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MEMORANDUM

ATTENTION Senate
FROM Elizabeth Elle, Vice-Chair
Senate Committee on
Undergraduate Studies
RE: Program Changes (SCUS 21-57)

DATE July 9, 2021
PAGES 1/1

For information:

Acting under delegated authority at its meeting of July 8, 2021, SCUS approved the following curriculum revisions effective Summer 2022.

a. Faculty of Environment
1. School of Environmental Science

(i) Description, upper and lower division requirement changes for the:

- Environmental Science Major
- Environmental 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>.



Calendar Entry Change

School of Environmental Science, Faculty of Environment

Rationale for change:

Rearranging the current calendar entry to indicate a common first year and partial common second year, which will simplify the calendar entry for new students.

Adding a new concentration in Environmental Archaeology (archaeological science).

Introduction of a new general concentration, which will become the default concentration for students in the program and allow students to complete the program without declaration in one of the specialized concentrations in Applied Biology, Environmental Archaeology, Environmental Earth Systems, Environmetrics, or Water Science.

Effective term and year:

Summer 2022

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

Environmental 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**.

Environmental Science Major

Bachelor of Science

~~This program provides a broad education with specialization in one of four areas of concentration: Applied Biology, Environmental Earth Systems, Environmetrics, and Water Science. Students choose one of these areas of concentration and complete the requirements as shown below.~~

This Bachelor of Science (BSc) degree offers students the option of completing either the general program or one of five specialized concentrations that include Applied Biology, Environmental Archaeology, Environmental Earth Systems, Environmetrics, and Water Science. 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 2.00.

Program Requirements

Students complete 120 units, as specified below. ~~Students choose one of the following areas of emphasis, and complete all the required courses as listed. Additional upper division units will be required to total a minimum of~~ **including 44 units at the upper division units. University and Faculty of Environment regulations also apply.**

Visit the [program overview](#) for a suggested course sequence and for lists of course groupings.

Course Substitutions

Substitutions of program requirements, including courses deemed equivalent to these required courses, are not allowed without written permission from the 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) & [EVSC 495](#) - Special Topics in Environmental Science (3)) can be substituted into their concentration.**

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 (4)

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

MATH 150 - Calculus I with Review (4)

MATH 151 - Calculus I (3)

MATH 154 - Calculus I for the Biological Sciences (3)

and one of

MATH 152 - Calculus II (3)

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

and one of

PHYS 101 - Physics for the Life Sciences I (3)

PHYS 120 - Mechanics and Modern Physics (3)

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)

General Concentration

This 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.

Upper Division Requirements

Students who choose this concentration will also complete two of

EVSC 334 - Earth's Past Climates (4)

EVSC 395 - Special Topics in Environmental Science (3)

EVSC 445 - Environmental Data Analysis (4)

EVSC 495 - Special Topics in Environmental Science (3)

and 12 units from

BISC 309 - Conservation Biology (3)†

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)*

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)

*Students will need to take additional prerequisites courses in order to register

†Requires BISC 204 and not GEOG 215

Applied Biology Concentration

This concentration is for students interested in the impacts of human activities on terrestrial and aquatic ecosystems. This concentration is accredited by the British Columbia [College of Applied Biology for the Registered Biologist \(RPBio\) designation.](#)

Lower Division Requirements

Students who choose this concentration will also complete all of

BISC 205 - Principles of Physiology (3)

CHEM 281 - Organic Chemistry and Laboratory I (4)

MBB 201 - Biochemistry of the Cell (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

And Students complete one of

EVSC 445 – STT Environmental Data Analysis

STAT 302 – Analysis of Experimental and Observation Data

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)*

GEOG 315 - World Ecosystems (4)

GEOG 316 - Global Biogeochemical and Water Cycles (4)

***requires approval from the Director for use in the concentration**

and two of

BISC 309 - Conservation Biology (3)†

BISC 413 - Fisheries Ecology (3)†

BISC 435 - Introduction to Pest Management (3)

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)

†Requires BISC 204 and not GEOG 215

and one of

BISC 306 - Invertebrate Biology (4)†

BISC 316 - Vertebrate Biology (4)

BISC 317 - Insect Biology (3)

BISC 326 - Biology of Algae and Fungi (3)

BISC 337 - Plant Biology (4)

†Requires BISC 204 and not GEOG 215

and one of

EASC 305 - Quantitative Methods for the Earth Sciences (3)

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 326 - Biology of Algae and Fungi (3)
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)
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 BISC 204 and not GEOG 215

Environmental Archaeology Concentration

This 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 Cultural Resource Management workforce.

Lower Division Requirements

Students who choose this concentration will also complete all of

ARCH 101- Reconstructing Human Past (3)

ARCH 131 - Human Origins (3)

ARCH 282 - Material Culture Analysis (4)

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 (4)

ARCH 388 – Geoarchaeology (4)

ARCH 390 – Archaeobotany (4)

At least one of

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 495 - Special Topics in Environmental Science (3)*
***requires approval from the Director for use in the concentration**

At least two of

ARCH 329 - Special Topics in Environmental Archaeology (4)
ARCH 363 - Landscape Archaeology (3)
ARCH 365 - Archaeological Perspectives on Human Ecology (3)
ARCH 376 - Quantitative Methods in Archaeology (4)
ARCH 383 - Molecular Bioarchaeology (3)
ARCH 389 – Ethnoecology (3)
ARCH 425 – Archaeometry (3)
ARCH 428 - Soil Micromorphology (4)
ARCH 431 - Historical Ecology and Coastal Archaeology (3)
ARCH 480 - Directed Laboratory/Library/Field Research (5)

Environmental Earth Systems Concentration

This 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 concentration must complete all of

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

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

and 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 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (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)

†Requires BISC 204 and not GEOG 215

and one of

EASC 305 - Quantitative Methods for the Earth Sciences (3)
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)

Environmetrics Concentration

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

Lower Division Requirements

Students who choose this 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)

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)

plus 12 upper division science-based units from the Faculty of Environment or the Faculty of Science with approval from the Director.

Water Science Concentration

This 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 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)
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)

~~Applied Biology Area of Concentration~~

~~Lower Division Requirements~~

~~Students complete all of~~

~~BISC 101—General Biology (4)~~
~~BISC 102—General Biology (4)~~
~~BISC 204—Introduction to Ecology (3)~~
~~BISC 205—Principles of Physiology (3)~~
~~CHEM 121—General Chemistry and Laboratory I (4)~~
~~CHEM 122—General Chemistry II (2)~~
~~CHEM 126—General Chemistry Laboratory II (2)~~
~~CHEM 281—Organic Chemistry and Laboratory I (4)~~
~~EASC 101—Dynamic Earth (3)~~
~~EVSC 100—Introduction to Environmental Science (3)~~
~~EVSC 201W—Environmental Science in Practice (4)~~
~~GEOG 111—Earth Systems (3)~~
~~MBB 201—Biochemistry of the Cell (3)~~
~~REM 100—Global Change (3)~~

~~and one of~~

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

~~and one of~~

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

~~and one of~~

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

~~and one of~~

~~PHYS 101—Physics for the Life Sciences I (3)~~
~~PHYS 120—Mechanics and Modern Physics (3)~~

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)~~

~~STAT 302—Analysis of Experimental and Observational Data (3)~~

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)~~

and two of

~~BISC 407—Population Dynamics (3)~~

~~BISC 412—Aquatic Ecology (3)~~

~~BISC 414—Limnology (3)~~

~~BISC 420—Community Ecology (3)~~

~~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)~~

~~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 326—Biology of Algae and Fungi (3)~~

~~BISC 337—Plant Biology (4)~~

and one of

~~EASC 305—Quantitative Methods for the Earth Sciences (3)~~
~~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 326—Biology of Algae and Fungi (3)~~
~~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)~~
~~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)~~
~~Environmental Earth Systems Area of Concentration~~

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)~~
~~EASC 101—Dynamic Earth (3)~~
~~EVSC 100—Introduction to Environmental Science (3)~~
~~EVSC 201W—Environmental Science in Practice (4)~~
~~GEOG 111—Earth Systems (3)~~

and one of

~~GEOG 100—Our World: Introducing Human Geography (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)~~

~~and one of~~

~~MATH 150—Calculus I with Review (4)~~

~~MATH 151—Calculus I (3)~~

~~MATH 154—Calculus I for the Biological Sciences (3)~~

~~and one of~~

~~MATH 152—Calculus II (3)~~

~~MATH 155—Calculus II for the Biological Sciences (3)~~

~~and one of~~

~~PHYS 101—Physics for the Life Sciences I (3)~~

~~PHYS 120—Mechanics and Modern Physics (3)~~

~~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)~~

~~and six of, with at least one from the 400 division~~

~~BISC 414—Limnology (3)~~

~~EASC 209W—Environmental Geoscience (4) *~~

~~EASC 304—Hydrogeology (3)~~

~~EASC 314—Principles of Glaciology (3)~~

~~EVSC 334—Earth's Past Climates (4) or REM 334—Earth's Past Climates (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)~~
~~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)~~

~~* Students who select this course may be required to complete additional upper division units to meet their degree requirements. Please see the Environmental Science Advisor.~~
~~Environmetrics Area of Concentration~~

~~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)~~
~~EVSC 100—Introduction to Environmental Science (3)~~
~~EVSC 201W—Environmental Science in Practice (4)~~
~~GEOG 111—Earth Systems (3)~~
~~MATH 232—Applied Linear Algebra (3)~~
~~MATH 251—Calculus III (3)~~
~~REM 100—Global Change (3)~~
~~STAT 270—Introduction to Probability and Statistics (3)~~
~~STAT 285—Intermediate Probability and Statistics (3)~~

and one of

~~MATH 150—Calculus I with Review (4)~~

~~MATH 151—Calculus I (3)~~

~~MATH 154—Calculus I for the Biological Sciences (3)~~

and one of

~~MATH 152—Calculus II (3)~~

~~MATH 155—Calculus II for the Biological Sciences (3)~~

and one of

~~PHYS 101—Physics for the Life Sciences I (3)~~

~~PHYS 120—Mechanics and Modern Physics (3)~~

and one of

~~PHYS 102—Physics for the Life Sciences II (3)~~

~~PHYS 121—Optics, Electricity and Magnetism (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)~~

~~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 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)~~

and one of

~~STAT 445—Applied Multivariate Analysis (3)~~

~~STAT 475—Applied Discrete Data Analysis (3)~~

~~STAT 485—Applied Time Series Analysis (3)~~

~~plus 12 upper division science-based units from the Faculty of Environment or the Faculty of Science with approval from the Director.~~

~~Water Science Area of Concentration~~

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)~~
~~EASC 101—Dynamic Earth (3)~~
~~EVSC 100—Introduction to Environmental Science (3)~~
~~EVSC 201W—Environmental Science in Practice (4)~~
~~GEOG 111—Earth Systems (3)~~
~~GEOG 213—Introduction to Geomorphology (3)~~
~~GEOG 214—Weather and Climate (3)~~

and one of

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

and one of

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

and one of

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

and one of

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

and one of

~~PHYS 101—Physics for the Life Sciences I (3)~~
~~PHYS 120—Mechanics and Modern Physics (3)~~

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
~~BISC 414—Limnology (3)~~
~~EASC 304—Hydrogeology (3)~~
~~EASC 315W—Geochemistry of Natural Waters (3)~~
~~EVSC 300—Seminar in Environmental Science (3)~~
~~EVSC 305—Methods in Environmental Science (4)~~
~~EVSC 400—Environmental Science Capstone (4)~~
~~GEOG 311—Hydrology (4)~~
~~GEOG 313—River Geomorphology (4)~~

~~GEOG 316—Global Biogeochemical and Water Cycles (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)~~

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)~~

~~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)~~

...

Calendar Entry Change

School of Environmental Science, Faculty of Environment

Rationale for change:

Rearranging the current calendar entry to indicate a common first year and partial common second year, which will simplify the calendar entry for new students.

Adding a new concentration in Environmental Archaeology (archaeological science).

~~Introduction of a new general concentration, which will become the default concentration for students in the program and allow students to complete the program without declaration in one of the specialized concentrations in Applied Biology, Environmental Archaeology, Environmental Earth Systems, Environmetrics, or Water Science.~~

Effective term and year:

Summer 2022

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

Environmental 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**.

Environmental Science Honours

Bachelor of Science

~~This honours program provides a broad education with specialization in one of four areas of concentration: Applied Biology, Environmental Earth Systems, Environmetrics, and Water Science. Students choose one of these areas of concentration and complete the requirements as shown below.~~

This Bachelor of Science (BSc) degree offers students the option of completing one of five specialized concentrations that include Applied Biology, Environmental Archaeology, Environmental Earth Systems, Environmetrics, and Water Science. 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

~~This program requires~~ **Students complete** 120 units including ~~writing, quantitative and breadth requirements. A~~ at least 60 units ~~must be in at the upper division~~ **courses**. ~~Exceptions must be approved by a faculty advisor. Other courses may be substituted subject to the approval of a faculty advisor.~~ **University and Faculty of Environment regulations also apply.**

Visit [the program overview](#) for a suggested course sequence and for lists of course groupings.

Course Substitutions

Substitutions of program requirements, including courses deemed equivalent to these required courses, are not allowed without written permission from the 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) & [EVSC 495](#) - Special Topics in Environmental Science (3)) can be substituted into their concentration.**

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 (4)

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

MATH 150 - Calculus I with Review (4)

MATH 151 - Calculus I (3)

MATH 154 - Calculus I for the Biological Sciences (3)

and one of

MATH 152 - Calculus II (3)

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

and one of

PHYS 101 - Physics for the Life Sciences I (3)

PHYS 120 - Mechanics and Modern Physics (3)

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)

Applied Biology Concentration

This concentration is for students interested in the impacts of human activities on terrestrial and aquatic ecosystems. This concentration is accredited by the British Columbia [College of Applied Biology for the Registered Biologist \(RPBio\) designation.](#)

Lower Division Requirements

Students who choose this concentration will also complete all of

BISC 205 - Principles of Physiology (3)

CHEM 281 - Organic Chemistry and Laboratory I (4)
MBB 201 - Biochemistry of the Cell (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

~~And~~ **Students complete** one of

EVSC 445 – STT Environmental Data Analysis

STAT 302 – Analysis of Experimental and Observation Data

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)*

GEOG 315 - World Ecosystems (4)

GEOG 316 - Global Biogeochemical and Water Cycles (4)

*requires approval from the Director for use in the concentration

and two of

BISC 309 - Conservation Biology (3)†

BISC 413 - Fisheries Ecology (3)†

BISC 435 - Introduction to Pest Management (3)

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)

†Requires BISC 204 and not GEOG 215

and one of

BISC 306 - Invertebrate Biology (4)†

BISC 316 - Vertebrate Biology (4)

BISC 317 - Insect Biology (3)

BISC 326 - Biology of Algae and Fungi (3)

BISC 337 - Plant Biology (4)

†Requires BISC 204 and not GEOG 215

and one of

EASC 305 - Quantitative Methods for the Earth Sciences (3)

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 326 - Biology of Algae and Fungi (3)
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)
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 BISC 204 and not GEOG 215

Environmental Archaeology Concentration

This 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 Cultural Resource Management workforce.

Lower Division Requirements

Students who choose this concentration will also complete all of

ARCH 101- Reconstructing Human Past (3)
ARCH 131 - Human Origins (3)
ARCH 282 - Material Culture Analysis (4)

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 (4)

ARCH 388 – Geoarchaeology (4)

ARCH 390 – Archaeobotany (4)

At least one of

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 495 - Special Topics in Environmental Science (3)*

***requires approval from the Director for use in the concentration**

At least two of

ARCH 329 - Special Topics in Environmental Archaeology (4)

ARCH 363 - Landscape Archaeology (3)

ARCH 365 - Archaeological Perspectives on Human Ecology (3)

ARCH 376 - Quantitative Methods in Archaeology (4)

ARCH 383 - Molecular Bioarchaeology (3)

ARCH 389 – Ethnoecology (3)

ARCH 425 – Archaeometry (3)

ARCH 428 - Soil Micromorphology (4)

ARCH 431 - Historical Ecology and Coastal Archaeology (3)

ARCH 480 - Directed Laboratory/Library/Field Research (5)

Environmental Earth Systems Concentration

This 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 concentration must complete all of

EASC 101 - Dynamic Earth (3)

GEOG 111 - Earth Systems (3)

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

and 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 334 - Earth's Past Climates (4) or REM 334 - Earth's Past Climates (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)

†Requires BISC 204 and not GEOG 215

and one of

EASC 305 - Quantitative Methods for the Earth Sciences (3)
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)

Environmetrics Concentration

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

Lower Division Requirements

Students who choose this 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)

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)

plus 12 upper division science-based units from the Faculty of Environment or the Faculty of Science with approval from the Director.

Water Science Concentration

This 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 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)
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)

~~Applied Biology Area Of Concentration~~

~~Lower Division Requirements~~

~~Students complete all of~~

~~BISC 101—General Biology (4)~~
~~BISC 102—General Biology (4)~~
~~BISC 204—Introduction to Ecology (3)~~
~~BISC 205—Principles of Physiology (3)~~
~~CHEM 121—General Chemistry and Laboratory I (4)~~
~~CHEM 122—General Chemistry II (2)~~
~~CHEM 126—General Chemistry Laboratory II (2)~~
~~CHEM 281—Organic Chemistry and Laboratory I (4)~~
~~EASC 101—Dynamic Earth (3)~~
~~EVSC 100—Introduction to Environmental Science (3)~~
~~EVSC 201W—Environmental Science in Practice (4)~~
~~GEOG 111—Earth Systems (3)~~
~~MBB 201—Biochemistry of the Cell (3)~~
~~REM 100—Global Change (3)~~

~~and one of~~

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

~~and one of~~

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

~~and one of~~

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

~~and one of~~

~~PHYS 101—Physics for the Life Sciences I (3)~~
~~PHYS 120—Mechanics and Modern Physics (3)~~

~~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)~~
~~STAT 302—Analysis of Experimental and Observational Data (3)~~

~~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)~~

~~and two of~~

~~BISC 407—Population Dynamics (3)~~
~~BISC 412—Aquatic Ecology (3)~~
~~BISC 414—Limnology (3)~~
~~BISC 420—Community Ecology (3)~~
~~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)~~
~~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 326—Biology of Algae and Fungi (3)~~
~~BISC 337—Plant Biology (4)~~

and one of

~~EASC 305—Quantitative Methods for the Earth Sciences (3)~~
~~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 326—Biology of Algae and Fungi (3)~~
~~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)~~
~~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)~~
~~Environmental Earth Systems Area Of Concentration~~

~~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)~~
~~EASC 101—Dynamic Earth (3)~~
~~EVSC 100—Introduction to Environmental Science (3)~~
~~EVSC 201W—Environmental Science in Practice (4)~~
~~GEOG 111—Earth Systems (3)~~

and one of
~~GEOG 100—Our World: Introducing Human Geography (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)~~

and one of
~~MATH 150—Calculus I with Review (4)~~
~~MATH 151—Calculus I (3)~~
~~MATH 154—Calculus I for the Biological Sciences (3)~~

and one of
~~MATH 152—Calculus II (3)~~
~~MATH 155—Calculus II for the Biological Sciences (3)~~

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

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)~~

and six of, with at least one from the 400 division

~~BISC 414—Limnology (3)~~

~~EASC 209W—Environmental Geoscience (4) *~~

~~EASC 304—Hydrogeology (3)~~

~~EASC 314—Principles of Glaciology (3)~~

~~EVSC 334—Earth's Past Climates (4) or REM 334—Earth's Past Climates (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)~~

~~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)~~

* Students who select this course may be required to complete additional upper division units to meet their degree requirements. Please see the Environmental Science Advisor.

~~Environmetrics Area Of Concentration~~

~~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)~~
~~EVSC 100—Introduction to Environmental Science (3)~~
~~EVSC 201W—Environmental Science in Practice (4)~~
~~GEOG 111—Earth Systems (3)~~
~~MATH 232—Applied Linear Algebra (3)~~
~~MATH 251—Calculus III (3)~~
~~REM 100—Global Change (3)~~
~~STAT 270—Introduction to Probability and Statistics (3)~~
~~STAT 285—Intermediate Probability and Statistics (3)~~

~~and one of~~

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

~~and one of~~

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

~~and one of~~

~~PHYS 101—Physics for the Life Sciences I (3)~~
~~PHYS 120—Mechanics and Modern Physics (3)~~

~~and one of~~

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

~~and one of~~

~~STAT 445—Applied Multivariate Analysis (3)~~
~~STAT 475—Applied Discrete Data Analysis (3)~~

~~STAT 485—Applied Time Series Analysis (3)~~

~~plus 12 upper division science-based units from the Faculty of Environment or the Faculty of Science with approval from the Director.~~

~~Water Science Area Of Concentration~~

~~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)~~

~~EASC 101—Dynamic Earth (3)~~

~~EVSC 100—Introduction to Environmental Science (3)~~

~~EVSC 201W—Environmental Science in Practice (4)~~

~~GEOG 111—Earth Systems (3)~~

~~GEOG 213—Introduction to Geomorphology (3)~~

~~GEOG 214—Weather and Climate (3)~~

~~and one of~~

~~BISC 204—Introduction to Ecology (3)~~

~~GEOG 215—The Biosphere (3)~~

~~and one of~~

~~GEOG 253—Introduction to Remote Sensing (3)~~

~~GEOG 255—Geographical Information Science I (3)~~

~~and one of~~

~~MATH 150—Calculus I with Review (4)~~

~~MATH 151—Calculus I (3)~~

~~MATH 154—Calculus I for the Biological Sciences (3)~~

~~and one of~~

~~MATH 152—Calculus II (3)~~

~~MATH 155—Calculus II for the Biological Sciences (3)~~

~~and one of~~

~~PHYS 101—Physics for the Life Sciences I (3)~~

~~PHYS 120—Mechanics and Modern Physics (3)~~

~~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

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

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)~~
~~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)~~

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