dynamic Earth (3)
GEOG 111 - Earth Systems (3)
REM 100 - Global Change (3)

Upper Division Requirements

~~Students who choose this concentration will complete three of the following~~

~~EVSC 320 - Watershed Ecology (4)~~
~~EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)~~
~~EVSC 395 - Special Topics in Environmental Science (3)~~
~~EVSC 445 - Environmental Data Analysis (4)~~
~~EVSC 460 - Ecogeomorphology (4)~~
~~EVSC 495 - Special Topics in Environmental Science (3)~~

~~and 12 units from~~ **Students complete 8 of the following, with at least 3 courses from EVSC and at least one course from the 400 division**

BISC 306 - Invertebrate Biology (4)
BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 309 - Conservation Biology (3) †
BISC 313 - Environmental Toxicology: A Mechanistic Perspective (3)
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 327 – Algal Biology
BISC 328 – Fungal Biology and Ecology
BISC 337 - Plant Biology (4)
BISC 407 - Population Dynamics (3)
BISC 412 - Aquatic Ecology (3)
BISC 413 - Fisheries Ecology (3) †
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
EASC 304 - Hydrogeology (3) *
EASC 314 - Principles of Glaciology (3)

EASC 315W - Geochemistry of Natural Waters (3) *
EASC 405 - Water, Environment, and Climate Change (3) *
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3)
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3)
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 414 - Climate Change (4) *
GEOG 417W - Advanced Soil Science (4)
GEOG 418 – Ecohydrology (4)
PHYS 346 – Energy and the Environment (3)
REM 311 - Applied Ecology (3)
REM 370 - Global Resource Issues in Oceanography (4)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 423 - Research Methods in Fisheries Assessment (4) *
REM 431 - Climate Change and Environmental Management (4)
REM 445 - Environmental Risk Assessment (4)
REM 471 - Forest Ecosystem Management (4)

* Students will need to take additional prerequisite courses in order to enroll
† Requires BISC 204 and not GEOG 215

Applied Biology **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in the impacts of human activities on terrestrial and aquatic ecosystems. This **stream** ~~concentration~~ is accredited by the British Columbia College of Applied Biology for the Registered Biologist (RPBio) designation.
Lower Division Requirements

Students who choose this **stream** ~~concentration~~ will also complete all of
BISC 205 - Principles of Physiology (3)
CHEM 281 - Organic Chemistry and Laboratory I (4)
GEOG 111 - Earth Systems (3)
MBB 201 - Biochemistry of the Cell (3)

and one of

EASC 101 - Dynamic Earth (3)
REM 100 - Global Change (3)

and one of
GEOG 253 - Introduction to Remote Sensing (3) *
GEOG 255 - Geographical Information Science I (3) *

~~*Requires GEOG 111 and not EASC 101~~

Upper Division Requirements

Students complete one of
EVSC 445 - Environmental Data Analysis (4)
STAT 302 - Analysis of Experimental and Observational Data (3)

and two of
BISC 407 - Population Dynamics (3)
BISC 412 - Aquatic Ecology (3)
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
~~EVSC 395 - Special Topics in Environmental Science (3) *~~
EVSC 320 – Watershed Ecology
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)

and two of
BISC 309 - Conservation Biology (3) †
BISC 413 - Fisheries Ecology (3) †
BISC 435 - Introduction to Pest Management (3)
EVSC 460 - Ecogeomorphology
REM 311 - Applied Ecology (3)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 445 - Environmental Risk Assessment (4)
REM 471 - Forest Ecosystem Management (4)

and one of
BISC 306 - Invertebrate Biology (4) †
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 327 – Algal Biology
BISC 328 – Fungal Biology and Ecology
BISC 337 - Plant Biology (4)

and one of
EASC 305 - Quantitative Methods for the Earth Sciences (3)
EVSC 445 – Environmental Data Analysis
GEOG 352 - Spatial Analysis (4)
GEOG 353 - Advanced Remote Sensing (4)
GEOG 355 - Geographical Information Science II (4)
GEOG 356 - 3D GIScience (4)
REM 412 - Environmental Modeling (4)
REM 423 - Research Methods in Fisheries Assessment (4)
STAT 403 - Intermediate Sampling and Experimental Design (3)

and one of

BISC 306 - Invertebrate Biology (4) †
BISC 309 - Conservation Biology (3) †
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 327 – Algal Biology
BISC 328 – Fungal Biology and Ecology
BISC 337 - Plant Biology (4)
BISC 407 - Population Dynamics (3)
BISC 412 - Aquatic Ecology (3)
BISC 413 - Fisheries Ecology (3) †
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
BISC 435 - Introduction to Pest Management (3)
EVSC 320 – Watershed Ecology
EVSC 460 – Ecogeomorphology
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)
REM 311 - Applied Ecology (3)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 471 - Forest Ecosystem Management (4)

~~*Requires approval from the Director for use in the concentration or school designate, to be acquired through the Academic Advisor.~~

†Requires BISC 204 and not GEOG 215

Environmental Archaeology **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in studying deep-time human-environment interactions with emphasis on the long-term impact of human activities on terrestrial and coastal ecosystems. Students will receive training in archaeology, geomorphology, paleoecology,

paleoclimatology, and quantitative analysis of Indigenous, historic, prehistoric, and paleontological environmental data archives and will be able to enter the **environmental archaeology consulting** ~~Cultural Resource Management~~ workforce.

Lower Division Requirements

Students who choose this **stream** ~~concentration~~ will also complete all of
ARCH 101 - Reconstructing the Human Past (3)
ARCH 131 - Human Origins (3)
ARCH 282 - Material Culture Analysis (4)

and one of

EASC 101 - Dynamic Earth (3)
GEOG 111 - Earth Systems (3)
REM 100 - Global Change (3)

and one of
ARCH 272W - Archaeology of the Old World (4)
ARCH 273 - Archaeology of the New World (3)

Upper Division Requirements

Students complete all of
ARCH 340 - Zooarchaeology (5)
ARCH 388 - Geoarchaeology (4)
ARCH 390 - Archaeobotany (4)

and at least one of
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3) *
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3) *

and at least two of
ARCH 329 - Special Topics in Environmental Archaeology (3)
ARCH 363 - Landscape Archaeology (3)
ARCH 365 - Archaeological Perspectives on Human Ecology (3)
ARCH 376 - Quantitative Methods in Archaeology (4)
ARCH 383 - Ancient and Forensic DNA (3)
ARCH 389 - Ethnoecology (3)
ARCH 425 - Archaeometry (3)

ARCH 428 - Soil Micromorphology (5)
ARCH 431 - Historical Ecology & Coastal Archaeology (3)
ARCH 480 - Directed Laboratory/Library/Field Research (0)
* Requires approval from the Director or school designate, to be acquired through the Academic Advisor, for use in the **stream** ~~concentration~~

Environmental Earth Systems **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in an integrative understanding of environmental processes and earth systems. Students develop technical skills in quantitative research and use technology to analyze spatial data.

Lower Division Requirements

Students who choose this **stream** ~~concentration~~ must complete ~~all of~~

~~EASC 101 - Dynamic Earth (3)~~
GEOG 111 - Earth Systems (3)

and one of

EASC 101 - Dynamic Earth (3)
REM 100 - Global Change (3)

and two of
GEOG 213 - Introduction to Geomorphology (3)
GEOG 214 - Weather and Climate (3)
GEOG 215 - The Biosphere (3)

and one of
GEOG 253 - Introduction to Remote Sensing (3)
GEOG 255 - Geographical Information Science I (3)

Upper Division Requirements

Students complete six of, with at least one from the 400 division

BISC 414 - Limnology (3)
EASC 304 - Hydrogeology (3)
EASC 314 - Principles of Glaciology (3)
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3)

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

and one of
BISC 309 - Conservation Biology (3) †
BISC 420 - Community Ecology (3)
REM 311 - Applied Ecology (3)
REM 370 - Global Resource Issues in Oceanography (4)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 431 - Climate Change and Environmental Management (4)
REM 445 - Environmental Risk Assessment (4)
REM 471 - Forest Ecosystem Management (4)
and one of
EASC 305 - Quantitative Methods for the Earth Sciences (3)
EVSC 445 - Environmental Data Analysis (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 GIScience (4)
REM 412 - Environmental Modeling (4)
STAT 302 - Analysis of Experimental and Observational Data (3)
† Requires BISC 204 and not GEOG 215

Environmetrics **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in environmental data analysis, sampling design and monitoring.

Lower Division Requirements

Students who choose this **stream** ~~concentration~~ will complete all of
MATH 232 - Applied Linear Algebra (3)

MATH 251 - Calculus III (3)
STAT 270 - Introduction to Probability and Statistics (3)
STAT 285 - Intermediate Probability and Statistics (3)

and one of

EASC 101 - Dynamic Earth (3)
GEOG 111 - Earth Systems (3)
REM 100 - Global Change (3)

Upper Division Requirements

Students complete all of
STAT 350 - Linear Models in Applied Statistics (3)
STAT 410 - Statistical Analysis of Sample Surveys (3)
STAT 430 - Statistical Design and Analysis of Experiments (3)

and one of
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)

~~Students who choose this concentration will also complete at least~~ **and** one of ~~the following~~
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3)
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3)

and three of ~~plus eight upper division science-based units from the Faculty of Environment or the Faculty of Science with approval from the Director or school designate, to be acquired through the Academic Advisor.~~
BISC 306 - Invertebrate Biology (4)
BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 309 - Conservation Biology (3) †
BISC 313 - Environmental Toxicology: A Mechanistic Perspective (3)
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 327 – Algal Biology
BISC 328 – Fungal Biology and Ecology
BISC 337 - Plant Biology (4)
BISC 407 - Population Dynamics (3)

BISC 412 - Aquatic Ecology (3)
BISC 413 - Fisheries Ecology (3) †
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3)
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3)
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)
PHYS 346 – Energy and the Environment (3)
REM 325 - Uncertainty, Risk, and Decision Analysis (3)
REM 370 - Global Resource Issues in Oceanography (4)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 388 - Wildlife Conservation (3)
REM 412 - Environmental Modeling (4)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 427 - Avalanche Risk Management (4)
REM 431 - Climate Change and Environmental Management (4)
REM 445 - Environmental Risk Assessment (4)
REM 471 - Forest Ecosystem Management (4)
STAT 302 - Analysis of Experimental and Observational Data (3)
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)
STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)
† Requires BISC 204 and not GEOG 215

Water Science **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in water resources in the context of Earth's changing climate. Students receiving training in hydrology, climatology, glaciology and aquatic sciences.

Lower Division Requirements

Students who choose this **stream** ~~concentration~~ will also complete all of
EASC 101 - Dynamic Earth (3)
GEOG 111 - Earth Systems (3)
GEOG 213 - Introduction to Geomorphology (3)
GEOG 214 - Weather and Climate (3)

and one of

GEOG 253 - Introduction to Remote Sensing (3)
GEOG 255 - Geographical Information Science I (3)

Upper Division Requirements

Students complete all of
BISC 414 - Limnology (3)
EASC 304 - Hydrogeology (3)
EASC 315W - Geochemistry of Natural Waters (3)
GEOG 311 - Hydrology (4)
GEOG 313 - River Geomorphology (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)

and three of, with at least one from the 400 division
EASC 314 - Principles of Glaciology (3)
EASC 405 - Water, Environment, and Climate Change (3)
EASC 410 - Groundwater Contamination and Transport (3)
EASC 415 - Groundwater Modelling (3)
EASC 416 - Field and Lab Techniques in Hydrogeology (3)
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
GEOG 310 - Physical Geography Field Course (4)
GEOG 314 - The Climate System (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
REM 370 - Global Resource Issues in Oceanography (4)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 412 - Environmental Modeling (4)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 445 - Environmental Risk Assessment (4)

Name of Program or Name of Faculty
School of Environmental Science

Rationale for change:

The term "concentration" has been changed to the term "stream" throughout the program description for consistency with most other programs at SFU and to provide clarity for students.

Various changes have been made to improve clarity for students, including: the wording in the preamble has been revised to more clearly describe the process that students need to carry out to declare their stream and to manage course substitution requests; inclusion of internal transfer requirements; and a blurb indicating that students may need more units to meet the 60 upper division units requirement to graduate.

A new grouping of courses (ARCH 286 and REM 207) dedicated to Indigenous perspectives has been added into all streams.

It was necessary to make space in the program for the addition of courses with an Indigenous perspective. REM 100/GEOG 111/EASC 101 have been removed from the overarching requirements shared by all streams and have been converted to an 'and one of' requirement within each stream. If one or more of these courses are necessary for the pre-requisite needs of a specific stream that course has been made required within that stream and the students will take 'and one of' the remaining courses. The result is that now there is room in the program to incorporate the new course grouping in Indigenous perspectives.

REM 407 has been added as an option to the 'and two of' REM section to give students more exposure to the context of working relationships between Indigenous groups and the natural resources sector.

The General Environmental Science Stream has been added to the Honours program as it was decided that the requirement to be in a specific stream to pursue further research opportunities is not necessary. Allowing a student to explore their options and then delve deeper into an aspect of Environmental Science that most interests them aligns with the intentions behind creating the General Environmental Science stream to begin with.

A requirement has been changed within the Environmetrics stream from '8 Upper Division science-based units from the Faculty of Environment or the Faculty of Science with approval of the Director….' to 'and 3 of' where 3 courses will be selected. We have also added a list of common courses taken for this requirement historically for students to choose from, to provide clarity for students.

GEOG 418 has been added where GEOG 411 was previously listed to provide more options for students. GEOG 411 has been removed as it is no longer offered.

BISC 327 (Algal Biology) and 328 (Fungal Biology and Ecology) have been added to the Applied Biology Stream as BISC 326 (Biology of Algae and Fungi) is no longer offered.

EVSC 395 was removed from the Applied Biology Stream as the content of this course varies and is not always suitable for this stream.

EVSC 320, EVSC 460, EVSC 445 have been added to the Applied Biology stream as these are new courses that are relevant for this stream.

The wording has been changed in the Environmental Archaeology Stream description as suggested by the ARCH department to make the wording more appropriate to an environmental science stream.

PHYS 346 (3) – Energy and the Environment and REM 431 (4) – Climate Change and Environmental Management have been added to the Environmetrics stream and included in the newly added General Environmental Science stream as these courses are suitable for those streams.

Effective term and year: Fall 2023

The following program(s) will be affected by these changes:

Bachelor of Science, Honours in Environmental 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.**

Environmental Science Honours

Bachelor of Science

This bachelor of science (BSc) degree offers students the option of completing **either the general environmental science stream or** one of five specialized **streams** ~~concentrations~~ that include applied biology, environmental archaeology, environmental earth systems, environmetrics, and water science. **Students declare their stream by meeting with their academic advisor or submitting the online form.** ~~Students should meet with their advisor to declare one of these areas of concentration.~~

Minimum Grades

The minimum cumulative grade point average (CGPA) for continuation and graduation is 3.00.

Program Requirements

Students complete 120 units including at least 60 units at the upper division. University and Faculty of Environment regulations also apply.

~~Visit the program overview for a suggested course sequence and for lists of course groupings.~~

Internal Transfer Requirements

A CGPA of 3.0 or above is required to complete an internal transfer, as well as two of the science courses from the lower division requirements below completed with a final grade of C or above, in separate disciplines (BISC, CHEM, MATH, PHYS, or STAT).

Course Substitutions

Substitutions of program requirements, including courses deemed equivalent to these required courses, are not allowed without written permission **obtained** from the **academic advisor** ~~program~~. Such courses taken without approval will not be applied to graduation requirements. Students should consult their academic advisor for details on obtaining permission for substitutions. Students should contact their academic advisor to determine how special topics courses (EVSC 395 - Special Topics in Environmental Science (3) and EVSC 495 - Special Topics in Environmental Science (3)) can be substituted into their **stream** ~~concentration~~.

Upper Division Units

Additional upper division units may be required to reach the graduation requirement of 60 UD units. Recommended to select from BISC, CHEM, EASC, EVSC, GEOG, INDG, MATH, PHYS, REM, or STAT to further scientific and natural resources related knowledge

Lower Division Requirements

Students complete all of

BISC 101 - General Biology (4)
BISC 102 - General Biology (4)
CHEM 121 - General Chemistry and Laboratory I (4)
CHEM 122 - General Chemistry II (2)
CHEM 126 - General Chemistry Laboratory II (2)

EVSC 100 - Introduction to Environmental Science (3)
EVSC 201W - Environmental Science in Practice (3)
~~REM 100 - Global Change (3)~~

and one of
BISC 204 - Introduction to Ecology (3)
GEOG 215 - The Biosphere (3)

~~and one of~~

~~EASC 101 - Dynamic Earth (3)~~
~~GEOG 111 - Earth Systems (3)~~

and one of
ARCH 286 – Cultural Heritage Management (3)
REM 207 – Indigenous Peoples and Resource Management (3)

and one of
MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3)

and one of
MATH 152 - Calculus II (3)
MATH 155 - Mathematics for the Life Sciences II (3)

and one of
PHYS 101 - Physics for the Life Sciences I (3)
PHYS 120 - Mechanics and Modern Physics (3)

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

and one of
STAT 201 - Statistics for the Life Sciences (3)
STAT 270 - Introduction to Probability and Statistics (3)

Upper Division Requirements

Students complete all of
EVSC 300 - Seminar in Environmental Science (3)
EVSC 305 - Methods in Environmental Science (4)
EVSC 400 - Environmental Science Capstone (4)

EVSC 489 - Environmental Science Thesis I (4)
EVSC 490W - Environmental Science Thesis II (4)

and two of
REM 319 - Environmental and Planning Law (3)
REM 320W - Ethics and the Environment (3)
REM 321 - Ecological Economics (4)
REM 356W - Environmental Policy (3)
REM 407 – Indigenous Governance and Resource Relationships

General Environmental Science Stream

This stream is for students who wish to explore the broad field of environmental science, without specializing in any one area. This provides students with the flexibility to pursue their own interests across environmental disciplines.

Students who choose this stream will also complete one of

EASC 101 - Dynamic Earth (3)
GEOG 111 - Earth Systems (3)
REM 100 - Global Change (3)

Upper Division Requirements

Students complete 8 of the following, with at least 3 courses from EVSC and at least one course from the 400 division

BISC 306 - Invertebrate Biology (4)
BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 309 - Conservation Biology (3) †
BISC 313 - Environmental Toxicology: A Mechanistic Perspective (3)
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 327 – Algal Biology
BISC 328 – Fungal Biology and Ecology
BISC 337 - Plant Biology (4)
BISC 407 - Population Dynamics (3)
BISC 412 - Aquatic Ecology (3)
BISC 413 - Fisheries Ecology (3) †
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
EASC 304 - Hydrogeology (3) *
EASC 314 - Principles of Glaciology (3)
EASC 315W - Geochemistry of Natural Waters (3) *

EASC 405 - Water, Environment, and Climate Change (3) *
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3)
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3)
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 414 - Climate Change (4) *
GEOG 417W - Advanced Soil Science (4)
GEOG 418 – Ecohydrology (4)
PHYS 346 – Energy and the Environment (3)
REM 311 - Applied Ecology (3)
REM 370 - Global Resource Issues in Oceanography (4)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 423 - Research Methods in Fisheries Assessment (4) *
REM 431 - Climate Change and Environmental Management (4)
REM 445 - Environmental Risk Assessment (4)
REM 471 - Forest Ecosystem Management (4)

*** Students will need to take additional prerequisite courses in order to enroll**
† Requires BISC 204 and not GEOG 215

Applied Biology **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in the impacts of human activities on terrestrial and aquatic ecosystems. This **stream** ~~concentration~~ is accredited by the British Columbia College of Applied Biology for the Registered Biologist (RPBio) designation.
Lower Division Requirements

Students who choose this **stream** ~~concentration~~ will also complete all of
BISC 205 - Principles of Physiology (3)
CHEM 281 - Organic Chemistry and Laboratory I (4)
GEOG 111 - Earth Systems (3)
MBB 201 - Biochemistry of the Cell (3)

and one of

EASC 101 - Dynamic Earth (3)

REM 100 - Global Change (3)

and one of
GEOG 253 - Introduction to Remote Sensing (3) *
GEOG 255 - Geographical Information Science I (3) *

~~*Requires GEOG 111 and not EASC 101~~

Upper Division Requirements

Students complete one of
EVSC 445 - Environmental Data Analysis (4)
STAT 302 - Analysis of Experimental and Observational Data (3)

and two of
BISC 407 - Population Dynamics (3)
BISC 412 - Aquatic Ecology (3)
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
~~EVSC 395 - Special Topics in Environmental Science (3) *~~
EVSC 320 – Watershed Ecology
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)

and two of
BISC 309 - Conservation Biology (3) †
BISC 413 - Fisheries Ecology (3) †
BISC 435 - Introduction to Pest Management (3)
EVSC 460 - Ecogeomorphology
REM 311 - Applied Ecology (3)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 445 - Environmental Risk Assessment (4)
REM 471 - Forest Ecosystem Management (4)

and one of
BISC 306 - Invertebrate Biology (4) †
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 327 – Algal Biology
BISC 328 – Fungal Biology and Ecology
BISC 337 - Plant Biology (4)

and one of

EASC 305 - Quantitative Methods for the Earth Sciences (3)
EVSC 445 – Environmental Data Analysis
GEOG 352 - Spatial Analysis (4)
GEOG 353 - Advanced Remote Sensing (4)
GEOG 355 - Geographical Information Science II (4)
GEOG 356 - 3D GIScience (4)
REM 412 - Environmental Modeling (4)
REM 423 - Research Methods in Fisheries Assessment (4)
STAT 403 - Intermediate Sampling and Experimental Design (3)

and one of

BISC 306 - Invertebrate Biology (4) †
BISC 309 - Conservation Biology (3) †
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 327 – Algal Biology
BISC 328 – Fungal Biology and Ecology
BISC 337 - Plant Biology (4)
BISC 407 - Population Dynamics (3)
BISC 412 - Aquatic Ecology (3)
BISC 413 - Fisheries Ecology (3) †
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
BISC 435 - Introduction to Pest Management (3)
EVSC 320 – Watershed Ecology
EVSC 460 – Ecogeomorphology
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)
REM 311 - Applied Ecology (3)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 471 - Forest Ecosystem Management (4)

~~*Requires approval from the Director for use in the concentration or school designate, to be acquired through the Academic Advisor.~~

†Requires BISC 204 and not GEOG 215

Environmental Archaeology **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in studying deep-time human-environment interactions with emphasis on the long-term impact of human activities on terrestrial and coastal ecosystems. Students will receive training in archaeology, geomorphology, paleoecology, paleoclimatology, and quantitative analysis of Indigenous, historic, prehistoric, and

paleontological environmental data archives and will be able to enter the **environmental archaeology consulting** ~~Cultural Resource Management~~ workforce.

Lower Division Requirements

Students who choose this **stream** ~~concentration~~ will also complete all of
ARCH 101 - Reconstructing the Human Past (3)
ARCH 131 - Human Origins (3)
ARCH 282 - Material Culture Analysis (4)

and one of

EASC 101 - Dynamic Earth (3)
GEOG 111 - Earth Systems (3)
REM 100 - Global Change (3)

and one of
ARCH 272W - Archaeology of the Old World (4)
ARCH 273 - Archaeology of the New World (3)

Upper Division Requirements

Students complete all of
ARCH 340 - Zooarchaeology (5)
ARCH 388 - Geoarchaeology (4)
ARCH 390 - Archaeobotany (4)

and at least one of
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3) *
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3) *

and at least two of
ARCH 329 - Special Topics in Environmental Archaeology (3)
ARCH 363 - Landscape Archaeology (3)
ARCH 365 - Archaeological Perspectives on Human Ecology (3)
ARCH 376 - Quantitative Methods in Archaeology (4)
ARCH 383 - Ancient and Forensic DNA (3)
ARCH 389 - Ethnoecology (3)
ARCH 425 - Archaeometry (3)
ARCH 428 - Soil Micromorphology (5)

ARCH 431 - Historical Ecology & Coastal Archaeology (3)
ARCH 480 - Directed Laboratory/Library/Field Research (0)

* Requires approval from the Director or school designate, to be acquired through the Academic Advisor, for use in the **stream** ~~concentration~~

Environmental Earth Systems **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in an integrative understanding of environmental processes and earth systems. Students develop technical skills in quantitative research and use technology to analyze spatial data.

Lower Division Requirements

Students who choose this **stream** ~~concentration~~ must complete ~~all of~~

~~EASC 101 - Dynamic Earth (3)~~
GEOG 111 - Earth Systems (3)

and one of

EASC 101 - Dynamic Earth (3)
REM 100 - Global Change (3)

and two of
GEOG 213 - Introduction to Geomorphology (3)
GEOG 214 - Weather and Climate (3)
GEOG 215 - The Biosphere (3)

and one of
GEOG 253 - Introduction to Remote Sensing (3)
GEOG 255 - Geographical Information Science I (3)

Upper Division Requirements

Students complete six of, with at least one from the 400 division

BISC 414 - Limnology (3)
EASC 304 - Hydrogeology (3)
EASC 314 - Principles of Glaciology (3)
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3)

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

and one of
BISC 309 - Conservation Biology (3) †
BISC 420 - Community Ecology (3)
REM 311 - Applied Ecology (3)
REM 370 - Global Resource Issues in Oceanography (4)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 431 - Climate Change and Environmental Management (4)
REM 445 - Environmental Risk Assessment (4)
REM 471 - Forest Ecosystem Management (4)
and one of
EASC 305 - Quantitative Methods for the Earth Sciences (3)
EVSC 445 - Environmental Data Analysis (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 GIScience (4)
REM 412 - Environmental Modeling (4)
STAT 302 - Analysis of Experimental and Observational Data (3)
† Requires BISC 204 and not GEOG 215

Environmetrics **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in environmental data analysis, sampling design and monitoring.

Lower Division Requirements

Students who choose this **stream** ~~concentration~~ will complete all of
MATH 232 - Applied Linear Algebra (3)

MATH 251 - Calculus III (3)
STAT 270 - Introduction to Probability and Statistics (3)
STAT 285 - Intermediate Probability and Statistics (3)

and one of

EASC 101 - Dynamic Earth (3)
GEOG 111 - Earth Systems (3)
REM 100 - Global Change (3)

Upper Division Requirements

Students complete all of
STAT 350 - Linear Models in Applied Statistics (3)
STAT 410 - Statistical Analysis of Sample Surveys (3)
STAT 430 - Statistical Design and Analysis of Experiments (3)

and one of
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)

~~Students who choose this concentration will also complete at least~~ **and** one of ~~the following~~
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3)
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3)

and three of ~~plus eight upper division science-based units from the Faculty of Environment or the Faculty of Science with approval from the Director or school designate, to be acquired through the Academic Advisor.~~
BISC 306 - Invertebrate Biology (4)
BISC 308 - Environmental Toxicology: An Ecological Perspective (3)
BISC 309 - Conservation Biology (3) †
BISC 313 - Environmental Toxicology: A Mechanistic Perspective (3)
BISC 316 - Vertebrate Biology (4)
BISC 317 - Insect Biology (3)
BISC 327 – Algal Biology
BISC 328 – Fungal Biology and Ecology
BISC 337 - Plant Biology (4)
BISC 407 - Population Dynamics (3)

BISC 412 - Aquatic Ecology (3)
BISC 413 - Fisheries Ecology (3) †
BISC 414 - Limnology (3)
BISC 420 - Community Ecology (3)
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 395 - Special Topics in Environmental Science (3)
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
EVSC 495 - Special Topics in Environmental Science (3)
GEOG 315 - World Ecosystems (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)
PHYS 346 – Energy and the Environment (3)
REM 325 - Uncertainty, Risk, and Decision Analysis (3)
REM 370 - Global Resource Issues in Oceanography (4)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 388 - Wildlife Conservation (3)
REM 412 - Environmental Modeling (4)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 427 - Avalanche Risk Management (4)
REM 431 - Climate Change and Environmental Management (4)
REM 445 - Environmental Risk Assessment (4)
REM 471 - Forest Ecosystem Management (4)
STAT 302 - Analysis of Experimental and Observational Data (3)
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)
STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)
† Requires BISC 204 and not GEOG 215

Water Science **Stream** ~~Concentration~~

This **stream** ~~concentration~~ is for students interested in water resources in the context of Earth's changing climate. Students receiving training in hydrology, climatology, glaciology and aquatic sciences.

Lower Division Requirements

Students who choose this **stream** ~~concentration~~ will also complete all of
EASC 101 - Dynamic Earth (3)
GEOG 111 - Earth Systems (3)
GEOG 213 - Introduction to Geomorphology (3)
GEOG 214 - Weather and Climate (3)

and one of

GEOG 253 - Introduction to Remote Sensing (3)
GEOG 255 - Geographical Information Science I (3)

Upper Division Requirements

Students complete all of
BISC 414 - Limnology (3)
EASC 304 - Hydrogeology (3)
EASC 315W - Geochemistry of Natural Waters (3)
GEOG 311 - Hydrology (4)
GEOG 313 - River Geomorphology (4)
GEOG 316 - Global Biogeochemical and Water Cycles (4)

and three of, with at least one from the 400 division
EASC 314 - Principles of Glaciology (3)
EASC 405 - Water, Environment, and Climate Change (3)
EASC 410 - Groundwater Contamination and Transport (3)
EASC 415 - Groundwater Modelling (3)
EASC 416 - Field and Lab Techniques in Hydrogeology (3)
EVSC 320 - Watershed Ecology (4)
EVSC 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (4)
EVSC 445 - Environmental Data Analysis (4)
EVSC 460 - Ecogeomorphology (4)
GEOG 310 - Physical Geography Field Course (4)
GEOG 314 - The Climate System (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
REM 370 - Global Resource Issues in Oceanography (4)
REM 375 - Ecology and Conservation of Coastal BC (3)
REM 412 - Environmental Modeling (4)
REM 423 - Research Methods in Fisheries Assessment (4)
REM 445 - Environmental Risk Assessment (4)

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

PROGRAM MODIFICATION TEMPLATE

Calendar Entry Change
Biomedical Physiology & Kinesiology

Rationale for change: **Remove BPK140 (Contemporary Health Issues) from the list of one of BPK 110, 140, 180W, 241 electives for the Kinesiology General program in the Academic Calendar AND edit the Academic Calendar to accurately reflect 21 elective units instead of 18 for the Active Health and Rehabilitation Concertation.** BPK140 has already been removed from the concentration and is not a prerequisite for any other course. Both the Kinesiology General Program and Active Heath and Rehabilitation Concentration should specify 21 elective units due to removal of BPK 140 as core (students now need to take an additional elective instead).
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Kinesiology Major Kinesiology 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.**

Program Requirements

…

Lower Division Requirements

…

Kinesiology General Program

Students who choose the Kinesiology General Program will complete

One of

BPK 110 - Human Nutrition: Current Issues (3)
~~BPK 140 - Contemporary Health Issues (3)~~
BPK 180W - Introduction to Ergonomics (3)
BPK 241 - Sports Injuries - Prevention and Rehabilitation (3)

…

…

Unspecified and Partially Specified Electives

…

Active Health and Rehabilitation Concentration

A total of ~~18~~ **21** elective units are also required. These ~~18~~ **21** units must include units from courses that will satisfy the University breadth requirement of six units each of designated humanities breadth (B-Hum) and social science breadth (B-Soc), and three units of lower division writing (W) as well as six units of designated CCUPEKA courses. For more information, please visit http://www.sfu.ca/ugcr.

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Calendar Entry Change
Biomedical Physiology & Kinesiology

Rationale for change: **Move the CCUPEKA requirement in the Academic Calendar so it applies to both the concentration and the KIN GEN program.** Consistency between the advantages these degrees offer. A few years ago, we made changes to our Kinesiology General program, added certain courses to the core, which then made both options: the Concentration and the Kinesiology General program eligible for CCUPEKA (Canadian Council of University Physical Education and Kinesiology Administrators) accreditation. This is an overdue Calendar edit.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Kinesiology Major Kinesiology 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.**

…

Unspecified and Partially Specified Electives

General Program

A total of 24 elective units are also required. These 24 units must include units from courses that will satisfy the University breadth requirement of six units each of designated humanities breadth (B-Hum) and social science breadth (B-Soc), and three units of lower division writing (W) **as well as six units of designated CCUPEKA courses**. For more information, please visit http://www.sfu.ca/ugcr.

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Calendar Entry Change
Biomedical Physiology & Kinesiology

Rationale for change: **Add "National Strength and Conditioning Association (NCSA) – Certified Personal Trainer" to the list of external personal training certification requirements.** Alternative certification that will allow Kinesiology graduates holding a PKC to find employment in the field.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Professional Kinesiology Certificate

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.**

Program Requirements

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The following documentation must be provided to and approved by the BPK Department Advisor prior to applying for graduation.

- Bachelor's Degree in Kinesiology (or completion of requirements for graduation)
- A current cardiopulmonary resuscitation (CPR) certificate
- A current First Aid Certificate
- Student membership in the BC Association of Kinesiologists
- Successful granting of at least one of the following external personal training certifications
    - Canadian Fitness Education Services - Personal Training
    - Canadian Society for Exercise Physiology - Certified Personal Trainer
    - **National Strength and Conditioning Association (NSCA) - Certified Personal Trainer**
- Completion of eight months of cooperative education in a related area approved by the BPK co-operative education coordinator, or equivalent. Students are required to apply to the BPK advisor to have outside employment evaluated as the equivalent for this requirement.

…

SFU SENATE COMMITTEE ON UNDERGRADUATE STUDIES

PROGRAM MODIFICATION TEMPLATE

Name of Program or Name of Faculty
Chemistry and Earth Sciences Joint Honours (Bachelor of Science)

Rationale for change:
Increases flexibility in the program's upper-division CHEM requirements: specifically, only requiring one of CHEM 317/371/372 rather than all of them, and allowing students to take any UD CHEM course to fulfill those units instead - will help students progress through the program without encountering delays due to limited course offerings (as is currently the case). The addition of CHEM 282 (2) provides the students with required background in petrochemistry that is important in the field. CHEM 215 was split into two separate courses (210/216) and is accordingly updated in the list, but the course content and unit number are otherwise unchanged.

The location in the list of the NUSC course requirements has been altered so that they don't break up the flow of the EASC course offerings but the content is unchanged.

Changes to the EASC requirements reflect updated core program requirements that resulted from their external review. EASC 206 was changed from a 2 unit to a 3 unit course and EASC 207 (Introduction to Applied Geophysics) was removed in order to limit LD requirements without compromising the necessity to meet EASC professional registration requirements. The changes in UD requirements of the EASC program include removal of specified course requirements and their replacement with unspecified EASC UD elective units that increase flexibility and student choice, while also making more explicit the University requirement to complete 50 UD units in the two subject areas.

Note that the LD and total unit # of 69 and 131 were supposed to be changed to 73 and 135 in 2017 to account for a program revision but inexplicably, this was not reflected in the calendar. This error has now been corrected.

Effective term and year:
Fall 2023

The following program(s) will be affected by these changes:

Chemistry and Earth Sciences Joint Honours (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.**

Program Requirements

Students complete a minimum of 13**5**~~1~~ units, as specified below including a minimum 3.00 cumulative grade point average to be awarded an honours degree.

Lower Division Requirements

Students will complete a minimum of ~~69~~ **73** units including all of

CHEM 121 - General Chemistry and Laboratory I (4)
CHEM 122 - General Chemistry II (2)
CHEM 126 - General Chemistry Laboratory II (2)
CHEM 210 - Introduction to Analytical Chemistry (2)
CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)
CHEM 230 - Inorganic Chemistry (3)
CHEM 236W - Inorganic Chemistry Laboratory (3)
CHEM 260 - Atoms, Molecules, Spectroscopy (4)
CHEM 281 - Organic Chemistry and Laboratory I (4)
CHEM 282 - Organic Chemistry II (2)
EASC 101 - Dynamic Earth (3)
EASC 201 - Stratigraphy and Sedimentation (3)
EASC 202 - Introduction to Mineralogy (3)
EASC 204 - Structural Geology I (3)
EASC 205 - Introduction to Petrology (3)
EASC 206 - Field Geology I (22**3**)
~~EASC 207 - Introduction to Applied Geophysics (3)~~
EASC 208 - Introduction to Geochemistry (3)
EASC 209W - Environmental Geoscience (4)
EASC 210 - Evolving Earth (3)
MATH 151 - Calculus I (3) or MATH 150 - Calculus I with Review (4)
MATH 152 - Calculus II (3)

and one of

STAT 201 - Statistics for the Life Sciences (3)
STAT 270 - Introduction to Probability and Statistics (3)

and all of

PHYS 120 - Mechanics and Modern Physics (3)
PHYS 121 - Optics, Electricity and Magnetism (3)
PHYS 132 - Physics Laboratory I (1)
PHYS 133 - Physics Laboratory II (1)

or all of

PHYS 125 - Mechanics and Special Relativity (3)
PHYS 126 - Electricity, Magnetism and Light (3)
PHYS 132 - Physics Laboratory I (1)
PHYS 133 - Physics Laboratory II (1)

or both of

PHYS 140 - Studio Physics - Mechanics and Modern Physics (4)
PHYS 141 - Studio Physics - Optics, Electricity and Magnetism (4)

Upper Division Requirements

Upper division units must total a minimum of 50 units in CHEM and EASC, including at least 26 units in upper division CHEM **and 24 units in upper division EASC**, and all of

CHEM 316 - Introductory Instrumental Analysis (4)
~~CHEM 317 - Analytical Environmental Chemistry (2)~~
CHEM 332 - The Chemistry of Transition Metals (3)
CHEM 360 - Thermodynamics and Chemical Kinetics (3)
~~CHEM 371 - Chemistry of the Aqueous Environment (3)~~
~~CHEM 372 - Chemistry of the Atmospheric Environment (3)~~
EASC 304 - Hydrogeology (3)
EASC 315W - Geochemistry of Natural Waters (3)

and one of

CHEM 317 - Analytical Environmental Chemistry (2)
CHEM 371 - Chemistry of the Aqueous Environment (3)
CHEM 372 - Chemistry of the Atmospheric Environment (3)

and **11 units of upper division CHEM courses, including** 6 units of 400-level CHEM (which can include CHEM 481-5)

and one of

NUSC 341 - Introduction to Radiochemistry (3)
NUSC 344 - Nucleosynthesis and Distribution of the Elements (3)

and ~~all~~ **one** of

EASC 306 - Field Geology II (3)
EASC 308 - Field Geology III (3)

~~and one of~~

~~EASC 310W - Paleontology (3)~~
~~EASC 315W - Geochemistry of Natural Waters (3)~~

and one of

CHEM 481 - Undergraduate Research (5)
EASC 498 - Undergraduate Research (3)
~~EASC 499 - Honours Thesis (6)~~

~~and one of~~

~~NUSC 341 - Introduction to Radiochemistry (3)~~
~~NUSC 344 - Nucleosynthesis and Distribution of the Elements (3)~~

Environmental Geoscience Stream

Students who choose this stream will complete ~~all of~~

~~EASC 304 - Hydrogeology (3)~~
EASC 403 - Quaternary Geology (3)

and 12 additional units of upper division EASC courses.

Geology Stream

Students who choose this stream will complete ~~all of~~

EASC 301 - Igneous Petrology (3)
~~EASC 302 - Sedimentary Petrology (3)~~

and one of

EASC 302 - Sedimentary Petrology (3)
EASC 311 - Metamorphic Petrology (3)

and 9 additional units of upper division EASC courses.

Name of Program or Name of Faculty
Chemistry and Earth Sciences Joint Major (Bachelor of Science)

Rationale for change:
Increases flexibility in the program's upper-division CHEM requirements: specifically, only requiring one of CHEM 317/371/372 rather than all of them, and allowing students to take any UD CHEM course to fulfill those units instead - will help students progress through the program without encountering delays due to limited course offerings (as is currently the case). The addition of CHEM 282 (2) provides the students with required background in petrochemistry that is important in the field. Students will also be allowed to use CHEM 481-5 (Undergraduate Research) to fulfill their UD CHEM requirements, which should provide an incentive to take this experiential research course.

The location in the list of the NUSC course requirements has been altered so that they don't break up the flow of the EASC course offerings but the content is unchanged.

Changes to the EASC requirements reflect updated core program requirements that resulted from their external review. EASC 206 was changed from a 2 unit to a 3 unit course and EASC 207 (Introduction to Applied Geophysics) was removed in order to limit LD requirements without compromising the necessity to meet EASC professional registration requirements. The changes in UD requirements of the EASC program include removal of specified course requirements and their replacement with unspecified EASC UD elective units that increase flexibility and student choice.

Note that the LD and total unit # of 69 and 123 currently listed in the calendar are incorrect. Inexplicibly, they were not changed to the actual values of 73 and 127 in the calendar following the 2017 update to the programs. This is now being corrected to these # which have been active in practice. The LD changes in this revision do not change the # of LD units from 73, and the increased flexibility in the CHEM UD requirements reduces the minimum UD specified units from 42 to 41 and the overall minimum units to 126 from 127.

Effective term and year:
Fall 2023

The following program(s) will be affected by these changes:

Chemistry and Earth Sciences Joint 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.**

Program Requirements

Students complete a minimum of 12**6**~~3~~ units, as specified below.

Lower Division Requirements

Students will complete a minimum of ~~69~~ **73** units including all of

CHEM 121 - General Chemistry and Laboratory I (4)
CHEM 122 - General Chemistry II (2)
CHEM 126 - General Chemistry Laboratory II (2)
CHEM 210 - Introduction to Analytical Chemistry (2)
CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)
CHEM 230 - Inorganic Chemistry (3)
CHEM 236W - Inorganic Chemistry Laboratory (3)
CHEM 260 - Atoms, Molecules, Spectroscopy (4)
CHEM 281 - Organic Chemistry and Laboratory I (4)
CHEM 282 - Organic Chemistry II (2)
EASC 101 - Dynamic Earth (3)
EASC 201 - Stratigraphy and Sedimentation (3)
EASC 202 - Introduction to Mineralogy (3)
EASC 204 - Structural Geology I (3)
EASC 205 - Introduction to Petrology (3)
EASC 206 - Field Geology I (~~2~~2**3**)
~~EASC 207 - Introduction to Applied Geophysics (3)~~
EASC 208 - Introduction to Geochemistry (3)
EASC 209W - Environmental Geoscience (4)
EASC 210 - Evolving Earth (3)
MATH 151 - Calculus I (3) or MATH 150 - Calculus I with Review (4)
MATH 152 - Calculus II (3)

and one of

STAT 201 - Statistics for the Life Sciences (3)
STAT 270 - Introduction to Probability and Statistics (3)

and all of

PHYS 120 - Mechanics and Modern Physics (3)
PHYS 121 - Optics, Electricity and Magnetism (3)
PHYS 132 - Physics Laboratory I (1)
PHYS 133 - Physics Laboratory II (1)

or all of

PHYS 125 - Mechanics and Special Relativity (3)
PHYS 126 - Electricity, Magnetism and Light (3)
PHYS 132 - Physics Laboratory I (1)
PHYS 133 - Physics Laboratory II (1)

or both of

PHYS 140 - Studio Physics - Mechanics and Modern Physics (4)
PHYS 141 - Studio Physics - Optics, Electricity and Magnetism (4)

Upper Division Requirements

Students will complete a minimum of **41**~~2~~ units including all of

CHEM 316 - Introductory Instrumental Analysis (4)
~~CHEM 317 - Analytical Environmental Chemistry (2)~~
CHEM 332 - The Chemistry of Transition Metals (3)
CHEM 360 - Thermodynamics and Chemical Kinetics (3)
~~CHEM 371 - Chemistry of the Aqueous Environment (3)~~
~~CHEM 372 - Chemistry of the Atmospheric Environment (3)~~
EASC 304 - Hydrogeology (3)
EASC 315W - Geochemistry of Natural Waters (3)

and one of

CHEM 317 - Analytical Environmental Chemistry (2)
CHEM 371 - Chemistry of the Aqueous Environment (3)
CHEM 372 - Chemistry of the Atmospheric Environment (3)

and **8 units of upper division CHEM courses, including** 3 units of 400-level CHEM (not including ~~CHEM 481-5,~~ CHEM 483-5 or CHEM 484-10)

and one of

NUSC 341 - Introduction to Radiochemistry (3)
NUSC 344 - Nucleosynthesis and Distribution of the Elements (3)

~~and 3 additional units of upper division EASC courses~~

and ~~all~~ **one** of

EASC 306 - Field Geology II (3)

EASC 308 - Field Geology III (3)

~~and one of~~

~~EASC 310W - Paleontology (3)~~
~~EASC 315W - Geochemistry of Natural Waters (3)~~

~~and one of~~

~~NUSC 341 - Introduction to Radiochemistry (3)~~
~~NUSC 344 - Nucleosynthesis and Distribution of the Elements (3)~~

Environmental Geoscience Stream

Students who choose this stream will complete ~~all of~~

~~EASC 304 - Hydrogeology (3)~~
EASC 403 - Quaternary Geology (3)

and 6 additional units of upper division EASC courses.

Geology Stream

Students who choose this stream will complete ~~all of~~

EASC 301 - Igneous Petrology (3)
~~EASC 302 - Sedimentary Petrology (3)~~

and one of

EASC 302 - Sedimentary Petrology (3)
EASC 311 - Metamorphic Petrology (3)

and 3 additional units of upper division EASC courses.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

PROGRAM MODIFICATION TEMPLATE

Calendar Entry Change

Name of Program or Name of Faculty: Actuarial Science
Rationale for change: We wish to align our admission requirements to those of most departments in the Faculty of Science by admitting students directly from high school. This will simplify our admission process by streamlining it. It will also allow us to interact with our major and honours students sooner in their degrees and increase student retention. The new description of admission requirements (see Page 2 of this document) refers to a website that will contain the details of these requirements once approved. Note that the new wording used in the calendar description has been selected to be consistent with the calendar description of the Statistics Major (BSc) program (see here). We are also changing the continuation requirements of the Actuarial Science Major (BSc) program to allow for some consistency with our new admission requirements. Specifically, our new internal transfer requirements state that an Actuarial Science Major student needs to have a GPA of at least 2.5 across all ACMA, CMPT, MACM, MATH, and STAT courses. We are adding CMPT courses to our continuation requirements for consistency. The new list now includes ACMA, CMPT, MACM, MATH, and STAT courses.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Actuarial Science Major (BSc)

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.**

Actuarial Science Major
Bachelor of Science

The Department of Statistics and Actuarial Science offers a bachelor of science (BSc) program in actuarial science within the Faculty of Science.

Frequently asked questions about the program and contact information for the Undergraduate Advisor for the department can be found here. Students should seek advice early in their academic careers about program planning from the department's advisors.

Admission Requirements

~~For admission, students normally complete each lower division required course in mathematics and statistics, or its equivalent, with a minimum C+ grade. Students are also normally required to have completed ACMA 101 and ACMA 201 with a minimum grade of C+ and have a cumulative grade point average (CGPA) of at least 3.0.~~

~~Achieving the minimum grade requirements will not guarantee program admission.~~

~~Students normally apply for admission in the term in which they complete ACMA 201.~~

Students may be admitted by direct entry on their university application, or by application to the Department of Statistics and Actuarial Science, after they have been admitted.

Visit this website to view admission requirements.

Courses for Further Credit

No student may complete, for further credit, any course offered by the Department of Statistics and Actuarial Science which is a prerequisite for a course the student has already completed with a grade of C- or higher without permission of the department.

Computing Recommendation

Some experience with a high-level programming language is recommended by the beginning of the second year.

Prerequisite Grade Requirement

Students must have a grade of C- or better in prerequisites for STAT courses. Students must have a grade of C or better in prerequisites for ACMA courses.

GPA Required for Continuation

To continue in the program, students must maintain at least a 2.25 grade point average in ~~MATH, STAT, MACM, or ACMA~~ **ACMA, CMPT, MACM, MATH, and STAT** courses.

Graduation Requirement

Students are required to complete a minimum of 44 upper division units including a minimum of 28 units in the major subject or field and achieve a CGPA of 2.5 or better to graduate.
[...]

Calendar Entry Change

Name of Program or Name of Faculty: Actuarial Science
Rationale for change: We are changing the continuation requirements of the Actuarial Science Honours (BSc) program to allow for consistency with our new admission requirements. Specifically, our new internal transfer requirements state that an Actuarial Science Honours student needs to have a GPA of at least 3.0 across all ACMA, CMPT, MACM, MATH, and STAT courses. We are adding CMPT courses to our continuation requirements for consistency. The new list now includes ACMA, CMPT, MACM, MATH, and STAT courses.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Actuarial Science Honours (BSc)

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.**

Actuarial Science Honours
Bachelor of Science

The Department of Statistics and Actuarial Science offers a bachelor of science (BSc) honours program in actuarial science within the Faculty of Science.

Frequently asked questions about the program and contact information for the Undergraduate Advisor for the department can be found here. Students should seek advice early in their academic careers about program planning from the department's advisors.

Courses for Further Credit

No student may complete, for further credit, any course offered by the Department of Statistics and Actuarial Science which is a prerequisite for a course the student has already completed with a grade of C- or higher without permission of the department.

Computing Recommendation

Some experience with a high-level programming language is recommended by the beginning of the second year.

Prerequisite Grade Requirement

Students must have a grade of C- or better in prerequisites for STAT courses. Students must have a grade of C or better in prerequisites for ACMA courses.

GPA Required for Continuation

To continue in the program, students must maintain at least a 3.0 grade point average in ~~MATH, STAT, MACM, or ACMA~~ **ACMA, CMPT, MACM, MATH, and STAT** courses.

Graduation Requirement

Students are required to complete a minimum of 60 upper division units including a minimum of 48 units in the honours subject or field and achieve a CGPA of 3.0 or better to graduate.

[...]

Name of Program or Name of Faculty
Department of Statistics and Actuarial Science

Rationale for change:
We are aiming to have a larger set of program changes approved for Data Science, which will likely need to entail a full review by the Ministry. However, Computing Science is due to be making changes to **CMPT 300**, which is currently required for Data Science and which we had decided to remove entirely from the new program changes (as well as its prerequisite **CMPT 295** and one other course that CMPT 300 is a prerequisite for: **CMPT 454**).

These changes to CMPT 300 will likely come into effect before we're able to get the full set of program changes approved for Data Science. As a result, we'd like to also propose the below changes so that we can get them into the Calendar for the Fall 2023 semester.

In summary, what is changed below is:

1. The removal of CMPT 295 as a required course.
2. The removal of CMPT 300 as a required course.
3. The removal of CMPT 454 as a required course.
4. The addition of **CMPT 310** as a required course, in place of CMPT 454. (CMPT 310 was deemed by Computing Science to be highly related to data science and is due to take on a more prominent position in the new program changes).
5. The removal of CMPT 310 from the list of "Upper Division Recommended Courses" since we would be making CMPT 310 a required course. CMPT 322W was also removed from this list, as this course is no longer being offered.

6. The removal of language around how many lower division and upper division students must complete (i.e. "Students complete a total of x units").
7. The removal of the asterisks and accompanying additional information for BUS 439 and BUS 445. This language is already contained within the Calendar descriptions for these courses and therefore is redundant here.

Effective term and year:
Fall 2023

The following program(s) will be affected by these changes:

Data Science 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.**

Data Science Major

Lower Division Requirements

~~Students complete a total of 55-57 units.~~

Business Administration

Students complete all of

BUS 200 - Business Fundamentals (3)
BUS 217W - Critical Thinking in Business (3)
BUS 251 - Financial Accounting I (3)
BUS 272 - Behaviour in Organizations (3)

Computing Science

Students complete all of

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 225 - Data Structures and Programming (3)
CMPT 276 - Introduction to Software Engineering (3)
~~CMPT 295 - Introduction to Computer Systems (3)~~

Mathematics and Computing Science

Students complete both of

MACM 101 - Discrete Mathematics I (3)
MACM 201 - Discrete Mathematics II (3)

Data Science

Students complete

DATA 180 - Undergraduate Seminar in Data Science (1)

Mathematics

Students complete one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

and both of

MATH 152 - Calculus II (3)
MATH 208W - Introduction to Operations Research (3)

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3)

Statistics

Students complete all of

STAT 240 - Introduction to Data Science (3)
STAT 260 - Introductory R for Data Science (2)
STAT 261 - Laboratory for Introductory R for Data Science (1)

and one of

BUS 232 - Business Statistics (3)
STAT 201 - Statistics for the Life Sciences (3)
STAT 203 - Introduction to Statistics for the Social Sciences (3)
STAT 205 - Introduction to Statistics (3)
STAT 270 - Introduction to Probability and Statistics (3)

Upper Division Requirements

~~Students complete a minimum of 43-44 units.~~

Business Administration

Students complete all of

BUS 343 - Introduction to Marketing (3)
BUS 360W - Business Communication (4)
BUS 439 - Analytics Project (3) *
BUS 445 - Customer Analytics (3) **

~~*For this course, Data Science students are eligible for a prerequisite waiver for BUS 345, 437, 445, 462, 464, 90 units. Students should consult with their program advisor.~~

~~**For this course, Data Science students are eligible for a prerequisite waiver for BUS 336. Students should consult with their program advisor.~~

Computing Science

Students complete all of

~~CMPT 300 - Operating Systems I (3)~~
CMPT 307 - Data Structures and Algorithms (3)
CMPT 353 - Computational Data Science (3)
CMPT 354 - Database Systems I (3)
~~CMPT 454 - Database Systems II (3)~~
CMPT 310 - Introduction to Artificial Intelligence (3)

Mathematics

Students complete one of

MATH 308 - Linear Optimization (3)
MATH 309 - Continuous Optimization (3)

Statistics

Students complete one of

ECON 333 - Statistical Analysis of Economic Data (4)
STAT 302 - Analysis of Experimental and Observational Data (3)
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)
STAT 350 - Linear Models in Applied Statistics (3)

and both of

STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 452 - Statistical Learning and Prediction (3)

and one of

STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)

Upper Division Recommended Courses

BUS 345 - Marketing Research (3)
BUS 362 - Business Process Analysis (4)
BUS 437 - Decision Analysis in Business (3)
BUS 440 - Simulation in Management Decision-making (4)
CMPT 308 - Computability and Complexity (3)
~~CMPT 310 - Introduction to Artificial Intelligence (3)~~
CMPT 373 - Software Development Methods (3)
CMPT 376W - Technical Writing and Group Dynamics (3)
CMPT 405 - Design and Analysis of Computing Algorithms (3)
CMPT 417 - Intelligent Systems (3)
CMPT 419 - Special Topics in Artificial Intelligence (3)
MACM 316 - Numerical Analysis I (3)
MATH 343 - Applied Discrete Mathematics (3)
MATH 345 - Introduction to Graph Theory (3)
STAT 342 - Introduction to Statistical Computing and Exploratory Data Analysis - SAS (2)
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)

Name of Program or Name of Faculty Department of Statistics and Actuarial Science
Rationale for change: There have been issues with the Data Science program being too structured (i.e. very little room for choice) and having too many required courses. This has been causing problems particularly for transfer students who transfer in with a lot of courses not required for the program (i.e. they end up needing to graduate with well over 120 units). There has also been an issue with course conflicts between required courses, given that students do not get to choose which courses to take, and it's not feasible to coordinate course scheduling across four different departments/schools. The intention here is to reduce the number of required courses and to allow for more course options. We believe the changes below accomplish this, while maintaining the program's learning and skill outcomes, and the interdisciplinary nature of the program.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Data Science 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.**

Data Science Major

Bachelor of Science

The Faculty of Science, with the Departments of Statistics and Actuarial Science and of Mathematics, the Beedie School of Business, and the School of Computing Science, offers a major in Data Science (DATA) leading to a bachelor of science (BSc). This is a ~~highly structured~~ program providing a multidisciplinary approach to quantitative methods for business and industry in an environment of rapid changes in technology.

The program is overseen by the Department of Statistics and Actuarial Science. A steering committee consisting of representatives from the above mentioned departments and faculty serve as liaison between participating departments and the program director.

Students formally apply to be admitted into the program. Applications can be considered both for students entering Simon Fraser University, and for students already enrolled. Admission into the program is decided on a competitive basis. Students must maintain a 2.7 cumulative grade point average (CGPA) in DATA program course work to remain in the program and to graduate. It is strongly recommended that students contact the Statistics advisor or program director early about admission and scheduling.

More information can be found on our website: https://www.sfu.ca/stat-actsci/undergraduate/current-students/program-info/data-science.html.

Program Requirements

Students complete 120 units, as specified below.

Under program and University regulations, a general degree requires a total of 120 units, 44 of which are in upper division courses. Completion of all lower and upper division courses shown below is required. However, students should be aware of particular department requirements for course entry. Contact those departments for information.

Lower Division Requirements

~~Business Administration~~

Students complete all of

~~BUS 200 - Business Fundamentals (3)~~
BUS 217W - Critical Thinking in Business (3)
~~BUS 251 - Financial Accounting I (3)~~
BUS 272 - Behaviour in Organizations (3)

~~Computing Science~~

~~Students complete all of~~

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 225 - Data Structures and Programming (3)
~~CMPT 276 - Introduction to Software Engineering (3)~~

~~Mathematics and Computing Science~~

~~Students complete both of~~

MACM 101 - Discrete Mathematics I (3)

~~MACM 201 - Discrete Mathematics II (3)~~

~~Data Science~~

~~Students complete~~

DATA 180 - Undergraduate Seminar in Data Science (1)
STAT 240 - Introduction to Data Science (3)
STAT 260 - Introductory R for Data Science (2)
STAT 261 - Laboratory for Introductory R for Data Science (1)

~~Mathematics~~

~~Students complete~~ **and** one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

and ~~both of~~

MATH 152 - Calculus II (3)

and one of

MATH 208W - Introduction to Operations Research (3)
MACM 203 - Computing with Linear Algebra (2)

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3)

~~Statistics~~

~~Students complete all of~~

~~STAT 240 - Introduction to Data Science (3)~~
~~STAT 260 - Introductory R for Data Science (2)~~
~~STAT 261 - Laboratory for Introductory R for Data Science (1)~~

and one of

BUS 232 - Business Statistics (3)
STAT 201 - Statistics for the Life Sciences (3)
STAT 203 - Introduction to Statistics for the Social Sciences (3)
STAT 205 - Introduction to Statistics (3)
STAT 270 - Introduction to Probability and Statistics (3) **

*** Recommended**

Lower Division Recommended Courses

CMPT 276 - Introduction to Software Engineering (3)
MACM 201 - Discrete Mathematics II (3) OR CMPT 210 - Probability and Computing (3)
STAT 285 - Intermediate Probability and Statistics (3)

Upper Division Requirements

~~Business Administration~~

Students complete all of

BUS 343 - Introduction to Marketing (3)
~~BUS 360W - Business Communication (4)~~
BUS 439 - Analytics Project (3) *
BUS 445 - Customer Analytics (3) *
CMPT 354 - Database Systems I (3)
MATH 308 - Linear Optimization (3)

and one of

STAT 302 - Analysis of Experimental and Observational Data (3)
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)
STAT 350 - Linear Models in Applied Statistics (3) **

and one of

BUS 360W - Business Communication (4) **
MATH 402W - Operations Research Clinic (4)
CMPT 376W - Technical Writing and Group Dynamics (3) ***
STAT 300W - Statistics Communication (3) ***

(Note: For students who complete MATH 402W, CMPT 376W or STAT 300W as their UD W, a waiver for BUS 217W is possible. Please consult with the Statistics Advisor.)

and at least 5 courses from List 1 and 2, including a minimum of 3 courses from List 1 (which must include at least one STAT course and one CMPT course)

List 1

STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 452 - Statistical Learning and Prediction (3)
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)
CMPT 310 - Introduction to Artificial Intelligence (3)
CMPT 353 - Computational Data Science (3)
CMPT 459 - Special Topics in Database Systems (3)
CMPT 307 - Data Structures and Algorithms (3) ***
MATH 309 - Continuous Optimization (3) ***

List 2

BUS 345 - Marketing Research (3)
BUS 362 - Business Process Analysis (4)
BUS 437 - Decision Analysis in Business (3) *
BUS 440 - Simulation in Management Decision-making (4) *
BUS 441 - Web Analytics (3) *
CMPT 363 - User Interface Design (3)
CMPT 371 - Data Communications and Networking (3)
CMPT 340 - Biomedical Computing (3)
CMPT 419 - Special Topics in Artificial Intelligence (3)
CMPT 456 – Information Retrieval and Web Search (3)
CMPT 372 - Web II – Service-side Development (3) ***
CMPT 373 - Software Development Methods (3) ***
CMPT 410 - Machine Learning (3) ***
CMPT 420 - Deep Learning (3) ***
CMPT 454 - Database Systems II (3) ***
CMPT 467 – Visualization (3) ***
MACM 316 - Numerical Analysis I (3)
MATH 343 - Applied Discrete Mathematics (3) ***
MATH 345 - Introduction to Graph Theory (3) ***
MATH 348 - Introduction to Probabilistic Models (3)
MATH 408 - Discrete Optimization (3)
MATH 448 - Network Flows (3)
STAT 342 - Introduction to Statistical Computing and Exploratory Data Analysis - SAS (2)
STAT 360 - Advanced R for Data Science (2)
STAT 440 - Learning from Big Data (3) ***

STAT 410 - Statistical Analysis of Sample Surveys (3) ***
STAT 450 - Statistical Theory (3) ***
STAT 460 – Bayesian Statistics (3) ***

*** BUS 360W is recommended but not required. BUS 360W will be waived as a prerequisite for 400 division business courses for those in the Data Science Major, provided that an alternative approved upper division W course is in progress, or has been completed. Students should consult with a Department of Statistics and Actuarial Science Academic Advisor for further information on obtaining a waiver.**

**** Recommended**

***** Course has extra prerequisite(s) (i.e. beyond what is required for the Data Science program)**

****** Recommended; course has extra prerequisite(s) (i.e. beyond what is required for the Data Science program)**

~~Computing Science~~

~~Students complete all of~~

~~CMPT 307 - Data Structures and Algorithms (3)~~
~~CMPT 310 - Introduction to Artificial Intelligence (3)~~
~~CMPT 353 - Computational Data Science (3)~~
~~CMPT 354 - Database Systems I (3)~~
~~CMPT 370 - Information System Design (3)~~

~~Mathematics~~

~~Students complete one of~~

~~MATH 308 - Linear Optimization (3)~~
~~MATH 309 - Continuous Optimization (3)~~

~~Statistics~~

~~Students complete one of~~

~~ECON 333 - Statistical Analysis of Economic Data (4)~~
~~STAT 302 - Analysis of Experimental and Observational Data (3)~~
~~STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)~~
~~STAT 350 - Linear Models in Applied Statistics (3)~~

~~and both of~~

~~STAT 403 - Intermediate Sampling and Experimental Design (3)~~
~~STAT 452 - Statistical Learning and Prediction (3)~~

~~and one of~~

~~STAT 445 - Applied Multivariate Analysis (3)~~
~~STAT 475 - Applied Discrete Data Analysis (3)~~
~~STAT 485 - Applied Time Series Analysis (3)~~

~~Upper Division Recommended Courses~~

~~BUS 345 - Marketing Research (3)~~
~~BUS 362 - Business Process Analysis (4)~~
~~BUS 437 - Decision Analysis in Business (3)~~
~~BUS 440 - Simulation in Management Decision-making (4)~~
~~CMPT 308 - Computability and Complexity (3)~~
~~CMPT 322W - Professional Responsibility and Ethics (3)~~
~~CMPT 373 - Software Development Methods (3)~~
~~CMPT 376W - Technical Writing and Group Dynamics (3)~~
~~CMPT 405 - Design and Analysis of Computing Algorithms (3)~~
~~CMPT 417 - Intelligent Systems (3)~~
~~CMPT 419 - Special Topics in Artificial Intelligence (3)~~
~~CMPT 470 - Web-based Information Systems (3)~~
~~MACM 316 - Numerical Analysis I (3)~~
~~MATH 343 - Applied Discrete Mathematics (3)~~
~~MATH 345 - Introduction to Graph Theory (3)~~
~~STAT 342 - Introduction to Statistical Computing and Exploratory Data Analysis - SAS (2)~~
~~STAT 445 - Applied Multivariate Analysis (3)~~
~~STAT 475 - Applied Discrete Data Analysis (3)~~
~~STAT 485 - Applied Time Series Analysis (3)~~

....

~~Double Majors and Minors~~

~~Students wishing to complete a second major or a minor in addition to a Data Science (DATA) major must satisfy all DATA requirements. At least 34 upper division units must be allocated exclusively to the DATA major.~~

~~This includes at least nine units from each of the lists under the sub-headings Business Administration, Computing Science, and Statistics. Units used to satisfy DATA upper division requirements beyond these 34 can be applied simultaneously to the other major, minor or honours.~~

Name of Program or Name of Faculty
Department of Statistics and Actuarial Science

Rationale for change:
We are aiming to have a larger set of program changes approved for Data Science, which will likely need to entail a full review by the Ministry. However, Computing Science is due to be making changes to **CMPT 300**, which is currently required for Data Science and which we had decided to remove entirely from the new program changes (as well as its prerequisite **CMPT 295** and one other course that CMPT 300 is a prerequisite for: **CMPT 454**).

These changes to CMPT 300 will likely come into effect before we're able to get the full set of program changes approved for Data Science. As a result, we'd like to also propose the below changes so that we can get them into the Calendar for the Fall 2023 semester.

In summary, what is changed below is:

1. The removal of CMPT 295 as a required course.
2. The removal of CMPT 300 as a required course.
3. The removal of CMPT 454 as a required course.
4. The addition of **CMPT 310** as a required course, in place of CMPT 454. (CMPT 310 was deemed by Computing Science to be highly related to data science and is due to take on a more prominent position in the new program changes).
5. The removal of CMPT 310 from a list of optional courses for the Open Concentration since we would be making CMPT 310 a required course. CMPT 322W was also removed from this list, as this course is no longer being offered.

6. The removal of language around how many lower division and upper division students must complete (i.e. "Students complete a total of x units").
7. The removal of the asterisks and accompanying additional information for BUS 439 and BUS 445. This language is already contained within the Calendar descriptions for these courses and therefore is redundant here.

Effective term and year:
Fall 2023

The following program(s) will be affected by these changes:
Data Science 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.**

Data Science Honours

Mathematics Concentration Requirements

Lower Division Requirements

~~Students complete a minimum of 65 units.~~

Business Administration

Students complete all of

BUS 200 - Business Fundamentals (3)
BUS 217W - Critical Thinking in Business (3)
BUS 251 - Financial Accounting I (3)
BUS 272 - Behaviour in Organizations (3)

Computing Science

Students complete all of

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 225 - Data Structures and Programming (3)
CMPT 276 - Introduction to Software Engineering (3)
~~CMPT 295 - Introduction to Computer Systems (3)~~

Mathematics and Computing Science

Students complete all of

MACM 101 - Discrete Mathematics I (3)
MACM 201 - Discrete Mathematics II (3)
MACM 203 - Computing with Linear Algebra (2)
MACM 204 - Computing with Calculus (2)

Data Science

Students complete

DATA 180 - Undergraduate Seminar in Data Science (1)

Mathematics

Students complete one of

MATH 150 - Calculus I with Review (4) *
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

and all of

MATH 152 - Calculus II (3)
MATH 208W - Introduction to Operations Research (3)
MATH 242 - Introduction to Analysis I (3)
MATH 251 - Calculus III (3)

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3) *

Statistics

Students complete all of

STAT 240 - Introduction to Data Science (3)
STAT 260 - Introductory R for Data Science (2)
STAT 261 - Laboratory for Introductory R for Data Science (1)
STAT 270 - Introduction to Probability and Statistics (3)

* Recommended

Upper Division Requirements

~~Students complete a minimum of 50 units.~~

Business Administration

Students complete all of

BUS 343 - Introduction to Marketing (3)
BUS 360W - Business Communication (4)

Computing Science

Students complete all of

~~CMPT 300 - Operating Systems I (3)~~
CMPT 307 - Data Structures and Algorithms (3)
CMPT 353 - Computational Data Science (3)
CMPT 354 - Database Systems I (3)
~~CMPT 454 - Database Systems II (3)~~
CMPT 310 - Introduction to Artificial Intelligence (3)

Mathematics and Computing Science

MACM 316 - Numerical Analysis I (3)

Mathematics

Students complete one of

MATH 308 - Linear Optimization (3)
MATH 309 - Continuous Optimization (3)

and one of

MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3)
MATH 320 - Introduction to Analysis II (3)
MATH 340 - Algebra II: Rings and Fields (3)
MATH 343 - Applied Discrete Mathematics (3)
MATH 345 - Introduction to Graph Theory (3)
MATH 348 - Introduction to Probabilistic Models (3)

and

MATH 402W - Operations Research Clinic (4)

and one additional 400-level MATH course

Statistics

Students complete one of

ECON 333 - Statistical Analysis of Economic Data (4)
STAT 302 - Analysis of Experimental and Observational Data (3)

STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)
STAT 350 - Linear Models in Applied Statistics (3)

and both of

STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 452 - Statistical Learning and Prediction (3)

and one of

STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)

Open Concentration Requirements

Lower Division Requirements

~~Students complete a minimum of 55 units.~~

Business Administration

Students complete all of

BUS 200 - Business Fundamentals (3)
BUS 217W - Critical Thinking in Business (3)
BUS 251 - Financial Accounting I (3)
BUS 272 - Behaviour in Organizations (3)

Computing Science

Students complete all of

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 225 - Data Structures and Programming (3)
CMPT 276 - Introduction to Software Engineering (3)
~~CMPT 295 - Introduction to Computer Systems (3)~~

Mathematics and Computing Science

Students complete both of

MACM 101 - Discrete Mathematics I (3)

MACM 201 - Discrete Mathematics II (3)

Data Science

Students complete

DATA 180 - Undergraduate Seminar in Data Science (1)

Mathematics

Students complete one of

MATH 150 - Calculus I with Review (4) *
MATH 151 - Calculus I (3) *
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

and both of

MATH 152 - Calculus II (3)
MATH 208W - Introduction to Operations Research (3)

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3) *

Statistics

Students complete all of

STAT 240 - Introduction to Data Science (3)
STAT 260 - Introductory R for Data Science (2)
STAT 261 - Laboratory for Introductory R for Data Science (1)

and one of

BUS 232 - Business Statistics (3)
STAT 201 - Statistics for the Life Sciences (3)
STAT 203 - Introduction to Statistics for the Social Sciences (3)
STAT 205 - Introduction to Statistics (3)
STAT 270 - Introduction to Probability and Statistics (3)

* Recommended

Upper Division Requirements

~~Students complete a minimum of 52 units.~~

Business Administration

Students complete all of

BUS 343 - Introduction to Marketing (3)
BUS 360W - Business Communication (4)
BUS 439 - Analytics Project (3) *
BUS 445 - Customer Analytics (3) **

~~*For this course, Data Science students are eligible for a prerequisite waiver for BUS 345, 437, 445, 462, 464, 90 units. Students should consult with their program advisor.~~

~~**For this course, Data Science students are eligible for a prerequisite waiver for BUS 336. Students should consult with their program advisor.~~

Computing Science

Students complete all of

~~CMPT 300 - Operating Systems I (3)~~
CMPT 307 - Data Structures and Algorithms (3)
CMPT 353 - Computational Data Science (3)
CMPT 354 - Database Systems I (3)
~~CMPT 454 - Database Systems II (3)~~
CMPT 310 - Introduction to Artificial Intelligence (3)

Mathematics

Students complete one of

MATH 308 - Linear Optimization (3)
MATH 309 - Continuous Optimization (3)

Statistics

Students complete one of

ECON 333 - Statistical Analysis of Economic Data (4)
STAT 302 - Analysis of Experimental and Observational Data (3)
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)
STAT 350 - Linear Models in Applied Statistics (3)

and both of

STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 452 - Statistical Learning and Prediction (3)

and one of

STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)

Students must complete 9 additional units from this list

BUS 345 - Marketing Research (3)
BUS 362 - Business Process Analysis (4)
BUS 437 - Decision Analysis in Business (3)
BUS 440 - Simulation in Management Decision-making (4)
CMPT 308 - Computability and Complexity (3)
~~CMPT 310 - Introduction to Artificial Intelligence (3)~~
CMPT 373 - Software Development Methods (3)
CMPT 376W - Technical Writing and Group Dynamics (3)
CMPT 405 - Design and Analysis of Computing Algorithms (3)
CMPT 417 - Intelligent Systems (3)
CMPT 419 - Special Topics in Artificial Intelligence (3)
MACM 316 - Numerical Analysis I (3)
MATH 343 - Applied Discrete Mathematics (3)
MATH 345 - Introduction to Graph Theory (3)
STAT 342 - Introduction to Statistical Computing and Exploratory Data Analysis - SAS (2)
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)

Statistics Concentration Requirements

Lower Division Requirements

~~Students complete a minimum of 61 units.~~

Business Administration

Students complete all of

BUS 200 - Business Fundamentals (3)
BUS 217W - Critical Thinking in Business (3)
BUS 251 - Financial Accounting I (3)
BUS 272 - Behaviour in Organizations (3)

Computing Science

Students complete all of

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 225 - Data Structures and Programming (3)
CMPT 276 - Introduction to Software Engineering (3)
~~CMPT 295 - Introduction to Computer Systems (3)~~

Mathematics and Computing Science

Students complete both of

MACM 101 - Discrete Mathematics I (3)
MACM 201 - Discrete Mathematics II (3)

Data Science

Students complete

DATA 180 - Undergraduate Seminar in Data Science (1)

Mathematics

Students complete one of

MATH 150 - Calculus I with Review (4) *
MATH 151 - Calculus I (3) *
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

and all of

MATH 152 - Calculus II (3)
MATH 208W - Introduction to Operations Research (3)
MATH 251 - Calculus III (3)

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3) *

Statistics

Students complete all of

STAT 240 - Introduction to Data Science (3)
STAT 260 - Introductory R for Data Science (2)
STAT 261 - Laboratory for Introductory R for Data Science (1)
STAT 270 - Introduction to Probability and Statistics (3)
STAT 285 - Intermediate Probability and Statistics (3)

* Recommended

Upper Division Requirements

~~Students complete a minimum of 49 units.~~

Business Administration

Students complete all of

BUS 343 - Introduction to Marketing (3)
BUS 360W - Business Communication (4)
BUS 439 - Analytics Project (3) ~~*~~
BUS 445 - Customer Analytics (3) ~~**~~

~~*For this course, Data Science students are eligible for a prerequisite waiver for BUS 345, 437, 445, 462, 464, 90 units. Students should consult with their program advisor.~~

~~**For this course, Data Science students are eligible for a prerequisite waiver for BUS 336. Students should consult with their program advisor.~~

Computing Science

Students complete all of

~~CMPT 300 - Operating Systems I (3)~~
CMPT 307 - Data Structures and Algorithms (3)
CMPT 353 - Computational Data Science (3)
CMPT 354 - Database Systems I (3)
~~CMPT 454 - Database Systems II (3)~~
CMPT 310 - Introduction to Artificial Intelligence (3)

Mathematics

Students complete one of

MATH 308 - Linear Optimization (3)
MATH 309 - Continuous Optimization (3)

Statistics

Students complete all of

STAT 330 - Introduction to Mathematical Statistics (3)
STAT 350 - Linear Models in Applied Statistics (3)
STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 440 - Learning from Big Data (3)
STAT 450 - Statistical Theory (3)
STAT 452 - Statistical Learning and Prediction (3)

Name of Program or Name of Faculty Department of Statistics and Actuarial Science
Rationale for change: There have been issues with the Data Science program being too structured (i.e. very little room for choice) and having too many required courses. This has been causing problems particularly for transfer students who transfer in with a lot of courses not required for the program (i.e. they end up needing to graduate with well over 120 units). There has also been an issue with course conflicts between required courses, given that students do not get to choose which courses to take, and it's not feasible to coordinate course scheduling across four different departments/schools. The intention here is to reduce the number of required courses and to allow for more course options. We believe the changes below accomplish this, while maintaining the program's learning and skill outcomes, and the interdisciplinary nature of the program.
Effective term and year: Fall 2023
The following program(s) will be affected by these changes: Data Science 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.**

Bachelor of Science

The Department of Statistics and Actuarial Science and its partners, the Department of Mathematics, the Beedie School of Business, and the School of Computing Science, offer an honours program in Data Science (DATA) leading to a bachelor of science (BSc) with honours degree. This is a ~~highly structured~~ program providing a multidisciplinary approach to quantitative methods for business and industry in an environment of rapid changes in technology. The honours program offers specialization in one of three concentrations: Mathematics, Statistics, or Open Concentration.

The program is managed by a steering committee consisting of representatives from the above-mentioned departments, and faculty serve as liaisons between participating departments and the program director.

Students formally apply to be admitted into the program. Applications can be considered both for students entering Simon Fraser University, and for students already enrolled. Admission into the program is decided on a competitive basis. Students must maintain a 3.0 cumulative grade point average (CGPA) in DATA program course work to remain in the program and to graduate. It is

strongly recommended that students contact the Statistics advisor or program director early about admission and scheduling.

Students who wish to combine the DATA honours program with another major or minor program should consult with the Statistics advisor.

More information can be found on our website: https://www.sfu.ca/stat-actsci/undergraduate/current-students/program-info/data-science.html.

Program Requirements

Under University regulations, an honours degree requires the completion of a minimum of 120 units, including a minimum of 60 upper division units. Honours program students require a graduation cumulative grade point average of not less than 3.00.

Mathematics Concentration Requirements

Lower Division Requirements

~~Business Administration~~

Students complete all of

~~BUS 200 - Business Fundamentals (3)~~
~~BUS 217W - Critical Thinking in Business (3)~~
~~BUS 251 - Financial Accounting I (3)~~
BUS 272 - Behaviour in Organizations (3)

~~Computing Science~~

~~Students complete all of~~

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 225 - Data Structures and Programming (3)
~~CMPT 276 - Introduction to Software Engineering (3)~~

~~Mathematics and Computing Science~~

~~Students complete all of~~

MACM 101 - Discrete Mathematics I (3)
MACM 201 - Discrete Mathematics II (3)
MACM 203 - Computing with Linear Algebra (2)

MACM 204 - Computing with Calculus (2)
STAT 240 - Introduction to Data Science (3)
STAT 260 - Introductory R for Data Science (2)
STAT 261 - Laboratory for Introductory R for Data Science (1)
STAT 270 - Introduction to Probability and Statistics (3)

~~Data Science~~

~~Students complete~~

DATA 180 - Undergraduate Seminar in Data Science (1)

~~Mathematics~~

~~Students complete~~ **and** one of

MATH 150 - Calculus I with Review (4) *
MATH 151 - Calculus I (3)
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

and all of

MATH 152 - Calculus II (3)
MATH 208W - Introduction to Operations Research (3)
MATH 242 - Introduction to Analysis I (3)
MATH 251 - Calculus III (3)

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3) *

~~Statistics~~

~~Students complete all of~~
~~STAT 240 - Introduction to Data Science (3)~~
~~STAT 260 - Introductory R for Data Science (2)~~
~~STAT 261 - Laboratory for Introductory R for Data Science (1)~~
~~STAT 270 - Introduction to Probability and Statistics (3)~~
* Recommended

Lower Division Recommended Courses

CMPT 276 - Introduction to Software Engineering (3)

STAT 285 - Intermediate Probability and Statistics (3)

Upper Division Requirements

~~Business Administration~~

Students complete all of

BUS 343 - Introduction to Marketing (3)
~~BUS 360W - Business Communication (4)~~

~~**Computing Science**~~

~~Students complete all of~~

~~CMPT 307 - Data Structures and Algorithms (3)~~
~~CMPT 310 - Introduction to Artificial Intelligence (3)~~
~~CMPT 353 - Computational Data Science (3)~~
CMPT 354 - Database Systems I (3)

~~Mathematics and Computing Science~~

MACM 316 - Numerical Analysis I (3)
MATH 402W - Operations Research Clinic (4)

~~Mathematics~~

~~Students complete one of~~

MATH 308 - Linear Optimization (3)
~~MATH 309 - Continuous Optimization (3)~~

and one of

MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3)
MATH 320 - Introduction to Analysis II (3)
MATH 340 - Algebra II: Rings and Fields (3)
MATH 343 - Applied Discrete Mathematics (3)
MATH 345 - Introduction to Graph Theory (3)
MATH 348 - Introduction to Probabilistic Models (3)

~~and~~

~~MATH 402W - Operations Research Clinic (4)~~

and one additional 400-level MATH course

~~Statistics~~

~~Students complete~~ **and** one of

~~ECON 333 - Statistical Analysis of Economic Data (4)~~
STAT 302 - Analysis of Experimental and Observational Data (3)
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)
STAT 350 - Linear Models in Applied Statistics (3) *

~~and both of~~

~~STAT 403 - Intermediate Sampling and Experimental Design (3)~~
~~STAT 452 - Statistical Learning and Prediction (3)~~

~~and one of~~

~~STAT 445 - Applied Multivariate Analysis (3)~~
~~STAT 475 - Applied Discrete Data Analysis (3)~~
~~STAT 485 - Applied Time Series Analysis (3)~~

Students complete at least 8 courses from List 1 and 2, including a minimum of 4 courses from List 1 (which must include at least one STAT course and one CMPT course)

List 1

STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 452 - Statistical Learning and Prediction (3)
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)
CMPT 310 - Introduction to Artificial Intelligence (3)
CMPT 353 - Computational Data Science (3)
CMPT 459 - Special Topics in Database Systems (3)
CMPT 307 - Data Structures and Algorithms (3)
BUS 439 - Analytics Project (3) ***
BUS 445 - Customer Analytics (3) ***
MATH 309 - Continuous Optimization (3)

List 2

BUS 345 - Marketing Research (3)
BUS 362 - Business Process Analysis (4)
BUS 437 - Decision Analysis in Business (3) ***

BUS 440 - Simulation in Management Decision-making (4) ***
BUS 441 - Web Analytics (3) ***
CMPT 363 - User Interface Design (3)
CMPT 371 - Data Communications and Networking (3)
CMPT 340 - Biomedical Computing (3)
CMPT 419 - Special Topics in Artificial Intelligence (3)
CMPT 456 – Information Retrieval and Web Search (3)
CMPT 372 - Web II – Service-side Development (3) **
CMPT 373 - Software Development Methods (3) **
CMPT 410 - Machine Learning (3) **
CMPT 420 - Deep Learning (3) **
CMPT 454 - Database Systems II (3) **
CMPT 467 – Visualization (3) **
MATH 343 - Applied Discrete Mathematics (3)
MATH 345 - Introduction to Graph Theory (3)
MATH 348 - Introduction to Probabilistic Models (3)
MATH 408 - Discrete Optimization (3)
MATH 448 - Network Flows (3)
STAT 342 - Introduction to Statistical Computing and Exploratory Data Analysis - SAS (2)
STAT 360 - Advanced R for Data Science (2)
STAT 440 - Learning from Big Data (3) **
STAT 410 - Statistical Analysis of Sample Surveys (3) **
STAT 450 - Statistical Theory (3) **
STAT 460 – Bayesian Statistics (3) **

*** Recommended**

**** Course has extra prerequisite(s) (i.e. beyond what is required for the Data Science program)**

***** BUS 360W is recommended but not required. BUS 360W will be waived as a prerequisite for 400 division business courses for those in the Data Science Major, provided that an alternative approved upper division W course is in progress, or has been completed. Students should consult with a Department of Statistics and Actuarial Science Academic Advisor for further information on obtaining a waiver.**

Open Concentration Requirements

Lower Division Requirements

~~Business Administration~~

Students complete all of

~~BUS 200 - Business Fundamentals (3)~~
~~BUS 217W - Critical Thinking in Business (3)~~
~~BUS 251 - Financial Accounting I (3)~~
BUS 272 - Behaviour in Organizations (3)

~~Computing Science~~

~~Students complete all of~~

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 225 - Data Structures and Programming (3)
~~CMPT 276 - Introduction to Software Engineering (3)~~

~~Mathematics and Computing Science~~

~~Students complete both of~~

MACM 101 - Discrete Mathematics I (3)
MACM 201 - Discrete Mathematics II (3)

~~Data Science~~

~~Students complete~~

DATA 180 - Undergraduate Seminar in Data Science (1)
STAT 240 - Introduction to Data Science (3)
STAT 260 - Introductory R for Data Science (2)
STAT 261 - Laboratory for Introductory R for Data Science (1)
MATH 152 - Calculus II (3)

~~Mathematics~~

~~Students complete~~ **and** one of

MATH 150 - Calculus I with Review (4) *
MATH 151 - Calculus I (3) *
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

~~and both of~~

~~MATH 152 - Calculus II (3)~~
~~MATH 208W - Introduction to Operations Research (3)~~

and one of

MATH 208W - Introduction to Operations Research (3)
MACM 203 - Computing with Linear Algebra (2)

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3) *

~~Statistics~~

~~Students complete all of~~

~~STAT 240 - Introduction to Data Science (3)~~
~~STAT 260 - Introductory R for Data Science (2)~~
~~STAT 261 - Laboratory for Introductory R for Data Science (1)~~

and one of

BUS 232 - Business Statistics (3)
STAT 201 - Statistics for the Life Sciences (3)
STAT 203 - Introduction to Statistics for the Social Sciences (3)
STAT 205 - Introduction to Statistics (3)
STAT 270 - Introduction to Probability and Statistics (3) *

* Recommended

Lower Division Recommended Courses

BUS 217W - Critical Thinking in Business (3)
CMPT 276 - Introduction to Software Engineering (3)
STAT 285 - Intermediate Probability and Statistics (3)

Upper Division Requirements

~~Business Administration~~

Students complete all of

BUS 343 - Introduction to Marketing (3)
~~BUS 360W - Business Communication (4)~~
BUS 439 - Analytics Project (3) ***
BUS 445 - Customer Analytics (3) ***
CMPT 354 - Database Systems I (3)

MATH 308 - Linear Optimization (3)

and one of

STAT 302 - Analysis of Experimental and Observational Data (3)
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)
STAT 350 - Linear Models in Applied Statistics (3) **

and one of

BUS 360W - Business Communication (4) **
MATH 402W - Operations Research Clinic (4)
CMPT 376W - Technical Writing and Group Dynamics (3) **
STAT 300W - Statistics Communication (3) **

and at least 9 courses from List 1 and 2, including a minimum of 5 courses from List 1 (which must include at least two STAT courses and two CMPT courses)

List 1

STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 452 - Statistical Learning and Prediction (3)
STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)
CMPT 310 - Introduction to Artificial Intelligence (3)
CMPT 353 - Computational Data Science (3)
CMPT 459 - Special Topics in Database Systems (3)
CMPT 307 - Data Structures and Algorithms (3)
MATH 309 - Continuous Optimization (3) **

List 2

BUS 345 - Marketing Research (3)
BUS 362 - Business Process Analysis (4)
BUS 437 - Decision Analysis in Business (3) ***
BUS 440 - Simulation in Management Decision-making (4) ***
BUS 441 - Web Analytics (3) ***
CMPT 363 - User Interface Design (3)
CMPT 371 - Data Communications and Networking (3)
CMPT 340 - Biomedical Computing (3)
CMPT 419 - Special Topics in Artificial Intelligence (3)
CMPT 456 – Information Retrieval and Web Search (3)
CMPT 372 - Web II – Service-side Development (3) **
CMPT 373 - Software Development Methods (3) **

CMPT 410 - Machine Learning (3) **
CMPT 420 - Deep Learning (3) **
CMPT 454 - Database Systems II (3) **
CMPT 467 – Visualization (3) **
MACM 316 - Numerical Analysis I (3)
MATH 343 - Applied Discrete Mathematics (3)
MATH 345 - Introduction to Graph Theory (3)
MATH 348 - Introduction to Probabilistic Models (3)
MATH 408 - Discrete Optimization (3)
MATH 448 - Network Flows (3)
STAT 342 - Introduction to Statistical Computing and Exploratory Data Analysis - SAS (2)
STAT 360 - Advanced R for Data Science (2)
STAT 440 - Learning from Big Data (3) **
STAT 410 - Statistical Analysis of Sample Surveys (3) **
STAT 450 - Statistical Theory (3) **
STAT 460 – Bayesian Statistics (3) **

**** Course has extra prerequisite(s) (i.e. beyond what is required for the Data Science program)**

***** BUS 360W is recommended but not required. BUS 360W will be waived as a prerequisite for 400 division business courses for those in the Data Science Major, provided that an alternative approved upper division W course is in progress, or has been completed. Students should consult with a Department of Statistics and Actuarial Science Academic Advisor for further information on obtaining a waiver.**

****** Recommended; course has extra prerequisite(s) (i.e. beyond what is required for the Data Science program)**

~~Computing Science~~

~~Students complete all of~~

~~CMPT 307 - Data Structures and Algorithms (3)~~
~~CMPT 310 - Introduction to Artificial Intelligence (3)~~
~~CMPT 353 - Computational Data Science (3)~~
~~CMPT 354 - Database Systems I (3)~~
~~CMPT 370 - Information System Design (3)~~

~~Mathematics~~

~~Students complete one of~~
~~MATH 308 - Linear Optimization (3)~~

~~MATH 309 - Continuous Optimization (3)~~

~~Statistics~~

~~Students complete one of~~

~~ECON 333 - Statistical Analysis of Economic Data (4)~~
~~STAT 302 - Analysis of Experimental and Observational Data (3)~~
~~STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)~~
~~STAT 350 - Linear Models in Applied Statistics (3)~~

~~and both of~~

~~STAT 403 - Intermediate Sampling and Experimental Design (3)~~
~~STAT 452 - Statistical Learning and Prediction (3)~~

~~and one of~~

~~STAT 445 - Applied Multivariate Analysis (3)~~
~~STAT 475 - Applied Discrete Data Analysis (3)~~
~~STAT 485 - Applied Time Series Analysis (3)~~

~~Students must complete 9 additional units from this list~~

~~BUS 345 - Marketing Research (3)~~
~~BUS 362 - Business Process Analysis (4)~~
~~BUS 437 - Decision Analysis in Business (3)~~
~~BUS 440 - Simulation in Management Decision-making (4)~~
~~CMPT 308 - Computability and Complexity (3)~~
~~CMPT 322W - Professional Responsibility and Ethics (3)~~
~~CMPT 373 - Software Development Methods (3)~~
~~CMPT 376W - Technical Writing and Group Dynamics (3)~~
~~CMPT 405 - Design and Analysis of Computing Algorithms (3)~~
~~CMPT 417 - Intelligent Systems (3)~~
~~CMPT 419 - Special Topics in Artificial Intelligence (3)~~
~~CMPT 470 - Web-based Information Systems (3)~~
~~MACM 316 - Numerical Analysis I (3)~~
~~MATH 343 - Applied Discrete Mathematics (3)~~
~~MATH 345 - Introduction to Graph Theory (3)~~
~~STAT 342 - Introduction to Statistical Computing and Exploratory Data Analysis - SAS (2)~~
~~STAT 445 - Applied Multivariate Analysis (3)~~
~~STAT 475 - Applied Discrete Data Analysis (3)~~
~~STAT 485 - Applied Time Series Analysis (3)~~

Statistics Concentration Requirements

Lower Division Requirements

~~Business Administration~~

Students complete all of

~~BUS 200 - Business Fundamentals (3)~~
~~BUS 217W - Critical Thinking in Business (3)~~
~~BUS 251 - Financial Accounting I (3)~~
BUS 272 - Behaviour in Organizations (3)

~~Computing Science~~

~~Students complete all of~~

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)
CMPT 225 - Data Structures and Programming (3)
~~CMPT 276 - Introduction to Software Engineering (3)~~

~~Mathematics and Computing Science~~

~~Students complete both of~~

MACM 101 - Discrete Mathematics I (3)
~~MACM 201 - Discrete Mathematics II (3)~~

~~Data Science~~

~~Students complete~~

DATA 180 - Undergraduate Seminar in Data Science (1)
STAT 240 - Introduction to Data Science (3)
STAT 260 - Introductory R for Data Science (2)
STAT 261 - Laboratory for Introductory R for Data Science (1)
STAT 270 - Introduction to Probability and Statistics (3)
STAT 285 - Intermediate Probability and Statistics (3)

~~Mathematics~~

~~Students complete~~ **and** one of

MATH 150 - Calculus I with Review (4) *
MATH 151 - Calculus I (3) *
MATH 154 - Mathematics for the Life Sciences I (3)
MATH 157 - Calculus I for the Social Sciences (3)

and ~~all~~ **both** of

MATH 152 - Calculus II (3)
~~MATH 208W - Introduction to Operations Research (3)~~
MATH 251 - Calculus III (3)

and one of

MATH 208W - Introduction to Operations Research (3)
MACM 203 - Computing with Linear Algebra (2)

and one of

MATH 232 - Applied Linear Algebra (3)
MATH 240 - Algebra I: Linear Algebra (3) *

~~Statistics~~

~~Students complete all of~~

~~STAT 240 - Introduction to Data Science (3)~~
~~STAT 260 - Introductory R for Data Science (2)~~
~~STAT 261 - Laboratory for Introductory R for Data Science (1)~~
~~STAT 270 - Introduction to Probability and Statistics (3)~~
~~STAT 285 - Intermediate Probability and Statistics (3)~~

* Recommended

Lower Division Recommended Courses

CMPT 276 - Introduction to Software Engineering (3)
MACM 201 - Discrete Mathematics II (3) OR CMPT 210 - Probability and Computing (3)

Upper Division Requirements

~~Business Administration~~

Students complete all of

BUS 343 - Introduction to Marketing (3)
~~BUS 360W - Business Communication (4)~~
BUS 439 - Analytics Project (3) *****
BUS 445 - Customer Analytics (3) *****
CMPT 354 - Database Systems I (3)
MATH 308 - Linear Optimization (3)

~~Computing Science~~

~~Students complete all of~~

~~CMPT 307 - Data Structures and Algorithms (3)~~
~~CMPT 310 - Introduction to Artificial Intelligence (3)~~
~~CMPT 353 - Computational Data Science (3)~~
~~CMPT 354 - Database Systems I (3)~~

~~Mathematics~~

~~Students complete one of~~

~~MATH 308 - Linear Optimization (3)~~
~~MATH 309 - Continuous Optimization (3)~~

~~Statistics~~

~~Students complete all of~~

STAT 330 - Introduction to Mathematical Statistics (3)
STAT 350 - Linear Models in Applied Statistics (3)
STAT 403 - Intermediate Sampling and Experimental Design (3)
STAT 440 - Learning from Big Data (3)
STAT 450 - Statistical Theory (3)
STAT 452 - Statistical Learning and Prediction (3)
STAT 300W - Statistics Communication (3) **

and at least 4 courses from the List 1 and 2, including a minimum of 2 CMPT courses.

List 1

STAT 445 - Applied Multivariate Analysis (3)
STAT 475 - Applied Discrete Data Analysis (3)
STAT 485 - Applied Time Series Analysis (3)
CMPT 310 - Introduction to Artificial Intelligence (3)
CMPT 353 - Computational Data Science (3)
CMPT 459 - Special Topics in Database Systems (3)

CMPT 307 - Data Structures and Algorithms (3) **
MATH 309 - Continuous Optimization (3) **

List 2

BUS 345 - Marketing Research (3)
BUS 362 - Business Process Analysis (4)
BUS 437 - Decision Analysis in Business (3) *
BUS 440 - Simulation in Management Decision-making (4) *
BUS 441 - Web Analytics (3) *
CMPT 363 - User Interface Design (3)
CMPT 371 - Data Communications and Networking (3)
CMPT 340 - Biomedical Computing (3)
CMPT 419 - Special Topics in Artificial Intelligence (3)
CMPT 456 – Information Retrieval and Web Search (3)
CMPT 372 - Web II – Service-side Development (3) **
CMPT 373 - Software Development Methods (3) **
CMPT 410 - Machine Learning (3) **
CMPT 420 - Deep Learning (3) **
CMPT 454 - Database Systems II (3) **
CMPT 467 – Visualization (3) **
MACM 316 - Numerical Analysis I (3)
MATH 343 - Applied Discrete Mathematics (3) **
MATH 345 - Introduction to Graph Theory (3) **
MATH 348 - Introduction to Probabilistic Models (3)
MATH 408 - Discrete Optimization (3)
MATH 448 - Network Flows (3)
STAT 342 - Introduction to Statistical Computing and Exploratory Data Analysis - SAS (2)
STAT 360 - Advanced R for Data Science (2)
STAT 410 - Statistical Analysis of Sample Surveys (3)
STAT 460 – Bayesian Statistics (3)

*** BUS 360W is recommended but not required. BUS 360W will be waived as a prerequisite for 400 division business courses for those in the Data Science Major, provided that an alternative approved upper division W course is in progress, or has been completed. Students should consult with a Department of Statistics and Actuarial Science Academic Advisor for further information on obtaining a waiver.**

**** Course has extra prerequisite(s) (i.e. beyond what is required for the Data Science program)**

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~~Double Majors and Minors~~

~~Students wishing to complete a second major or a minor in addition to a Data Science (DATA) major must satisfy all DATA requirements. At least 34 upper division units must be allocated exclusively to the DATA major.~~

~~This includes at least nine units from each of the lists under the sub-headings Business Administration, Computing Science, Mathematics and Statistics. Units used to satisfy DATA upper division requirements beyond these 34 can be applied simultaneously to the other major, minor or honours.~~