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MEMORANDUM

ATTENTION Senate
FROM Elizabeth Elle, Vice-Chair
Senate Committee on Undergraduate
Studies
RE: New Course Proposal

DATE May 13, 2022
PAGES 1/1

For information:

Acting under delegated authority at its meeting of May 12, 2022 SCUS approved the following curriculum revision effective Spring 2023.

a. Faculty of Environment (SCUS 22-35)**1. School of Environmental Science****(i) New Course Proposals:**

- EVSC 445-4, Environmental Data Analysis
- EVSC 460-4, Ecogeomorphology

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>.

COURSE SUBJECT EVSC

NUMBER 445

COURSE TITLE LONG — for Calendar/schedule, no more than 100 characters including spaces and punctuation

Environmental Data Analysis

COURSE TITLE SHORT — for enrollment/transcript, no more than 30 characters including spaces and punctuation

Environmental Data Analysis

CAMPUS where course will be normally taught: ☒ Burnaby ☐ Surrey ☐ Vancouver ☐ Great Northern Way ☐ Off campus

COURSE DESCRIPTION — 50 words max. Attach a course outline. Don't include WQB or prerequisites info in this description box.

Introduces environmental scientists to application of modern data analysis methods. This course covers sampling, experimental design, and the analysis of quantitative data collected in the course of environmental monitoring, assessment and restoration programs. Students will be introduced and gain experience with the statistical programming language R.

REPEAT FOR CREDIT ☐ YES ☒ NO Total completions allowed Within a term? ☐ YES ☒ NO

LIBRARY RESOURCES

NOTE: Senate has approved (S.93-11) that no new course should be approved by Senate until funding has been committed for necessary library materials. Each new course proposal must be accompanied by the email that serves as proof of assessment. For more information, please visit www.lib.sfu.ca/about/overview/collections/course-assessments.

RATIONALE FOR INTRODUCTION OF THIS COURSE

Environmental Science undergraduates have been requesting an intermediate quantitative data analysis course that bridges between the traditional introductory statistics courses taught by the Department of Statistics and Actuarial Science and the Applied Biology, Earth Systems and Water Science courses that comprise most of their program. Environmental Data Analysis fills this gap by covering topics related to study design and survey sampling, exploratory data analysis and data analysis techniques commonly used in environmental monitoring, assessment and restoration programs.

SCHEDULING AND ENROLLMENT INFORMATION

Effective term and year (e.g. FALL 2016)

Term in which course will typically be offered ☒ Spring ☐ Summer ☐ Fall

Other (describe)

Will this be a required or elective course in the curriculum? ☐ Required ☒ Elective

What is the probable enrollment when offered? Estimate:

UNITS

Indicate number of units:

Indicate no. of contact hours: Lecture Seminar Tutorial Lab Other; explain below

OTHER

FACULTY

Which of your present CFL faculty have the expertise to offer this course?

WQB DESIGNATION

(attach approval from Curriculum Office)

PREREQUISITE AND / OR COREQUISITE

EQUIVALENT COURSES [For more information on equivalency, see Equivalency Statements under [Information about Specific Course components.](#)]

1. SEQUENTIAL COURSE [is not hard coded in the student information management system (SIMS).]

Students who have taken (*place relevant course(s) in the blank below (ex: STAT 100)*) **first** may not then take this course for further credit.

2. ONE-WAY EQUIVALENCY [is not hard coded in SIMS.]

(*Place relevant course(s) in the blank below (ex: STAT 100)*) will be accepted in lieu of this course.

3. TWO-WAY EQUIVALENCY [is hard coded and enforced by SIMS.]

Students with credit for (*place relevant course(s) in the blank below (ex: STAT 100)*) may not take this course for further credit.

Does the partner academic unit agree that this is a two-way equivalency? ☐ YES ☐ NO

Please also have the partner academic unit submit a course change form to update the course equivalency for their course(s).

4. SPECIAL TOPICS PRECLUSION STATEMENT [is not hard coded in SIMS.]

FEES

Are there any proposed student fees associated with this course other than tuition fees? ☐ YES ☒ NO

COURSE – LEVEL EDUCATIONAL GOALS (OPTIONAL)

Demonstrate the ability to apply fundamental concepts in exploratory data analysis of site restoration and impact assessment.

Design before-after control-impact (BACI) studies for assessing environmental impacts.

Design experiments that avoid common design flaws that incur bias, inefficiency and confounding.

Demonstrate an understanding of theoretical and applied concepts of probability as it applies to environmental uncertainty.

Understand the concept of the sampling distribution of a statistic.

Understand the foundations for confidence intervals and hypothesis testing in the context of assessing site reclamation.



RESOURCES

List any outstanding resource issues to be addressed prior to implementation: space, laboratory equipment, etc:

OTHER IMPLICATIONS

Final exam required ☒ YES ☐ NO

Criminal Record Check required ☐ YES ☒ NO

OVERLAP CHECK

Checking for overlap is the responsibility of the Associate Dean.

Each new course proposal must have confirmation of an overlap check completed prior to submission to the Faculty Curriculum Committee.

Name of Originator

Jeremy Venditti

COURSE SUBJECT EVSC

NUMBER 460

COURSE TITLE LONG — for Calendar/schedule, no more than 100 characters including spaces and punctuation

Ecogeomorphology

COURSE TITLE SHORT — for enrollment/transcript, no more than 30 characters including spaces and punctuation

Ecogeomorphology

CAMPUS where course will be normally taught: ☒ Burnaby ☐ Surrey ☐ Vancouver ☐ Great Northern Way ☐ Off campus

COURSE DESCRIPTION — 50 words max. Attach a course outline. Don't include WQB or prerequisites info in this description box.

Ecogeomorphology is the interdisciplinary study of watersheds that integrates geomorphology, hydrology and ecology to facilitate new understandings of landscapes and ecosystems by bridging dominant paradigms from the individual disciplines. This course explores the bidirectional influences of biota and landscapes, including how physical habitat condition can influence the dynamics and resilience of biological populations.

REPEAT FOR CREDIT ☐ YES ☒ NO Total completions allowed 1 Within a term? ☐ YES ☒ NO

LIBRARY RESOURCES

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RATIONALE FOR INTRODUCTION OF THIS COURSE

Ecogeomorphology encompasses and describes a broad and interdisciplinary field of science that explicitly integrates ecology and geomorphology. While there is a myriad of possible research foci, approaches, and nomenclature found at the intersection of these two disciplines, it is generally agreed upon that this field is fundamentally concerned with the bidirectional influences of biota and landscapes on each other.

Currently, Simon Fraser University offers courses that focus on the disciplines of surface hydrology, geomorphology, and ecology. This includes but is not limited to courses in Geography (e.g. GEOG 213, GEOG 215, GEOG311, GEOG 313, GEOG 418), Resource & Environmental Management (e.g. REM 311, REM 412), and Biology (e.g. BISC 204, BISC 407, BISC 421). While existing courses at SFU address points of natural overlap between ecology and geomorphology in teaching fundamentals of their principal discipline, EVSC 460 is a unique offering in that its primary intent is to provide students the opportunity to spend a semester focused on and examining the feedbacks and bidirectional influences between physical and biological systems, as well as the methodologies that have been used to study and interpret these coupled systems. The intent of this 400-level course is not to re-teach the fundamentals of any individual discipline that informs this interdisciplinary field, but instead to build upon curriculum covered in existing courses and provide students a novel interdisciplinary perspective.

The target audience for this course is not imagined to only include students in EVSC, but also students in GEOG, REM, EASC, and BISC, who may appreciate a course bridging dominant paradigms and perspectives in their individual disciplines. Although it is recognized that extensive prerequisites could be useful for the instruction of this course, the highly interdisciplinary nature of the topic would require courses across many different units, and most students, even those within EVSC, could not necessarily be expected to have taken them all. This would exclude most students from the opportunity to enroll, and for this reason, prerequisites have intentionally been kept to a minimum.

Course topics include but are not limited to: the influences of biota on fluvial processes; bioturbation-driven landscape evolution; interactions between beaver, riverscapes, and fish populations; the effects of disturbance (e.g., wildfire, avalanches, debris flows) on terrestrial and aquatic ecosystems; relationships between physical habitat condition, fragmentation, and biological resilience. Additionally, this course explores quantitative approaches used to evaluate the effects of dynamically changing physical landscapes on the resilience of biological populations. In the associated tutorial, students will gain skills that include computer coding for matrix-based mathematics and modeling, data analysis and visualization, and fundamentals in computational model development. Further, students will gain experience in the interpretation of scientific literature and the communication of scientific ideas and concepts through technical writing assignments and presentations.



SCHEDULING AND ENROLLMENT INFORMATION

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(attach approval from Curriculum Office)

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4. SPECIAL TOPICS PRECLUSION STATEMENT [is not hard coded in SIMS.]

Students who have taken EVSC 495 ST Ecogeomorphology in Fall 2020 may not take this course for further credit.

FEES

Are there any proposed student fees associated with this course other than tuition fees? ☐ YES ☒ NO

COURSE – LEVEL EDUCATIONAL GOALS (OPTIONAL)

1. To describe and be able to identify processes and feedbacks that exist between physical and biological systems
2. Develop skills for reading, interpreting, and discussing scientific literature
3. Learn and apply computer coding skills to run ecological models that incorporate habitat disturbance and fragmentation
4. Design modeling studies to evaluate and interpret effects of changing physical habitat condition on metapopulation dynamics
5. Communicate ecogeomorphology topics clearly and effectively and be able to present your work and ideas to an audience of peers



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OTHER IMPLICATIONS

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Name of Originator

Brendan Murphy