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MEMORANDUM

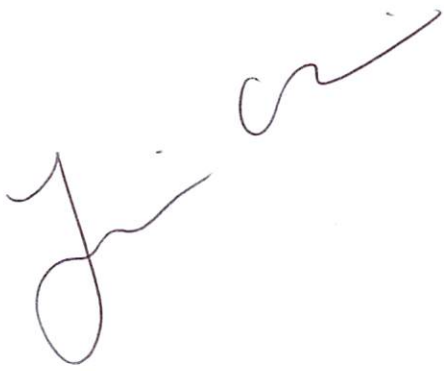
ATTENTION	Senate	**DATE**	December 11, 2013
FROM	Jon Driver, Vice-President, Academic and Provost, and Chair, SCUP	**PAGES**	1/1
RE:	Faculty of Environment: Full Program Proposal for a Bachelor of Environment (SCUP 13-63)		

At its November 20, 2013 meeting, SCUP reviewed and approved the Full Program Proposal for a Bachelor of Environment within the Faculty of Environment, effective Fall 2014.

Motion:

That Senate approve and recommend to the Board of Governors the Full Program Proposal for a Bachelor of Environment within the Faculty of Environment, effective Fall 2014.

c: A. Clapp
D. Burns



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MEMORANDUM

ATTENTION	Senate Committee on University Priorities	**DATE**	November 8, 2013
FROM	Gordon Myers, Chair Senate Committee on Undergraduate Studies	**PAGES**	1/1
RE:	Faculty of Environment (SCUS 13-48d)		

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of November 7, 2013, gives rise to the following recommendations:

Motion

That SCUP approve and recommend to Senate the Full Program Proposal for the Bachelor of Environment within the Faculty of Enironment.

The relevant documentation for review by SCUP is attached.

FULL PROGRAM PROPOSAL
Bachelor of Environment
Faculty of Environment (FENV)
Simon Fraser University
December 10, 2013

Executive Summary

This document contains a proposal for a new credential, a Bachelor of Environment (BEnv). It accompanies separate proposals for a BEnv in Environmental Resource Management, a BEnv in Global Environmental Systems, and a BBA/BEnv Joint Major in Business and Environment. Environmental issues facing society are complex and interdisciplinary in nature, and the rationale for the BEnv lies in the combination of the social and natural sciences and the interdisciplinarity of content within its majors. SFU presently awards 7 different Bachelor degree credentials: Bachelor of Arts (BA), Bachelor of Science (BSc), Bachelor of Applied Science (BASc), Bachelor of Business Administration (BBA), Bachelor of Education (BEd), Bachelor of Fine Arts (BFA) and Bachelor of General Studies (BGS) – one from each Faculty, except for Health Sciences and Environment.

The BEnv is characterized in several ways: 1) a core in both the social and the natural sciences, 2) courses which focus on methodology, practice and communication, and 3) integrative courses which emphasize complexity, systems and decision-making. In addition to a solid core in the social sciences, all BEnv majors require coursework in natural science and quantitative methods, but with different aims from those generally contained within a Bachelor of Science degree. BEnv majors require coursework dealing specifically with complexity, systems and interdisciplinarity. While sharing this commonality, BEnv majors differ by minor variation in lower division core requirements, driven by the prerequisites needed for upper division courses, and a selection of upper division courses specific to each major.

The BEnv reflects the history, goals and composition of the Faculty of Environment, created in 2009. The content of this proposal is the result of three years of consultation with faculty within and beyond the Faculty, as well as staff, students, alumni and prospective employers. Four previous documents, each more refined, were distributed for comment and discussion. The BEnv takes advantage of the capacities of and synergies between the various units joined in FENV (Archaeology, Development & Sustainability, Environmental Science, Geography, Resource & Environmental Management, and Sustainable Community Development).

The three programs proposed as BEnv degrees will require seven new courses. The BEnv majors can be mounted at a relatively low cost, primarily using existing courses, thereby reducing the impact on departments and schools and by giving students some flexibility in course requirements. This approach uses unfilled seats in existing FENV and non-FENV courses, increasing class sizes where appropriate; it also takes advantage of existing administrative capacity in FENV units and the FENV Dean's Office. Should the BEnv majors generate the projected demand from students, further resources will eventually be required in each of those areas.

Credential to be awarded:
Bachelor of Environment (BEnv)

Location of program:
SFU Burnaby, Harbour Centre and Surrey Campuses

Faculty offering the new degree program:
Faculty of Environment

Anticipated program start date:
September 2014 (See enrollment plan for timeline)

Description of the proposed program: Aims, goals and objectives

Building upon the consultation carried out by FENV over the past 3 years, this document proposes the establishment of a BEnv credential, new at SFU, under which initially would be majors in Global Environmental Systems and Environmental Resource Management, and a joint major in Business and Environment, proposed together with the Beedie School of Business. The majors proposed under the BEnv would extend FENV offerings rather than duplicate the Faculty's existing majors.

BEnv majors would 1) take full advantage of the expertise existing across FENV units, 2) build upon an interdisciplinary core of courses from the social and natural sciences, 3) provide students with the ability to understand and use tools and methodologies needed to work in complex environmental systems (e.g. GIS, remote sensing, and modeling), and 4) provide students with depth in a particular field, resource or system.

The rationale for the BEnv lies in the combination of the social and natural sciences and the interdisciplinarity of content within its majors. As with the other SFU credentials, the BEnv reflects the history, goals and composition of the Faculty, created in 2009 and augmented with the addition of Archaeology in 2011. Environmental issues facing society are complex and interdisciplinary in nature. The BEnv majors are characterized by interdisciplinarity, complexity and systems-thinking, and designed to prepare graduates to work on environmental issues and to continue their studies in environmentally related graduate programs in a range of disciplines.

Educational goals are described below. These were developed as a result of consultation with faculty, staff, students, alumni and prospective employers. The BEnv core would be comprised of 8–11 lower division courses in earth systems, ecology, biology, the human role in nature, the social and built environments, environmental stewardship and governance, and the global scale. Each BEnv major includes methodology courses, which vary depending on the needs of each BEnv program. Finally, integrative courses that draw upon the knowledge and skills gained in previous coursework would be required in the upper division. These include required

communication, methodology, and capstone courses. While sharing this common structure, BEnv majors differ in that lower division core requirements vary within the framework, guided by the knowledge and skills prerequisite to upper division courses specific to the major.

Educational Goals of the Bachelor of Environment

Students will have a basic understanding of:

The Natural Sciences

- Earth Systems – earth processes including earth history, landforms, soils, atmosphere, hydrosphere and cryosphere, and their roles and interrelationships in ecosystems and climate.

- Ecology – diversity and relationships of microorganisms, plants, and animals, and the abiotic and biotic factors that influence the distribution and development of ecosystems and their potential impacts on human health and livelihood.

- Biology – basic biochemical and physiological mechanisms of human and other living organisms.

The Social Sciences

- Human role in nature – the interaction of humans, natural resources and the biophysical environment in the past and the present. Human cultural development, landscapes, livelihoods and industries.

- Social and built environments – human settlements, urban structure, and socio-spatial organization; the interaction of the built environment with health, housing, transportation, and public policy.

- Stewardship and governance – normative ethical theories and their application to the natural environment and the obligations that humans bear with respect to it. Ecosystem services, externalities, and environmental policy, science and values.

- The global scale – global environmental change and its causes and effects, such as population growth, the ecological footprint, human health and social organization and technology as they affect land, ecosystems and food supply. The cumulative effects of urbanization, energy, raw materials and climate change.

Methodology, Practice and Communication

- Quantitative and geospatial analysis – Students will have a foundational knowledge of and abilities in geospatial analysis and modeling, quantitative data collection, statistics, probability, and the use of these techniques in environmental problem solving.

- Students will have specific knowledge of methods and experience applying those methods in models, laboratories, or fieldwork, and skills in communicating the results of those applications to professional and general audiences.

Integrative Educational Goals

- Complexity, controversy and decision-making – Students will have a basic understanding of the complexity of environmental systems, their potential social and biophysical impacts at various temporal and spatial scales, and their communication and resolution in environmental decision-making processes.

- Systems thinking – Students will be acquainted with systems theory and its application to understanding socio-economic and biophysical dynamics related to environmental issues.

- Sustainability – Students will have knowledge and appreciation of the various concepts of sustainability and sustainable futures. Students will be familiar with sustainability strategies at multiple spatial, temporal and comparative scales.

- Students will be able to integrate and demonstrate the knowledge and skills gained through their undergraduate study within a capstone course using analytical methodologies and communicating environmental complexity.

BEnv program-level educational goals in critical thinking and problem solving are built into BEnv courses in all majors. Educational goals specific to individual majors, such as community and stakeholder engagement, facilitation, conflict resolution, leadership and team building, may be addressed by specific courses or integrated in other BEnv activities (e.g. Coop).

Distinctive characteristics of the Bachelor of Environment:

- Required and elective courses are directly related to environment and sustainability;
- A core of both social and natural sciences is required;
- The BEnv is interdisciplinary, requiring a number of upper division courses from across FENV units and units outside of FENV;
- Program requirements include courses in methodology and communication
- Required integrative courses emphasize complexity and systems.
- The required capstone course provides an opportunity to integrate and demonstrate knowledge and skills.
- Requires natural science coursework, but with different aims than BSc majors like Environmental Science.
- Focus on methodology and content in systems and complexity distinguishes the BEnv from less focused or less technical environmental studies programs.

Content and Summary of Requirements for Graduation

All students undertaking a BEnv would require preparation in earth systems, ecology, the human role in nature, social and built environments, stewardship and governance, and the global scale.

Methodology is treated as a core requirement, with both lower division and upper division requirements. Students must also complete one of the identified capstone courses which encompasses practice and communication: they may vary according to the major. BEnv program educational goals as articulated below would drive the selection of core courses required for BEnv majors.

Proposed BEnv majors would be comprised of 1) a group of lower-division courses within core areas that are required of all BEnv majors, with some variation within majors; 2) one capstone course concerned with integration, communication and collaboration; and 3) required courses and electives specific to each of the BEnv majors, primarily in the upper division. The first two components of the program are common to all Bachelor of Environment degrees, and their educational goals are addressed in this proposal. Educational goals of the upper-division requirements and electives are addressed in accompanying Full Program Proposals for the individual majors.

There would be minor variation in the number of required courses in each area in different BEnv majors. This core would be composed primarily but not exclusively of lower-division courses. Joint majors with BEnv may require additional core courses in the non-BEnv major and a reduced number of courses in the BEnv core.

As with our existing majors, many students will enter BEnv majors as college transfers, especially from those in the Lower Mainland. Attention will be paid to students entering the BEnv from colleges, including Fraser International College, from the SFU Environment One Program in Surrey, as well as undecided students at SFU.

Domains covered by all BEnv Majors

All BEnv majors would require coursework in each of the domains below. Specific requirements from these courses are articulated in the individual BEnv major FPPs.

Earth Systems

EASC 101-3 Dynamic Earth
GEOG 111-3 Earth Systems
GEOG 213-3 Introduction to Geomorphology
GEOG 214-3 Weather and Climate

Ecology

BISC 204-3 Introduction to Ecology
EVSC 100-3 Introduction to Environmental Science
GEOG 215-3 Biogeography
HSCI 216-3 Ecological Determinants of Human Growth, Development and Health

Biology

ARCH 131-3 Human Origins
BISC 101-4 General Biology
BISC 102-4 General Biology
HSCI 100-3 Human Biology

Human Role in Nature

ARCH 100-3 Ancient People and Places
ARCH 201-3 Introduction to Archaeology
FNST 101-3 The Cultures, Languages and Origins of Canada's First Peoples
GEOG 100-3 Society, Space, Environment: Introducing Human Geography

Social and Built Environments

ENV 222-3 Environmental Controversy
GEOG 241-3 Social Geography
GEOG 261-3 Introduction to Urban Geography
REM/SCD 201-3 Introduction to Sustainable Community Development

Stewardship and Governance

ARCH 286-3 Cultural Heritage Stewardship in Global Context (new)
DEVS 201-3 Introduction to Development and Sustainability
GEOG 221-3 Economic Geography
POL 253-3 Introduction to the Public Policy Process
REM 200-3 Introduction to Resource and Environmental Management (new)

Global Scale

ENV 221-3 Systems Thinking (new)
GEOG 102-3 World Problems in Geographic Perspective
REM 100-3 Global Change
HSCI 160-3 Global Perspectives on Health

Methodology

ARCH 285-3 Archaeological Science (new)
BUEC 232-4 Data and Decisions I
GEOG 251-3 Quantitative Geography
GEOG 253-3 Introduction to Remote Sensing
GEOG 255-3 Geographical Information Science I
STAT 101-3 Introduction to Statistics
STAT 201-3 Statistics for the Life Sciences
STAT 203-3 Introduction to Statistics for the Social Sciences
STAT 270-3 Introduction to Probability and Statistics

Summary

The total BEnv core requirements would be approximately 15 courses or 55–60 units. This allows for specialization through upper division courses within specific BEnv majors.

Core	10–11 courses	~30–33 units
Major courses	10–11 courses	~33–45 units
Total	21 courses	~64–76 units

The two proposed BEnv majors (Environmental Resource Management and Global Environmental Systems) fit within this framework, but future BEnv majors may vary. Joint majors may have a slightly reduced number of environmental course requirements so that overall unit requirements leave students with some flexibility to choose their remaining courses. The proposed Sustainable Business joint major, for example, requires between 98 and 106 credits.

Additional courses may be required to satisfy WQB requirements. However, we anticipate that Quantitative requirements may be satisfied through required core courses.

Target Audience

BEnv majors will be targeted towards students wishing to seek careers in natural and cultural resource management, business & environment, environmental governance, development and sustainability. BEnv content and pedagogy will be intended to meet the knowledge and skill requirements of careers that involve a substantial amount of cross-disciplinary collaboration and understanding. Graduates of BEnv majors should be able to enter careers directly or continue in graduate studies. Recruitment for BEnv will focus on four potential target groups:

- Direct entry from secondary schools;
- Transfers from colleges;
- International students; and
- Undecided SFU students.

Delivery Methods

Face-to-face courses are the primary delivery method, but some distance education courses may be included.

Anticipated Completion Time in Semesters

The BEnv may be completed in 8 semesters of full time study.

Enrolment plan for the length of the program

These proposals anticipate obtaining approval from SCUS, SCUP, Senate and the Board of Governors by January 2014. Allowing two months for the Ministry approval process, we hope that prospective students will be able to apply for admission to BEnv programs as early as Spring 2014, and begin their studies in September 2014.

We hope initially to admit 10 students into each BEnv major and 15 students into the BBA/BEnv joint major, increasing after 5 years to 20 students admitted into each major and 30 students into the joint major. Assuming a modest attrition rate, this should result a steady state enrolment of approximately 250 students in the three proposed BEnv programs.

Contributions to the Mandate and Strategic Plan of the Faculty of Environment

Established in 2009, and augmented with the addition of Archaeology in 2011, the Faculty of Environment seeks to respond to a critical societal need, SFU's strategic objectives, student demand, and current and anticipated career opportunities in the environmental field. With broad expertise and existing resources, FENV is positioned to deliver undergraduate environmental programming that is innovative, interdisciplinary and flexible. Development of the BEnv, put forth in the FENV 2010-2013 Academic 3-Year Plan, is a major initiative engaging all FENV units and intended to realize FENV potential in undergraduate curriculum.

The mandate of the Faculty of Environment is to "Position FENV at SFU to become a world class leader in evidence-based research and teaching that integrates the natural, social, spatial, and policy sciences, and pure and applied research, to reconcile environment and development at different spatial and temporal scales."

The development of new environmental programming is a high priority in the FENV 2010-2012 Strategic/Academic Plan and the FENV 2013-2018 draft Academic Plan. A key FENV focus is supported by the development of the BEnv degrees:

- Continue with the development and consolidation of new undergraduate and graduate programming that ensures exposure to interdisciplinary and experiential learning opportunities; and differentiates SFU from other Environment Faculties/Schools.

FENV Guiding Principles related to BEnv development (FENV Academic Plan 2010-2013 and re-stated in the 2013-2018 plan) are:

- FENV will serve as the natural focal point for the co-ordination and promotion of environmental research and teaching at SFU;
- New programming needs to reflect the importance of the integration of knowledge of social, natural, spatial and policy sciences. GIS has the potential to bridge the many disciplines of the Faculty;
- Physical Geography should be included in all programs that require basic natural science;
- Interdisciplinarity and collaboration will become accepted elements of FENV's *modus operandi*;
- Experiential learning, including field classes, co-op, cohort programs, study abroad, practical workshops, special mentoring, and community based service learning, is a central part of the Faculty's pedagogy; and
- Undergraduate programming capacity will be expanded using existing courses along with a small number of new course offerings.

This effort directly supports SFU's strategic efforts to:

- Equip SFU students with the knowledge, skills, and experiences that prepare them for life in an ever-changing and challenging world (President's Goals 2012-13);
- Complete the development of planned environment programs (University Academic Plan 2012, Goal 2.1);
- Advance the teaching and practice of sustainability, one of the 6 university principles (University Planning Framework 2012; G.P 38, 3.2.1);

- Increase experiential learning opportunities (Section 1.1.4, Draft University Academic Plan 2013-2018); and
- Implement learning outcomes (Goal 1.1. 2 University Academic Plan 2013-2018)

Student Evaluation

Student evaluation will follow the general regulations of the University and the Faculty of Environment. Joint majors with other faculties will follow both Faculties' general regulations.

Program Design, Governance and Assessment

Design committees developed and refined each of the proposed BEnv majors into the accompanying Full Program Proposals. The design committees considered the course requirements and electives for the specific major, and the appropriate home unit(s) for student advising and program administration. See the accompanying proposals for details.

As part of the development of the Full Program Proposals for each major, FENV has proposed governance models for each of the three BEnv majors. Governance models differ slightly for each major, and are described in the accompanying proposals, and in a memorandum to the chairs and directors of FENV units. BEnv majors may be proposed, housed, advised, and governed either by the Faculty or by one or more of the constituent units. Units may propose to convert existing BA or BSc majors to BEnv majors if the educational goals of the credential and the degree are compatible. Majors proposed by individual units may be governed by a director and steering committee, or by the unit's undergraduate studies committee in consultation with other units in the Faculty. For BEnv majors that involve courses from multiple FENV units, curriculum modifications would be proposed by a director in consultation with a steering committee on which all FENV units that wish it are represented. The FENV Undergraduate Curriculum Committee would be responsible for approval of any BEnv curricular changes.

BEnv programs will be assessed as per university regulations. Programs administered by individual units within FENV will be reviewed as part of the normal external review process. Programs administered by the Dean's Office will be reviewed when the Faculty is reviewed. In addition, the BEnv credential and majors will undergo an external review after five years of operation. Assuming that the programs admit students starting in Fall 2014, this review would take place in 2019-2020.

Level of Support and Recognition from other Post-Secondary Institutions

As per SFU's transfer credit procedures, students may transfer from BC colleges or universities to enroll into BEnv programs. FENV Dean's Office will work with Lower Mainland colleges on preparing their students for transfer into BEnv programs. The proposed BEnv majors have been developed primarily from courses in the Faculty of Environment, most of which have already been articulated with the various post secondary institutions in British Columbia. Students who are part of these programs can transfer the courses to Environment, Geography or Science programs in other post secondary institutions.

Letters requesting support are being sent to BC universities and colleges 1) whose students might transfer to SFU into the proposed BEnv majors, 2) with graduate programs that are likely to appeal to graduates of those majors, and 3) that have degree program(s) similar to those majors.

Evidence of Student Interest and Labour Market Demand

Seeking input from SFU students has been an important part of the BEnv consultation process. Students were involved in both BEnv forums (November 2010 and June 2012). Sustainable SFU, an SFU student organization, ran two focus groups (Burnaby and Harbour Centre campuses) in November 2012 seeking input on the BEnv as described in this document. In all these sessions students expressed strong support for the BEnv credential and its interdisciplinary content, structure and experiential components. In the 2011 SFU Undergraduate Student Survey, of the over 5000 students responding, 8% were very interested in a possible Bachelor of Environment.

In recent years, Canadian employment in environmentally related jobs has been continually increasing. According to Environmental Careers Organization (ECO), between 2007 and 2010, the total number of Canadian workers who spend at least 50% of their time on environmental activities increased from 3.2% to 4%, bring the total number of such workers in 2010 to 682,000. ECO also stated that environmental employment has remained relatively strong during the recent economic downturn, and attributed difficulties in hiring to the lack of workers possessing appropriate levels of education and experience. ECO estimates that demand for environmental workers should continue to be strong into the future. Over the next decade over 100,000 environmental employees (14% of the environmental workforce) will reach retirement age (Profile of Canadian Environmental Employment: Labour Market Research Study, ECO, 2010).

U.S. environmental job market data is also encouraging. In 2013 Georgetown University published data on unemployment rates of college graduates in 15 sectors. The agriculture/natural resource category ranked third lowest with rates of 6.1/3.4/2.3 percent for recent graduates/experienced graduates/graduate degree holders. This compares with rates as high as 12.8/9.3/6.9 for architecture (Hard Times 2013: College majors, unemployment and earnings. Georgetown Public Policy Institute, May 2013).

Also in fall 2011, the FENV Faculty Advisory Board, made up of highly experienced representatives from business, government, First Nations and academia[1], met and provided guidance on development of the BEnv and its majors, stressing the importance of interdisciplinarity, experiential learning, and communication of technical information to non-specialist audiences. Two surveys, targeted at environmental professionals, were implement to gather input on the BEnv credential (December 2011 – March 2012) and its proposed majors

[1] FENV Advisory Board members were Frank Brown (Director, Land and Marine Stewardship, Coastal First Nations) Hon. David Anderson (former Minister of Fisheries and Oceans), Mr. Bob Elton (former Pres./CEO B.C. Hydro), Dr. C.S. Holling (one of the conceptual founders of ecological economics), Dr. Leslie King (Director Centre for Environmental Education, Royal Roads), Mr. Bruce Morgan (Director, Change Management and Special Projects at Canadian Environmental Assessment Agency), Nancy Olewiler (Director, SFU School of Public Policy)and Dr. Barry Smit (Chair in Global Environmental Change, Univ. of Guelph).

(June – August 2013). Seventy-three responses were received. The average years of experience of respondents were approximately 15. Approximately 67% of respondent strongly agreed or agreed with the statement "A Bachelor of Environment will be well perceived by potential employer." Respondents also provided input on job demand for graduates in each of the proposed majors in the next 5-15 years. On a scale of 5 to 1 (5-very high, 4-high, 3-medium, 2-low, 1-very low) results were as follows:

	Mean	Very High=5	High=4	Medium=3	Low=2	Very Low=1	N
Global Environmental Systems	3.4	2	13	10	4	0	29
Environmental Resource Management	3.8	4	17	8	1	0	30
Sustainable Business	4.0	4	17	4	0	0	25

Summary of Resources Required and Available to Implement the Program

BEnv majors can be mounted at a relatively low cost by providing students with the flexibility to satisfy graduation requirements using existing courses from FENV, and in some cases non-FENV, units. This is part of the FENV's goal of taking advantage of the synergy within newly joined FENV units. The selection of required and elective courses will be drawn mainly from existing courses, thereby reducing the costs of developing and teaching new courses. Nevertheless, seven new courses have been proposed in order to mount all three BEnv degrees, should they be approved.

We hope to also reduce the resources necessary by utilizing unfilled seats in existing FENV and non-FENV courses, increasing class sizes where appropriate, and utilizing existing administrative capacity in FENV units and the FENV Dean's Office. However, the small number of new courses and possible increases in course offering of existing courses will require additional faculty resources and teaching assistantships. The increased demand for GIS courses is likely to require additional laboratory space and computational resources within a few years. Furthermore, additional faculty resources will be needed to mount the capstone courses when the first cohorts of the BEnv majors reach the culmination of their programs.

The increased AFTEs will bring increased revenues to FENV. We are making special efforts to increase FENV international student enrolments, currently low in comparison to other Faculties, by working with Fraser International College. We expect that the joint BBA/BEnv major will be particularly attractive to international students.

Related programs at SFU or other British Columbia post-secondary institutions

No other BC post-secondary institution in Canada now awards a Bachelor of Environment. Related SFU programs are addressed in the three BEnv major proposals.

List of faculty members who will be teaching: All faculty members in Archaeology, Geography, and Resource and Environmental Management will contribute to greater or lesser degrees in the several proposed BEnv majors.

Proposed Program Contact Person:

Alex Clapp, Associate Dean, FENV, 778-782-8827, aclapp@sfu.ca
Dan Burns, Manager, Curriculum and Planning, FENV, 778-782-9225, dburns@sfu.ca

NOTICE OF INTENT

Bachelor of Environment

Faculty of Environment (FENV)

Simon Fraser University

January 29, 2013

Executive Summary

This document contains a proposal for a new credential, a Bachelor of Environment (BEnv). Separate NOIs are being proposed for majors under the BEnv credential (BBA/BEnv joint major in Sustainable Business, Global Environmental Systems major, and Environmental Resource Management major).

The rationale for the BEnv lies in the balance of the biophysical and social sciences and the interdisciplinarity of content within its majors. As with the other SFU credentials the BEnv reflects the history, goals and composition of the Faculty of Environment, created in 2009. Environmental issues facing society are complex and interdisciplinary in nature. The BEnv majors are designed to prepare graduates for these fields or to continue their studies in graduate programs. The BEnv also takes advantage of the capacities of and synergies between the various newly joined units within FENV (Archaeology, Development and Sustainability, Environmental Sciences, Geography, Resource and Environmental Management, and Sustainable Community Development).

In addition to a solid core in the social sciences, all BEnv majors require coursework in science and mathematics, but with different aims and not as much as is generally contained within a Bachelor of Science degree. Additionally, BEnv major would contain required coursework that specifically deals with complexity, systems and interdisciplinarity.

The BEnv would be characterized in several ways: 1) a core in both the environmental and the social sciences, 2) courses which focus on methodology and communication, and 3) integrative courses which emphasize complexity, systems and decision-making. While having this commonality, BEnv majors might differ by 1) minor variation in lower division core requirements (driven by prerequisite knowledge and skills of upper division courses) and 2) a selection of upper division courses specific to each major.

The decision of FENV to proceed with proposing an BEnv NOI is based on consultation with faculty, staff, students, alumni and prospective employers, as well as a review of other undergraduate environmental programs in BC, Canada and globally. This information was presented to all FENV faculty members as a discussion paper in November 2012. All FENV units provided input and subsequently support for this NOI.

The BEnv majors can be mounted at a relatively low cost, primarily using existing courses, thereby reducing the impact on departments and schools by giving students some flexibility in course requirements. This approach uses unfilled seats in existing FENV and non-FENV courses, increasing class sizes where appropriate; it also takes fuller advantage of existing administrative capacity in FENV units and the FENV Dean's Office.

SFU presently awards 7 different Bachelor degree credentials: Bachelor of Arts (BA), Bachelor of Science (BSc), Bachelor of Applied Science (BASc), Bachelor of Business Administration (BBA), Bachelor of Education (BEd), Bachelor of Fine Arts (BFA) and Bachelor of General Studies (BGS); one from each Faculty, except for Health Sciences and Environment.

Credential to be awarded:
Bachelor of Environment (BEnv)

Location of program:
SFU Burnaby, Harbour Centre and Surrey Campuses

Faculty offering the new degree program:
Faculty of Environment

Anticipated program start date:
September 2014 (See enrollment plan for timeline)

Description of the proposed program:

Aims, Goals and Objectives

Building upon the consultation carried out by FENV over the past 3 years, this document proposes the establishment of a Bachelor of Environment credential, new at SFU, under which would be a number of majors. The majors under the BEnv would augment FENV offerings rather then duplicate existing FENV majors.

The distinctiveness of majors under the BEnv would 1) take full advantage of the expertise existing across FENV units, 2) build upon an interdisciplinary core of courses from the social and natural sciences, 3) provide students with the ability to understand and use tools and methodologies needed to work in complex environmental systems (e.g. GIS, remote sensing, modeling and risk assessment) and 4) provide students with some depth in a particular discipline.

The rationale for the BEnv lies in the balance of the biophysical and social sciences and the interdisciplinarity of content within its majors. As with the other SFU credentials, the BEnv reflects the history, goals and composition of the Faculty, created in 2009. Environmental issues facing society are complex and interdisciplinary in nature. All the proposed BEnv majors require coursework in math and science but not as much as is generally contained in a Bachelor of Science degree. Additionally, the BEnv integrates systems, interdisciplinarity and complexity. The BEnv majors are designed to prepare graduates to work on environmental issues and to continue their studies in environmentally related graduate programs.

Course requirements at both the lower and upper division would be finalized based on program learning outcomes. Draft learning outcomes are provided below and in the appendices. They were developed as a result of consultation with faculty, staff, students, alumni and prospective employers. The BEnv core would be comprised of approximately 13 lower and upper division courses (see Table 1) in the environmental sciences, human relations with nature, the social and built environments, environmental stewardship and governance, and the global scale. Courses in quantitative, qualitative and geospatial methodologies would also be included. Finally, integrative courses that draw upon the knowledge and skills gained in previous coursework would be required in the upper division. These include capstone, fieldwork, modeling, and communication courses.

While sharing this commonality, BEnv majors differ by 1) lower division core requirements varying in a minor way (guided by the knowledge and skills prerequisite to upper division course) and 2) upper division courses specific to the majors.

Contributions to the Mandate and Strategic Plan of the Faculty of Environment

Established in 2009, the Faculty of Environment seeks to respond to a critical societal need, SFU's strategic objectives, student demand, and the current and anticipated career opportunities in the environmental field. With broad expertise and existing resources, FENV is positioned to deliver undergraduate environmental programming that is innovative, flexible and interdisciplinary. Development of the BEnv, put forth in the FENV 2010-2013 Academic 3-Year Plan, is a major initiative engaging all FENV units and intended to realize FENV potential in undergraduate curriculum.

The mandate of the Faculty of Environment is to:

"Position FENV at SFU to become a world class leader in evidence-based research and teaching that integrates the natural, social, spatial, and policy sciences, and pure and applied research, to reconcile environment and development at different spatial and temporal scales."

The development of new environmental programming is a high priority in the FENV 2010-2012 Strategic/Academic Plan and the FENV 2013-2018 draft Academic Plan. Two of the five areas of FENV focus are supported by BEnv development (FENV draft Academic Plan 2013-2018) are:

- Continue with the development and consolidation of new undergraduate and graduate programming that ensures exposure to interdisciplinary and experiential learning opportunities; and differentiates SFU from other Environment Faculties/Schools; and

- Focus on learning outcomes in terms of specific goals and evaluation methods.

FENV Guiding Principles related to BEnv development (FENV Academic Plan 2010-2013 and re-stated in the 2013-2018 plan) are:

- FENV will serve as the natural focal point for the co-ordination and promotion of environmental research and teaching at SFU;

- New programming needs to reflect the importance of the integration of knowledge of social, natural, spatial and policy sciences. GIS has the potential to bridge the many disciplines of the Faculty;

- Physical Geography should be included in all programs that require basic natural science;

- Interdisciplinarity and collaboration will become accepted elements of FENV's modus operandi;

- Experiential learning, including field classes, co-op, cohort programs, study abroad, practical workshops, special mentoring, and community based service learning, is a central part of the Faculty's pedagogy; and

- Undergraduate programming capacity will be expanded using existing courses along with a small number of new course offerings.

This effort directly supports SFU's strategic efforts to:

- Equip SFU students with the knowledge, skills, and experiences that prepare them for life in an ever-changing and challenging world (President's Goals 2012-13);
- Complete the development of planned environment programs (University Academic Plan 2012, Goal 2.1);
- Advance the teaching and practice of sustainability, one of the 6 university principles (University Planning Framework 2012; G.P 38, 3.2.1);
- Increase experiential learning opportunities (Section 1.1.4, Draft University Academic Plan 2013-2018); and
- Develop learning outcomes (section 1.1.2, Draft University Academic Plan 2013-2018).

Target Audience

BEnv majors will be targeted towards students wishing to seek careers in natural and cultural resource management, business & environment, environmental governance, development and sustainability. BEnv content and pedagogy will be intended to meet the knowledge and skill requirements of careers that involve a substantial amount of cross-disciplinary collaboration and understanding. Graduates of BEnv majors should be able to enter careers directly or continue in graduate studies.

Recruitment for BEnv will focus on four potential target groups:

- Direct entry from secondary schools;
- Transfers from colleges;
- International students; and
- Undecided SFU students.

Content and Summary of Requirements for Graduation

All students undertaking a Bachelor of Environment would require preparation in biology, chemistry, ecology, earth systems, the human place in nature, social and built environments, stewardship and governance, and the global scale. Methodology is treated as a core requirement, as most methods are introduced in the second year. Practice and communication are aspects of capstone courses: they may vary according to the major. BEnv core learning outcomes as articulated below would drive the selection of core courses required for BEnv majors.

There will likely be minor variation in the number of courses in each area required in different BEnv majors. Appendix A provides a table illustrating how the core requirements might be distributed among the different BEnv majors. This core would be composed primarily but not exclusively of lower-division courses. Joint majors with BEnv will likely require additional core courses in the non-BEnv major. For this reason a reduced number of courses in some of the areas of the core may be required.

As with our existing majors, many students enter BEnv majors from other colleges, especially those in the Lower Mainland. As we begin to finalize core requirements, attention will be paid to students

entering the BEnv from colleges, as well as from other Faculties and the Environment One Program in Surrey. High school entrance requirements also need to be decided.
The total BEnv core requirements, including capstone courses, would be approximately 17 courses or 55–60 units. This would allow for specialization through upper division courses within specific BEnv majors. Approximately 8–9 of these courses (~30–35 units) would require students to gain depth in a particular area.

Summary

Core	13 courses	~40 units
Integrative courses	4 courses	~15–20 units
Major-specific courses	8 courses	~30–35 units
Total	25 courses	~85–95 units

Additional courses may be required to satisfy WQB requirements. However, we anticipate that Q, B-Sci and B-Soc may be satisfied through required core courses.

Delivery Methods

Face-to-face courses are the primary delivery method, but some distance education courses may be included.

Linkages between the learning outcomes and the curriculum

Included in the appendices is a draft list of leaning outcomes (BEnv program-level rather than major-level). These have been developed based upon input received through our consultations with SFU faculty (within and outside of FENV), students, alumni and professionals working in the fields of environment and sustainability.

Proposed BEnv majors would be comprised of 1) a group of core courses, primarily in the lower division but also including some upper division courses, that are required of all BEnv majors with some minor variation within majors; 2) capstone courses concerned with collaboration, integration and communication; and 3) required courses and electives specific to each of the BEnv majors, primarily in the upper division. The draft program-level learning outcome relate to the first two components of the program. Learning outcomes of non-core specifics of majors will be addressed in NOI and FPP proposals for individual majors. As part of the development of the BEnv FPP Design Committees (see below) will provide recommendations for modification of the draft program-level learning outcomes.

Draft program-level learning outcomes have been developed for:

- Environmental Sciences - chemistry, earth systems, biology, and community ecology;
- Social Sciences – human role in nature, social and built environments, stewardship and governance, and the global scale;
- Methodology, Practice and Communication - Quantitative, geospatial, qualitative and comparative analysis, modeling skills, environmental communication, field work and collaborative skills; and

- Integrative – sustainability, complexity, controversy, decision-making, systems, and organizational function and change.

Distinctive characteristics

The BEnv distinguishes itself in a number of ways:

- Required and elective courses focus on or are directly related to environment and sustainability;
- A balanced core of social and environmental sciences is required;
- The BEnv is interdisciplinary, requiring a number of upper division courses from across FENV units and in some cases units outside of FENV;
- Program requirements include courses in environmental methodology, practice and communication; and
- Required integrative courses emphasize complexity and systems.

Anticipated Completion Time in Semesters

The BEnv may be completed in 8 semesters of full time study.

Enrolment plan for the length of the program

If this NOI and associated BEnv major NOIs are approved by SCUS and SCUP by March 2013, we hope to submit Full Program Proposals for the BEnv credential and majors in summer or fall of 2013, with the target of getting approval from Senate and the Board of Governors by fall 2013. Allowing two months for the Ministry approval process we hope that prospective students will be able to apply for admission to BEnv programs in late fall 2013, beginning their studies in September 2014.

As indicated above, we will focus on high school, BC college and uncommitted SFU students. If NOIs and FPPs for the Global Environmental Systems, Environmental Resource Management, and a joint BBA/BEnv major are approved, we hope initially to admit 10 students into each major and 15 students into the BBA/BEnv joint major, increasing to 20 students admitted into each major and 30 students into the joint major after 5 years. This should result a steady state enrolment of approximately 250 students in all BEnv programs.

Student Evaluation

Student evaluation will follow the general regulations of the University and the Faculty of Environment. This would also include other Faculty general regulations in joint majors with the BEnv.

Program Design, Governance and Assessment

Program Design

Design Committees will be established to develop and refine each of the proposed BEnv majors into Full Program Proposals. Committees will be made up of faculty members from FENV units with expertise in the major area. All FENV units will have the option to participate in each of the BEnv Design Committees. These committees will propose the structure and specific courses for each major needed for Full Program Proposals (FPP) including:

- Whether the particular major should be developed as a BEnv major;
- Review of the emerging major in terms of overlap with existing programming; and
- Determining the focus, courses, structure and capstone experience specific to the major

Design Committees will also provide recommendations on the BEnv core as it relates to the specific major, and appropriate home unit(s) for student advising and program administration.

An additional working group will address issues that cut across all BEnv majors including the common core, administration and governance.

FENV Dean's Office, working with these Design Committees, will provide Full Program Proposals to the Faculty of Environment Undergraduate Curriculum Committee for approval.

Program Governance and Assessment

As part of the development of the FPPs for each major, FENV will propose governance models for each of the majors. We anticipate that the individual FENV units that are most closely aligned with the content of the major will provide administration. In some cases the FENV Dean's Office may provide additional advising, and scheduling support. Housing these majors in existing units with Dean's Office support should minimize the resources required to mount these programs. If no existing unit is a suitable home for a major, an alternative model is that the Design Committee would evolve into steering committee responsible for reviewing the program and making recommendations for changes. Since all BEnv majors will be interdisciplinary, involving courses from most FENV units, curriculum modifications should be done with the involvement of all FENV units. The FENV Undergraduate Curriculum Committee would be responsible for approval of any BEnv curricular changes.

In the case of joint majors with other Faculties, advising and scheduling could be done either through either an individual FENV unit or the FENV Dean's Office in collaboration with non-FENV Faculty counterparts. Curricular modification and program assessment would be the responsibility of a committee made up of representatives of both Faculties.

BEnv programs will be assessed as per university regulations. Programs administered by individual units within FENV will be reviewed as part of the normal external review process.

Level of Support and Recognition from other Post-Secondary Institutions

As per SFU's transfer credit procedures, students may transfer from BC colleges or universities to enroll in BEnv programs.

Evidence of Student Interest and Labour Market Demand

Seeking input from SFU students has been an important part of the BEnv consultation process. Students were involved in both Bachelor of Environment forums (November 2010 and June 2012). Sustainable SFU, an SFU student organization, ran two focus groups (Burnaby and Harbour Centre campuses) in November 2012 seeking input on the Bachelor of Environment as described in this document. In all these sessions students expressed strong support for the BEnv credential and its interdisciplinary content, structure and experiential components. In the 2011 SFU Undergraduate Student Survey of the over 5000 students responding, approximately 8% were very interested in a possible Bachelor of Environment.

In recent years, Canadian employment in environmentally related jobs has been continually increasing. According to Environmental Careers Organization (ECO), between 2007 and 2010, the total number of Canadian workers who spend at least 50% of their time on environmental activities increased from 3.2% to 4%, bring the total number of such workers in 2010 to 682,000. ECO also stated that environmental employment has remained relatively strong during the recent economic downturn, and attributed difficulties in hiring to the lack of workers possessing appropriate levels of education and experience. ECO estimates that demand for environmental workers should continue to be strong into the future. Over the next decade over 100,000 environmental employees (14% of the environmental workforce) will reach retirement age (Profile of Canadian Environmental Employment: Labour Market Research Study. ECO, 2010).

Also in fall 2011, the FENV Faculty Advisory Board, made up of highly experienced representatives from business, government, First Nations and academia, met and provided guidance on development of the BEnv and its majors, stressing the importance of interdisciplinarity, experiential learning, and communication of technical information to non-specialist audiences.

If this NOI and NOIs for BEnv majors are approved further consultation with faculty, students, staff and environmental professionals will be used in development of the FPPs.

Summary of Resources Required and Available to Implement the Program

BEnv majors can be mounted at a relatively low cost by providing students with the flexibility to satisfy graduation requirements using existing courses from FENV, and in some cases non-FENV, units. This is part of FENV's goal of taking advantage of the synergy within newly joined FENV units. The selection of required and elective courses will be drawn mainly from existing courses, thereby reducing the costs of developing and teaching new courses. Nevertheless, we anticipate up to 3 new courses may be needed in order to mount all three BEnv majors, should they be approved. Three additional new courses now being developed to server other curricular initiatives would also be utilized in BEnv majors. The other three majors will be proposed in separate NOIs.

We hope to also reduce the resources necessary by utilizing unfilled seats in existing FENV and non-FENV courses, increasing class sizes where appropriate, and utilizing existing administrative capacity in FENV units and the FENV Dean's Office. However, the small number of new courses and possible increases in course offering of existing courses will require additional faculty resources and teaching assistantships.

The increased AFTEs will bring increased revenues to FENV. We are making special efforts to increase FENV international student enrolments, currently low in comparison to other Faculties, by working with Fraser International College. We hope that the joint BBA/BEnv major will be particularly attractive to international students.

Related programs at SFU or other British Columbia post-secondary institutions

The following BA programs are related and particular attention will be paid to evaluating and avoiding duplication:

- BA Geography;
- BA Geography Environmental Specialty; and
- BBA/BA Business Administration and Geography joint major.

The following majors are related, but as BSc degrees, they focus on the environmental sciences:

- BSc Biology: Ecology, Evolution and Conservation stream
- BSc Environmental Science
- BSc Physical Geography

No other BC post-secondary institution in Canada now awards a Bachelor of Environment.

UBC has a B.A. in Geography, B.A.Sc. in Environmental Engineering (joint with UNBC), a Bachelor in Environmental Design and a number of B.Sc. majors in environmental areas.

University of Victoria awards a B.A. and B.Sc. in Environmental Studies using a double major model.

Royal Roads offers a Bachelor of Arts in Environmental Practice and B.Sc. majors in Environmental Practice, Environmental Science and Environmental Management, all of which are offered via online learning with intensive on-campus residencies.

Trinity Western University offers a B.A. and B.Sc., in Environmental Studies.

Vancouver Island University has a B.A. in Global Studies that emphasizes the social sciences.

UNBC has a Bachelor of Planning focusing on Natural Resources and Northern, rural and First Nations planning, a B.A.Sc. in Environmental Engineering (joint with UBC), a B.A. with majors in Environmental Studies and Geography, and B.Sc. majors in Geography, Environmental Sciences and National Resource Management.

List of faculty members who will be teaching

Archaeology – Cathy D'Andrea, Mark Collard, Ross Jamieson, Dana Lepofsky, Bob Muir and John Welch;
Development and Sustainability – Bob Anderson;
Geography - Shiv Balram, Alex Clapp, Suzana Dragicevic, Anders Knudby, Meg Krawchuk, Geoff Mann, Eugene McCann, Jeremy Venditti, Kirsten Zickfeld, and others;
Resource and Environmental Management - Sean Cox, Karen Kohfeld, Tom Gunton, and others;
Sustainable Community Development - Mark Roseland and Sean Markey.

Proposed Program Contact Person:

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