



8888 University Drive,  
Burnaby, BC  
Canada V5A 1S6

TEL: 778.782.6654  
FAX: 778.782.5876

avpacad@sfu.ca  
www.sfu.ca/vpacademic

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**MEMORANDUM**

ATTENTION	Senate	DATE	June 3, 2022
FROM	Elizabeth Elle, Vice-Chair	PAGES	1/2
RE:	Senate Committee on Undergraduate Studies Program Changes		

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**For information:**

Acting under delegated authority at its meeting of June 2, 2022 SCUS approved the following curriculum revision effective Spring 2023.

**a. Faculty of Environment (SCUS 22-39)**
**1. School of Environmental Science**

- (i) Upper division requirement changes to the:
- Environmental Science Major
  - Environmental Science Honours

**b. Faculty of Health Sciences (SCUS 22-40)**

- (i) Upper and lower division requirement changes to the Life Sciences Concentration:
- Health Sciences Major BSc
  - Health Sciences Honours BSc

**c. Faculty of Applied Sciences (SCUS 22-46)**
**1. School of Computing Science**

- (i) Upper division requirement changes to the Software Systems Major

**2. School of Engineering Science**

- (i) Upper division requirement changes to the
- Engineering Science Major, Computer Engineering Option
  - Engineering Science Major, Electronics Engineering Option

- Engineering Science Major, Systems Engineering Option
- Engineering Science Honours, Biomedical Engineering Option
- Engineering Science Honours, Computer Engineering Option
- Engineering Science Honours, Electronics Engineering Option
- Engineering Science Honours, Engineering Physics Option
- Engineering Science Honours, Systems Engineering Option
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### 3. School of Sustainable Energy Engineering

(i) Requirement changes to the:

- Sustainable Energy Engineering Honours
- Sustainable Energy Engineering Major

### **d. Beedie School of Business (SCUS 22-47)**

(i) Requirement changes to the Business Technology Management Certificate (Fall 2023)

### **e. Faculty of Science (SCUS 22-48)**

#### 1. Department of Biological Sciences

(i) Upper division requirement changes to the:

- Biological Sciences Major
- Biological Sciences Honours
- Environmental Toxicology Minor

#### 2. Department of Chemistry

(i) Lower division requirement changes to the:

- Chemistry Major
- Chemistry Honours
- Chemistry and Earth Sciences Joint Major
- Chemistry and Earth Sciences Joint Honours
- Chemical Physics Major
- Chemical Physics Honours
- Chemistry and Molecular Biology and Biochemistry Joint Major
- Environmental Chemistry Minor

#### 3. Department of Molecular Biology and Biochemistry

(i) Lower division requirement changes to the Molecular Biology and Biochemistry Major and 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>.



<p><b>Name of Program or Name of Faculty</b> Bachelor of Science Major in Environmental Science Faculty of Environment</p>
<p><b>Rationale for change:</b>  To incorporate newly created EVSC courses into the existing curriculum.</p>
<p><b>Effective term and year:</b> Spring 2023</p>
<p><b>The following program(s) will be affected by these changes:</b>  Bachelor of Science Major in Environmental Science</p>

**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**.

<p>Environmental Science Major Bachelor of Science</p> <p>(...)</p> <p>General Concentration (...)</p> <p>Upper Division Requirements</p> <p>Students who choose this concentration will <del>also complete two</del> <b>three of the following</b>  <b>EVSC 320 - Watershed Ecology (4)</b>  EVSC 334 - Earth's Past Climates (4) <b>or REM 334 - Earth's Past Climates (4)</b>  EVSC 395 - Special Topics in Environmental Science (3)  EVSC 445 - <del>STT</del>-Environmental Data Analysis (4)  <b>EVSC 460 - Ecogeomorphology (4)</b>  EVSC 495 - Special Topics in Environmental Science (3)</p> <p>and 12 units from  BISC 309 - Conservation Biology (3) †  BISC 407 - Population Dynamics (3)  BISC 412 - Aquatic Ecology (3)</p>
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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 445 - Environmental Data Analysis (4)**  
**EVSC 460 – Ecogeomorphology (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 414 - Climate Change (4)\*  
 GEOG 417W - Advanced Soil Science (4)  
 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 445 - Environmental Risk Assessment (4)  
 REM 471 - Forest Ecosystem Management (4)

(...)

### Applied Biology Concentration

(...)

Upper Division Requirements

Students complete one of

EVSC 445 - Environmental Data Analysis (4)

STAT 302 - Analysis of Experimental and Observational Data (3)

(...)

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

(...)

### Environmental Archaeology Concentration

(...)

Upper Division Requirements

(...)

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 - ~~STT~~-Environmental Data Analysis (4)

**EVSC 460 – Ecogeomorphology (4)**

EVSC 495 - Special Topics in Environmental Science (3)\*

(...)

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

### Environmental Earth Systems Concentration

(...)

#### 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 460 – Ecogeomorphology (4)**

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)

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 Concentration

(...)

#### Upper Division Requirements

(...)

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 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)**

plus ~~8~~ 12-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.**

Water Science Concentration

(...)

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)

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)





<p><b>Name of Program or Name of Faculty</b>          Bachelor of Science Honours in Environmental Science          Faculty of Environment</p>
<p><b>Rationale for change:</b>           To incorporate newly created EVSC courses into the existing curriculum.</p>
<p><b>Effective term and year:</b>          Spring 2023</p>
<p><b>The following program(s) will be affected by these changes:</b>           Bachelor of Science Honours in Environmental Science</p>

**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**.

<p>Environmental Science Honours          Bachelor of Science</p> <p>(...)          Applied Biology Concentration          (...)          Upper Division Requirements</p> <p>Students complete one of          EVSC 445 - STT-Environmental Data Analysis (4)          STAT 302 - Analysis of Experimental and Observational Data (3)          (...)</p> <p>* Requires approval from the Director for use in the concentration <b>or school designate, to be acquired through the Academic Advisor</b></p> <p>(...)</p> <p>Environmental Archaeology Concentration</p> <p>(...)          Upper Division Requirements</p>
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(...)

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 - ~~STT~~-Environmental Data Analysis (4)

**EVSC 460 – Ecogeomorphology (4)**

EVSC 495 - Special Topics in Environmental Science (3)\*

(...)

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

**Environmental Earth Systems Concentration**

(...)

**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 460 – Ecogeomorphology (4)**

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)

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 Concentration

(...)

#### Upper Division Requirements

(...)

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 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)**

plus ~~8~~ 12-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.**

#### Water Science Concentration

(...)

#### 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)

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)



<p><b>Name of Program or Name of Faculty</b></p> <p>Faculty of Health Sciences, B.Sc., Life Sciences Concentration (BSc-LS)</p>
<p><b>Rationale for change:</b></p> <p>The changes help to align upper division course requirements and includes the addition of a new 300-level laboratory course as an option for students completing this major. We also include a list of lower division W designated courses that are parallel to the list found with the other BSc concentration in Population Health and Data in the Faculty of Health Sciences. Finally, HSCI 338 name change will be effective in the Fall 2022.</p>
<p><b>Effective term and year:</b></p> <p>Spring 2023</p>
<p><b>The following program(s) will be affected by these changes:</b></p> <p>Health Sciences Major, Bachelor of Science, Life Sciences Concentration</p>

**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**.

<p>Life Sciences Concentration Lower Division Requirements</p> <p>Students complete all of</p> <p>BISC 101 - General Biology (4)</p> <p>BISC 102 - General Biology (4)</p> <p>BISC 202 - Genetics (3)</p> <p>CHEM 121 - General Chemistry and Laboratory I (4)</p> <p>CHEM 122 - General Chemistry II (2)</p> <p>CHEM 281 - Organic Chemistry and Laboratory I (4)</p> <p>CHEM 282 - Organic Chemistry II (2)</p> <p>HSCI 130 - Foundations of Health Science (4)</p> <p>HSCI 230 - Evaluating Epidemiological Research (3)</p> <p>MATH 154 - Calculus I for the Biological Sciences (3)</p> <p>MATH 155 - Calculus II for the Biological Sciences (3)</p> <p>MBB 222 - Molecular Biology and Biochemistry (3)</p> <p>MBB 231 - Cellular Biology and Biochemistry (3)</p> <p>PHYS 101 - Physics for the Life Sciences I (3)</p> <p>STAT 201 - Statistics for the Life Sciences (3)</p> <p><b>and one of</b></p> <p><b>ENGL 111W - Literary Classics in English (3)</b></p>
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**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)**

and one of

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

Life Sciences Concentration Upper Division Requirements

Students complete all of

HSCI 305 - The Canadian Health System (3)  
HSCI 319W - Applied Health Ethics (3)  
HSCI 321 - Human Pathophysiology (3)  
HSCI 324 - Human Population Genetics and Evolution (3)  
MBB 331 - Molecular Biology (4)

and one of

STAT 302 - Analysis of Experimental and Observational Data (3)  
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)

and one of

HSCI 323 - Principles of Pharmacology and Toxicology (3)  
HSCI 326 - Introduction to the Immune System (3)  
HSCI 338 - ~~Animal~~ Virology (3)

and one of

BISC 357 - Genetic Engineering (4)  
MBB 308 - Molecular Biology Laboratory (3)  
MBB 309W - Biochemistry Laboratory (4)  
**HSCI 336 - Health and Life Sciences Laboratory (4) \*Recommended**

and one of

HSCI 440 - Cell Pathophysiology Laboratory (4)  
HSCI 441 - Virology Laboratory (4)  
HSCI 442 - Immunology Laboratory (4)

and two of



HSCI 427 - Immune Responses in Health and Disease (3)  
HSCI 474 - Seminar in Neuropharmacology (3)  
HSCI 475 - Seminar in Molecular Mechanisms of Epigenetics (3)  
HSCI 476 - Seminar in Molecular Basis of Drug Action and Environmental Exposure (3)  
HSCI 477 - Seminar in Vaccine Immunology (3)  
HSCI 478 - Seminar in Molecular Epidemiology of Infectious Diseases (3)  
HSCI 482 - Senior Seminar in Infectious Diseases (3)



<p><b>Name of Program or Name of Faculty</b></p> <p>Faculty of Health Sciences, B.Sc., Life Sciences Concentration (BSc-LS)</p>
<p><b>Rationale for change:</b></p> <p>The changes help to align upper division course requirements and includes the addition of a new 300-level laboratory course as an option for students completing this major. We also include a list of lower division W designated courses that are parallel to the list found with the other BSc concentration in Population Health and Data in the Faculty of Health Sciences. Finally, HSCI 338 name change will be effective in the Fall 2022.</p>
<p><b>Effective term and year:</b></p> <p>Spring 2023</p>
<p><b>The following program(s) will be affected by these changes:</b></p> <p>Health Sciences Honours, Bachelor of Science, Life Sciences Concentration</p>

**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**.

<p>Life Sciences Concentration Lower Division Requirements</p> <p>Students complete all of</p> <p>BISC 101 - General Biology (4)</p> <p>BISC 102 - General Biology (4)</p> <p>BISC 202 - Genetics (3)</p> <p>CHEM 121 - General Chemistry and Laboratory I (4)</p> <p>CHEM 122 - General Chemistry II (2)</p> <p>CHEM 281 - Organic Chemistry and Laboratory I (4)</p> <p>CHEM 282 - Organic Chemistry II (2)</p> <p>HSCI 130 - Foundations of Health Science (4)</p> <p>HSCI 230 - Evaluating Epidemiological Research (3)</p> <p>MATH 154 - Calculus I for the Biological Sciences (3)</p> <p>MATH 155 - Calculus II for the Biological Sciences (3)</p> <p>MBB 222 - Molecular Biology and Biochemistry (3)</p> <p>MBB 231 - Cellular Biology and Biochemistry (3)</p> <p>PHYS 101 - Physics for the Life Sciences I (3)</p> <p>STAT 201 - Statistics for the Life Sciences (3)</p> <p><b>and one of</b></p> <p><b>ENGL 111W - Literary Classics in English (3)</b></p>
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**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)**

and one of

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

Life Sciences Concentration Upper Division Requirements

Students complete all of

HSCI 305 - The Canadian Health System (3)  
HSCI 319W - Applied Health Ethics (3)  
HSCI 321 - Human Pathophysiology (3)  
HSCI 324 - Human Population Genetics and Evolution (3)  
MBB 331 - Molecular Biology (4)

and one of

STAT 302 - Analysis of Experimental and Observational Data (3)  
STAT 305 - Introduction to Biostatistical Methods for Health Sciences (3)

and one of

HSCI 323 - Principles of Pharmacology and Toxicology (3)  
HSCI 326 - Introduction to the Immune System (3)  
HSCI 338 - ~~Animal~~ Virology (3)

and one of

BISC 357 - Genetic Engineering (4)  
MBB 308 - Molecular Biology Laboratory (3)  
MBB 309W - Biochemistry Laboratory (4)  
**HSCI 336 - Health and Life Sciences Laboratory (4) \*Recommended**

and one of

HSCI 440 - Cell Pathophysiology Laboratory (4)  
HSCI 441 - Virology Laboratory (4)  
HSCI 442 - Immunology Laboratory (4)  
HSCI 494 - Independent Laboratory Research (9)

and two of



HSCI 427 - Immune Responses in Health and Disease (3)  
HSCI 474 - Seminar in Neuropharmacology (3)  
HSCI 475 - Seminar in Molecular Mechanisms of Epigenetics (3)  
HSCI 476 - Seminar in Molecular Basis of Drug Action and Environmental Exposure (3)  
HSCI 477 - Seminar in Vaccine Immunology (3)  
HSCI 478 - Seminar in Molecular Epidemiology of Infectious Diseases (3)  
HSCI 482 - Senior Seminar in Infectious Diseases (3)



<b>Name of Program or Name of Faculty</b> School of Computing Science
<b>Rationale for change:</b> CMPT 372 would be offered instead of CMPT 470
<b>Effective term and year:</b> Spring 2023
<b>The following program(s) will be affected by these changes:</b>  Software Systems 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**.

Software Systems Major ... Program Requirements ... Systems Requirements Students complete at least 12 upper division units, including  CMPT 300 - Operating Systems I (3) and three of  CMPT 354 - Database Systems I (3) CMPT 371 - Data Communications and Networking (3) <b>CMPT 372 - Web II-Server-side Development (3)</b> CMPT 431 - Distributed Systems (3) CMPT 433 - Embedded Systems (3) CMPT 454 - Database Systems II (3) <del>CMPT 470 - Web-based Information Systems (3)</del> CMPT 471 - Networking II (3)
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**Name of Program or Name of Faculty**

School of Engineering Science

**Rationale for change:**

ENSC has decided to remove the co-op as pre-requisite to declare the option as well as taking upper division courses. This pre-req is not practical these days and many students are affected by not being able to progress in their educational plan. Therefore, the school has decided to remove this requirement.

**Effective term and year:**

Spring 2023

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

Major

Engineering Science, Computer Engineering Option  
Engineering Science, Electronics Engineering Option  
Engineering Science, Systems Engineering Option

Honours

Engineering Science, Biomedical Engineering Option  
Engineering Science, Computer Engineering Option  
Engineering Science, Electronics Engineering Option  
Engineering Science, Engineering Physics Option  
Engineering Science, Systems Engineering Option

**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 Enrollment Requirements**

To be eligible to enroll in upper division engineering courses, excluding ENSC 320, students must have declared their option. ~~Before a student can declare their option, they must have successfully completed at least one co-op term (ENSC 194, ENSC 195, or ENSC 196). Students that fail to complete the first co-op as scheduled will be required to meet with an Academic Advisor from the Faculty of Applied Sciences. Failure to complete the first co-op in a timely fashion will result in the student being transferred to the BGS Applied Sciences program.~~

There is an absolute minimum of 80 units completed to enroll in 400-level courses. Please note that specific courses may have higher requirements.

[...]

### Calendar Entry Change

#### School of Sustainable Energy Engineering, Faculty of Applied Sciences

<p>Rationale for change:</p> <p>There have been some changes, mainly course additions and one course replacement, in SEE major program, which are now being reflected in SEE Honours program too.</p>
<p>Effective term and year:</p> <p>Spring 2023</p>
<p>The following program(s) will be affected by these changes:</p> <p>Sustainable Energy Engineering Honours Program</p>

**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**.

<p>...</p> <h2>Program Requirements</h2> <p>The following core courses are required for the sustainable energy engineering honours and cannot be substituted for "equivalent" courses in other areas without prior approval. "Equivalent" courses taken without prior approval will not be applied to graduation requirements. Students should consult an academic advisor within their program for details on obtaining permission.</p> <p>The program requires a cumulative grade point average (CGPA) and an upper division grade point average (UDGPA) of at least 3.0 in accordance with university graduation requirements. A grade of C- or better in prerequisite courses is required to enroll in sustainable energy engineering courses.</p> <p>Students complete all of</p> <p>(...)</p> <p><del>REM 321 Ecological Economics (4)</del></p> <p><b>REM 350 Energy Management for a Sustainable Climate and Society (4)</b></p> <p>(...)</p>
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## Elective Courses

### Technical Elective Courses

Students must complete three technical elective courses from the following SEE Technical Elective list. With permission from the SEE undergraduate curriculum committee chair, students may replace one technical elective with either a directed study (SEE 486) or a special project laboratory course. Approved special topics courses may also be counted here.

...

- SEE 464 – Energy Systems Modeling for Buildings (3)**
- SEE 475 – Special Topics in Sustainable Energy Engineering (3)**
- SEE 476 – Special Topics in Sustainable Energy Engineering (3)**
- SEE 477 – Special Topics in Sustainable Energy Engineering (3)**

...

### WQB Requirement Modifications for Sustainable Energy Engineering

For students in the Sustainable Energy Engineering program, the total number of Breadth-Social Sciences (B-Soc) and Breadth-Humanities (B-Hum) courses is reduced to nine units (three courses), with at least three units (one course) in each category.

As the curriculum already requires two B-Soc designated courses (BUS 238 and ~~REM 321~~ **REM 350**), students need only take one breadth-humanities course, in addition to the required and elective courses indicated above, in order to complete the university breadth and SEE complementary studies requirement.

...



**Calendar Entry Change**

**School of Sustainable Energy Engineering, Faculty of Applied Sciences**

Rationale for change:  REM 350 has replaced REM 321 in course list under program requirements, but this change is not reflected WBQ requirement.
Effective term and year:  Spring 2023
The following program(s) will be affected by these changes:  Sustainable Energy Engineering Major Program

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

<p>...</p> <h2>WQB Requirement Modifications for Sustainable Energy Engineering</h2> <p>For students in the Sustainable Energy Engineering program, the total number of Breadth-Social Sciences (B-Soc) and Breadth-Humanities (B-Hum) courses is reduced to nine units (three courses), with at least three units (one course) in each category.</p> <p>As the curriculum already requires two B-Soc designated courses (BUS 238 and <del>REM 321</del> <b>REM 350</b>), students need only take one breadth-humanities course, in addition to the required and elective courses indicated above, in order to complete the university breadth and SEE complementary studies requirement.</p> <p>...</p>
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<p><b>Name of Program or Name of Faculty</b></p> <p>Beedie School of Business</p>
<p><b>Rationale for change:</b></p> <p>Students pursuing the BTM certificate have taken CMPT 130, which is not currently a requirement. The School of Computing Science confirmed that CMPT 130 was more challenging than CMPT 120 and to support students pursuing the BTM certificate this course has been added as an option.</p>
<p><b>Effective term and year:</b></p> <p>Fall 2023</p>
<p><b>The following program(s) will be affected by these changes:</b></p> <ul style="list-style-type: none"> <li>• Business Technology Management Certificate</li> </ul>

**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**.

<p><b>Business Technology Management</b>          CERTIFICATE</p> <p>[...]</p> <p><b>Management Information Systems Specialization</b></p> <p>BUS 465 - Business Systems Development (3)</p> <p>and any two of</p> <p>BUS 440 - Simulation in Management Decision-making (4)          BUS 466 - Web-Enabled Business (3)          BUS 486 - Leadership (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) *</p>
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BUS 494 - Selected Topics in Business Administration (3) \*

BUS 495 - Selected Topics in Business Administration (4) \*

and one of

CMPT 120 - Introduction to Computing Science and Programming I (3)

**CMPT 130 - Introduction to Computer Programming I (3)**

CMPT 272 - Web I - Client-side Development (3)

IAT 201 - Human-Computer Interaction and Cognition (3)

\*When offered as a selected topics course in Management Information Systems.



<p><b>Name of Program or Name of Faculty</b></p> <p>Biological Sciences</p>
<p><b>Rationale for change:</b></p> <p>(1) BISC 326 Biology of Algae and Fungi is being split into 2 separate courses: BISC 327 Algal Biology and BISC 328 Fungal Biology and Ecology.</p> <p>(2) BISC 434, 439: these courses are being deleted from the calendar.</p> <p>(3) BISC 430 was temporarily withdrawn from the calendar a few years ago, and was dropped from the list of course options. It has since been 'revived' and taught, and is being added back into the program options.</p>
<p><b>Effective term and year:</b></p> <p>Spring 2023</p>
<p><b>The following program(s) will be affected by these changes:</b></p> <p>Biological Sciences Major          Biological Sciences Honours</p>

**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**.

<p>Upper Division Requirements</p> <p>[...]</p> <p>All students complete three core courses, as follows.</p> <p>BISC 300 - Evolution (3)          BISC 333 - Developmental Biology (3)</p>
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and at least one of

- BISC 303 - Microbiology (4)
- BISC 306 - Invertebrate Biology (4)
- BISC 316 - Vertebrate Biology (4)
- BISC 317 - Insect Biology (3)
- BISC 318 - Parasitology (3)
- ~~BISC 326 - Biology of Algae and Fungi (3)~~
- BISC 327 - Algal Biology (4)**
- BISC 328 - Fungal Biology and Ecology (3)**
- BISC 337 - Plant Biology (4)

### Cells, Molecules, and Physiology (CMP) Concentration

[...]

and at least five additional stream electives from

- BISC 302W - Genetic Analysis (3)
- BISC 303 - Microbiology (4)
- BISC 305 - Animal Physiology (3)
- BISC 313 - Environmental Toxicology: A Mechanistic Perspective (3)
- BISC 357 - Genetic Engineering (4)
- BISC 366 - Plant Physiology (3)
- BISC 403 - Current Topics in Cell Biology (3)
- BISC 405 - Neurobiology (3)
- BISC 421 - Models in Biology: From Molecules to Migration (3)
- BISC 423 - Developmental Neurobiology (3)
- BISC 424 - Applied Genomics (3)
- BISC 425 - Sensory Biology (3)
- BISC 428 - Cell Anatomy (3)
- BISC 430 - Microbe-Plant Interactions (3)**
- ~~BISC 439 - Industrial Microbiology (4)~~
- BISC 445 - Environmental Physiology of Animals (3)
- BISC 455 - Endocrinology (3)
- BISC 457 - Plant Molecular Biology and Biotechnology (3)
- BISC 471 - Special Topics in Cells, Molecules and Physiology (3)
- BISC 472 - Special Topics in Cells, Molecules and Physiology (3)
- BISC 475 - Special Topics in Biology (3)
- BISC 497W - Undergraduate Research: Writing Intensive (3)
- BISC 498 - Undergraduate Research I (3)
- BISC 499 - Undergraduate Research II (3)
- BPK 408W - Cellular Physiology Laboratory (3)

[...]

## Ecology, Evolution, and Conservation (EEC) Concentration

[...]

and at least one additional organismal course from

- BISC 306 - Invertebrate Biology (4)
- BISC 316 - Vertebrate Biology (4)
- BISC 317 - Insect Biology (3)
- ~~BISC 326 - Biology of Algae and Fungi (3)~~
- BISC 327 - Algal Biology (4)**
- BISC 328 - Fungal Biology and Ecology (3)**
- BISC 337 - Plant Biology (4)

[...]

and at least three additional stream electives from

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

[...]



<b>Name of Program or Name of Faculty</b>
Biological Sciences
<b>Rationale for change:</b>
BISC 439 is being deleted from the course calendar.
<b>Effective term and year:</b>
Spring 2023
<b>The following program(s) will be affected by these changes:</b>
Environmental Toxicology Minor

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

<b>Upper Division Requirements</b>
[...]
and three of
BISC 309 - Conservation Biology (3)
BISC 435 - Introduction to Pest Management (3)
<del>BISC 439 - Industrial Microbiology (4)</del>
BISC 445 - Environmental Physiology of Animals (3)
BPK 431 - Integrative Cancer Biology (3)
CHEM 371 - Chemistry of the Aqueous Environment (3)
HSCI 323 - Principles of Pharmacology and Toxicology (3)
REM 311 - Applied Ecology (3)
REM 350 - Energy Management for a Sustainable Climate and Society (4)
REM 412 - Environmental Modeling (4)
REM 445 - Environmental Risk Assessment (4)
[...]



<b>Name of Program or Name of Faculty</b>  Department of Chemistry
<b>Rationale for change:</b>  Updating the permanent change of CHEM 215 to CHEM 210 and 216.
<b>Effective term and year:</b>  Spring 2023
<b>The following program(s) will be affected by these changes:</b>  Chemistry Major Chemistry 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**.

<b>Lower Division Requirements</b>  ...  CHEM 121 - General Chemistry and Laboratory I (4) CHEM 122 - General Chemistry II (2) CHEM 126 - General Chemistry Laboratory II (2) <del>CHEM 215 - Introduction to Analytical Chemistry and Laboratory (4)</del> <u>CHEM 210 - Introduction to Analytical Chemistry (2)</u> <u>CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)</u> CHEM 230 - Inorganic Chemistry (3) CHEM 236W - Inorganic Chemistry Laboratory (3) CHEM 260 - Atoms, Molecules, Spectroscopy (4) CHEM 266 - Physical Chemistry Laboratory I (2) CHEM 281 - Organic Chemistry and Laboratory I (4)  ...
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<b>Name of Program or Name of Faculty</b>  Department of Chemistry
<b>Rationale for change:</b>  Updating the permanent change of CHEM 215 to CHEM 210 and 216.
<b>Effective term and year:</b>  Spring 2023
<b>The following program(s) will be affected by these changes:</b>  Chemistry and Earth Sciences Joint Major Chemistry and Earth Sciences 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**.

<b>Lower Division Requirements</b>  Students will complete a minimum of 69 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) <del>CHEM 215 - Introduction to Analytical Chemistry and Laboratory (4)</del> <u>CHEM 210 - Introduction to Analytical Chemistry (2)</u> <u>CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)</u> 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)  ...
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<b>Name of Program or Name of Faculty</b>  Department of Chemistry
<b>Rationale for change:</b>  Updating the permanent change of CHEM 215 to CHEM 210 and 216.
<b>Effective term and year:</b>  Spring 2023
<b>The following program(s) will be affected by these changes:</b>  Chemical Physics Major Chemical Physics 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**.

<b>Lower Division Requirements</b>  Complete all of  CHEM 121 - General Chemistry and Laboratory I (4) CHEM 122 - General Chemistry II (2) CHEM 126 - General Chemistry Laboratory II (2) <del>CHEM 215 - Introduction to Analytical Chemistry and Laboratory (4)</del> <b>CHEM 210 - Introduction to Analytical Chemistry (2)</b> <b>CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)</b> CHEM 230 - Inorganic Chemistry (3) CHEM 236W - Inorganic Chemistry Laboratory (3) CHEM 266 - Physical Chemistry Laboratory I (2) CHEM 281 - Organic Chemistry and Laboratory I (4)  ...
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<b>Name of Program or Name of Faculty</b> Department of Chemistry
<b>Rationale for change:</b> Updating the permanent change of CHEM 215 to CHEM 210 and 216.
<b>Effective term and year:</b> Spring 2023
<b>The following program(s) will be affected by these changes:</b> Chemistry and Molecular Biology and Biochemistry 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**.

<b>Lower Division Requirements</b> Students complete all of  CHEM 121 - General Chemistry and Laboratory I (4) CHEM 122 - General Chemistry II (2) CHEM 126 - General Chemistry Laboratory II (2) <del>CHEM 215 - Introduction to Analytical Chemistry and Laboratory (4)</del> <u>CHEM 210 - Introduction to Analytical Chemistry (2)</u> <u>CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)</u> 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)  ...
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<b>Name of Program or Name of Faculty</b>  Department of Chemistry
<b>Rationale for change:</b>  Updating the permanent change of CHEM 215 to CHEM 210 and 216.
<b>Effective term and year:</b>  Spring 2023
<b>The following program(s) will be affected by these changes:</b>  Environmental Chemistry 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**.

<h2>Program Requirements</h2> <p>Students complete all of</p> <p>CHEM 121 - General Chemistry and Laboratory I (4) CHEM 122 - General Chemistry II (2) CHEM 126 - General Chemistry Laboratory II (2) <del>CHEM 215 - Introduction to Analytical Chemistry and Laboratory (4)</del> <u>CHEM 210 - Introduction to Analytical Chemistry (2)</u> <u>CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)</u> CHEM 230 - Inorganic Chemistry (3) CHEM 236W - Inorganic Chemistry Laboratory (3) CHEM 281 - Organic Chemistry and Laboratory I (4)  ...</p>
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<b>Name of Program or Name of Faculty</b> Department of Molecular Biology and Biochemistry
<b>Rationale for change:</b> Updating the permanent change of CHEM 215 to CHEM 210 and 216.
<b>Effective term and year:</b> Spring 2023
<b>The following program(s) will be affected by these changes:</b> Molecular Biology and Biochemistry Major Molecular Biology and Biochemistry 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**.

<b>Lower Division Requirements</b> Students complete all of BISC 101 - General Biology (4) BISC 102 - General Biology (4) BISC 202 - Genetics (3) CHEM 121 - General Chemistry and Laboratory I (4) CHEM 122 - General Chemistry II (2) CHEM 126 - General Chemistry Laboratory II (2) CHEM 281 - Organic Chemistry and Laboratory I (4) CHEM 286 - Organic Chemistry Laboratory II (2) MBB 222 - Molecular Biology and Biochemistry (3) MBB 231 - Cellular Biology and Biochemistry (3)
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and ~~both~~ all of

~~CHEM 215 - Introduction to Analytical Chemistry and Laboratory (4)~~

**CHEM 210 - Introduction to Analytical Chemistry (2)**

**CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)**

CHEM 282 - Organic Chemistry II (2)

or ~~both~~ all of

~~CHEM 215 - Introduction to Analytical Chemistry and Laboratory (4)~~

**CHEM 210 - Introduction to Analytical Chemistry (2)**

**CHEM 216 - Introduction to Analytical Chemistry Laboratory (2)**

CHEM 283 - Organic Chemistry IIb (3)

or both of

CHEM 283 - Organic Chemistry IIb (3)

CHEM 380 - Chemical and Instrumental Methods of Identification of Organic Compounds (4)

...