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MEMORANDUM

ATTENTION Senate
DATE November 18, 2021
FROM Wade Parkhouse, Associate Vice-
President, Academic and Vice-Provost
On behalf of Catherine Dauvergne, Vice-
President, Academic and Provost and
Chair, SCUP
PAGES 1 of 1
RE: Full Program Proposal for a Minor in Climate Change and Society
(SCUP 21-32)

A handwritten signature in black ink, appearing to read "W. Parkhouse".

At its November 3rd, 2021 meeting, SCUP reviewed and approved the Full Program Proposal for a Minor in Climate Change and Society in the Department of Geography within the Faculty of Environment.

Motion:

That Senate approve and recommend to the Board of Governors the Full Program Proposal for a Minor in Climate Change and Society in the Department of Geography within the Faculty of Environment, effective Fall 2022.

C: T. Brennand, L. Lesack, and K. Zickfeld




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MEMORANDUM

ATTENTION	Senate Committee on University Priorities	DATE	October 15, 2021
FROM	Wade Parkhouse, Chair Senate Committee on Undergraduate Studies	PAGES	1/1
RE:	Faculty of Environment (SCUS 21-58)		

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of October 14, 2021, gives rise to the following recommendation:

Motion

That SCUP approves and recommends to Senate the Full Program Proposal for the Climate Change and Society Minor in the Department of Geography within the Faculty of Environment.

The relevant documentation for review by SCUP is attached.



SIMON FRASER UNIVERSITY
ENGAGING THE WORLD

Climate Change and Society Minor

Full Program Proposal

September 2021
Department of Geography

1 Executive Summary

a) An overview of the institution's history, mission, and academic goals:

As Canada's engaged university, Simon Fraser University is defined by its dynamic integration of innovative education, cutting-edge research and far-reaching community engagement. SFU was founded in 1965 with a mission to bring an interdisciplinary approach to learning, embrace bold initiatives, and engage with communities near and far. Today SFU is consistently ranked amongst Canada's top comprehensive universities and is one of the world's leading teaching and research institutions.

The Climate Change and Society minor is well aligned with SFU's strategic goal "To equip SFU students with the knowledge, skills, and experiences that prepare them for life in an ever-changing and challenging world" and with SFU's Strategic Sustainability Plan 2020-2025 that prioritizes climate action. It addresses three of the five challenges identified in SFU's 2019-2024 Academic Plan. Academic quality (1), and engagement (2), are achieved through innovative curriculum intended to equip students with skills and knowledge that prepare them for one of the major challenges faced by society in the coming decades. Bridging divides (3) is achieved by integrating natural and social sciences approaches that supports the creation of new interdisciplinary academic programming.

b) Credential to be awarded:

Minor in the Faculty of Environment in Climate Change and Society

c) Location of program:

Simon Fraser University, Burnaby Campus

d) Faculty offering the proposed new program:

Department of Geography, Faculty of Environment

Other departments that have agreed to offer courses as part of the minor -
Resources and Environmental Management (FENV), Environmental Science (FENV), Labour Studies (FASS), International Studies (FASS), Political Science (FASS), Indigenous Studies (FASS)

e) Anticipated program start date:

Fall 2022

f) Anticipated completion time:

Two to three years will be required to complete the program from the time of declaration of the minor. Like other minors, for most students it will be undertaken while the student is also completing a major or minor program in another department.

g) Summary of the proposed program

- **Aims, goals, and objectives:**

The minor in Climate Change and Society will be an interdisciplinary program linking pertinent science with social science and thereby provide students across SFU with knowledge of the scientific foundations of climate change as well as its social, political and economic dimensions. Building on the foundational science of climate change, students will gain understanding of the drivers of climate change, its effects on biophysical systems and societies, and options for climate change mitigation and adaptation, and gain the ability to critically evaluate a wide range of response options to climate change. Climate change affects all aspects of society and climate change literacy is becoming increasingly relevant to a broad range of careers, including environmental consulting, planning, conservation, resource management, engineering, finance, healthcare to name just some.

While students could choose to take a sampling of climate change-related courses without undertaking the minor, we believe that having a recognized credential in a well-known and sought-after field is more desirable. In addition, it will help employers recognize their specialized literacy and skills.

The general goals of the proposed minor are focused on providing students with (1) knowledge of the scientific foundations of climate change and (2) its societal implications, (3) the skills to critically evaluate response options, and (4) effectively communicate and apply the acquired knowledge.

- **Contribution to the mandate and strategic plan of the institution:**

See above, section 1a.

- **Linkages between program outcomes and curriculum design:**

The general goals of the Climate Change and Society minor are outlined in the "**Aims, goals, and objectives**" section above. The curriculum contributes and builds toward these goals starting with two required lower division courses that represent a starting point for understanding climate science: Earth Systems (GEOG 111), and Climate Change, Water, and Society (GEOG 104). Then one more lower division course is required from a list of four: Weather and Climate (GEOG 214), Our World: Introducing Human Geography (GEOG 100), Introduction to Environmental Science (EVSC 100), and Global Change (REM 100). These courses fulfill prerequisites for upper division courses that represent possible pathways through the minor with either more of a climate science focus, climate justice focus, or climate change solutions focus. To complete at least 27 units required for the minor, students will choose among a range of upper division elective courses from several different departments. This will allow them to tailor the program to their individual needs and future career aspirations.

- **Potential areas/sectors of employment for graduates or opportunities for further study:**

The Climate Change and Society minor targets students with an interest in climate change and/or pursuing careers related to climate change. Most experts suggest climate change will result in net employment growth. Organizations ranging from the Organization for Economic Cooperation and Development (OECD) to the International Labour Organization (ILO) have identified action on climate change as an imminent major source of job creation. In the transition to a less carbon-intensive economy, as well as within that new economy, new jobs are being and will be created and new responsibilities added to current jobs. Within this emerging job market, a comprehensive grasp of climate change is essential. We fully expect that graduates of the Climate Change and Society Minor will have training that is in demand for a variety of employment opportunities.

We also expect that graduates of this program will have training that could be enhanced further by pursuing a professional graduate degree in a field such as Resource and Environmental Management at SFU or other environmental management or assessment programs at other schools, or an academic graduate degree in climate science.

- **Delivery methods:**

This minor program will be delivered primarily through classroom, laboratory, and tutorial instruction at SFU Burnaby campus. However, we anticipate that – in the future – blended or online course delivery might replace some of the face-to-

face courses.

- **Program strengths:**

Climate change is addressed in a range of courses in different SFU units, but there is no academic program at SFU that integrates the different dimensions of climate change in a holistic way by blending fundamental climate science with social science perspectives. The Climate Change and Society minor will provide students with an integrated understanding of climate change, from the socio-economic drivers to the impacts on climate, the environment and society, and strategies to address climate change by building on an interdisciplinary curriculum.

- **Level of support and recognition:**

We have consulted with a range of pertinent faculty members and departments at SFU, and indeed, several are committed to supporting the Climate Change and Society Minor by opening their courses to our students (more details later in this proposal). We also know first-hand the value and importance of having a comprehensive grasp of climate change for students interested in the emerging job-market in this area, both in academia and the private sector. Outside of SFU, we have also investigated (cited later in this proposal) how climate change will result in future net employment growth for people with pertinent training.

There are no relevant regulatory or professional bodies to be consulted.

- **Related programs:**

There are no related academic programs at SFU. There are minor programs in the Faculty of Environment that include climate change among a broader suite of ecological issues (e.g. minors in Geography, Sustainability and Development, Resource and Environmental Management), but there is no minor dedicated to climate change.

UBC (Vancouver) offers an interdisciplinary Minor in Environment and Society, which also integrates content from the sciences, social sciences and humanities. While some science content is included (6 out of 21 credits), most of the content is examined from the perspective of the humanities and social sciences.

<<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,197,282,1475>>.

There are currently no dedicated climate change minors in the Lower Mainland though we understand that UBC may be developing one.

UVic offers an interdisciplinary Human Dimensions of Climate Change minor and certificate program. As the title indicates the program is not science-focused. It draws from the social sciences (geography, anthropology, environmental studies, political science, psychology, sociology), law and business. <https://www.uvic.ca/interdisciplinary/hdcc/>

Aside from the UVic minor and certificate program, there are no climate change minor programs (or dedicated programs of any scale) at any Canadian universities. This makes our proposed minor unique in Canada, for blending scientific and social scientific undergraduate training in climate change.

h) Contact information:

Kirsten Zickfeld, Professor, Geography, 778-782-3321, kzickfel@sfu.ca

Lance Lesack, UGSC Chair, Professor, Geography, 778-782-3321, LLesack@sfu.ca

Geoff Mann, Geography Chair (until Aug 2021) and Professor, 778-782-3321, geoffm@sfu.ca

Tracy Brennand, Geography Chair (from Sept 2021) and Professor, 778-782-3321, tbrenna@sfu.ca

2 Credential Recognition and Nomenclature

2.1 Post-secondary recognition

The Department of Geography student body already includes many students who transfer laterally from other postsecondary institutions. We will continue to articulate with and recognize the credentials that transfer students received from Colleges and Universities across BC and elsewhere. As part of our articulation efforts, we will ensure that transfer students can readily fit into the Climate Change and Society Minor if they wish to undertake this area of training. We will also ensure that other institutions are aware of this new credential so that further study can be pursued elsewhere if desired by the student.

2.2 Industry/employer recognition

There are no regulatory, licensing, or credentialing bodies related to the skills learned in this program. As indicated in section 7 of this proposal, however, there

is strong evidence that comes from academic studies and employer surveys that the unique combination of training offered in the Climate Change and Society Minor will be needed and wanted in the emerging future.

3 Curriculum/Program Content

3.1 Program structure

Content and summary of requirements for graduation

The Climate Change and Society minor should take two to three years to complete from the time the minor is declared. It requires a minimum of 23 credits total, and consists of the following courses:

Lower division requirements (9 units):

Students must complete:

GEOG 111 – Earth Systems (3) BSci

GEOG 104 – Climate Change, Water, and Society (3) BSci/BSS

and one of:

GEOG 214 – Weather and Climate (3) Q - Prerequisite: GEOG 111

GEOG 100 – Our World: Introducing Human Geography (3) B-Hum/BSS

EVSC 100 – Introduction to Environmental Science (3) BSci

REM 100 – Global Change (3) BSS

Upper division requirements (minimum of 14 units):

Climate Science

Students must complete two of:

EVSC 334/REM 334 – Earth’s Past Climate (3)

Prerequisite: REM 100 or EVSC 100; GEOG 111 or EASC 101 or EASC 106;
and 45 units.

Recommended: EASC 210, GEOG 214 or GEOG 215.

GEOG 314 – The Climate System (4) Q

Prerequisite: GEOG 214

GEOG 414 – Climate Change (4) Q

Prerequisite: GEOG 314

REM 370 – Global Resource Issues in Oceanography (4)

Prerequisite: EVSC 100, GEOG 111 or REM 100

Climate Justice

Students must complete one of:

GEOG 333 – Climate Crisis: Understanding a World on Fire (4)

Prerequisite: 45U

GEOG 389W – Nature and Society (4)

Prerequisite: 45U, including GEOG 100 or REM 100

LBST 311 – Labour and the Environment (3)

Prerequisite: 30U

INDG 433 – Indigenous Environmental Justice and Activism (4)

Prerequisite: 45U

Climate Change Solutions

Students must complete one of:

REM 350 – Sustainable Energy and Materials Management (4)

Prerequisite: 45U

REM 355 – Sustainable Transportation Management (3)

Prerequisite: 45U

REM 356W – Environmental Policy (3)

Prerequisite: REM 100

IS 373 – Global Environmental Politics (4)

Prerequisite: 45U

POL 452W – Energy Policy (4)

Delivery methods

This minor program will be delivered primarily through classroom, laboratory, and tutorial instruction at SFU Burnaby campus. However, we anticipate that – in the future – blended or online course delivery might replace some of the face-to-face courses.

Methods of evaluation

Student evaluation will be through traditional channels used for course work at SFU (letter marks and percentages).

3.2 Core courses

The curriculum starts with two required lower division courses (both 1 and 2) that represent a starting point for understanding climate science, then one more lower division course is required from a list of four (one of 3, 4, 5, or 6) that fulfill prerequisites for upper division courses that represent possible pathways through the minor.

1 - *required*. **GEOG 111 - Earth Systems** (3 units) - An introduction to landforms, climates, soils and vegetation; their origins, distributions, interrelationships and roles in the ecosystem. Laboratory work and field trips are

included. Breadth-Science. *Prerequisite:* none.

2 - *required*. **GEOG 104 - Climate Change, Water, and Society** (3 units) - An examination of climate change, its interaction with water availability, and how humans cope with these altered circumstances. Students who have completed GEOG 102 prior to the fall 2011 term may not complete this course for further credit. Breadth-Social Sci/Science. *Prerequisite:* none.

3. **GEOG 214 - Weather and Climate** (3 units) - An examination of the basic principles and processes governing the Earth's weather and climate. Topics include: radiation, greenhouse effect, clouds, precipitation, atmospheric circulation, mid-latitude cyclones, tropical storms, climate change. Quantitative. *Prerequisite:* GEOG 111.

4. **GEOG 100 - Our World: Introducing Human Geography** (3 units) - A geographical introduction to how humans shape our world, with attention also given to how it shapes us. Themes may include: culture, economic activities, environmental change, globalization, politics, population, resources, and urbanization. Breadth-Humanities/Social Sciences. *Prerequisite:* none.

5. **EVSC 100 - Introduction to Environmental Science** (3 units) - Introduces students to the study of environmental science. Lecture material spans contributing disciplines, emphasizing integration of diverse concepts to understand environmental problems. Tutorials develop core academic skills in environmental science context. Students who have completed EVSC 200 may not complete this course for further credit. Breadth-Science. *Prerequisite:* none.

6. **REM 100 - Global Change** (3 units) - This course provides students with an overview of global environmental change and its causes from a social science perspective, historically and at the present time. Population growth, an increasing ecological footprint and changes in ideology, social organization, economy and technology will be critically reviewed. New ways of thinking in natural and social science will be considered in relation to specific issues such as land, soil and food; energy, raw materials and solid waste; air pollution and transportation; water, oceans and fisheries; climate change; forestry and biodiversity; urbanization, and alternative futures. Breadth-Social Sciences. *Prerequisite:* none.

3.3 Existing and new courses

The only required courses are the core courses listed above. Students will then be able to choose from a range of upper division electives in Geography, Resource and Environmental Management, Environmental Science, Labour Studies, International Studies, Political Science, and Indigenous Studies that focus into the

realms of **Climate Science, Climate Justice, and Climate Change Solutions**. One new course created to enhance the Climate Justice focus is **GEOG 333 Climate Crisis: A World on Fire**. GEOG 333 has already been approved and is scheduled to be taught.

3.4 Curriculum and program goals

The general goals of the Climate Change and Society Minor are focused on providing students with knowledge of the scientific foundations of climate change and its societal implications, the skills to critically evaluate response options, and effectively communicate and apply the acquired knowledge. Achieving these goals is based on **specific learning objectives** as described in detail below.

Students who complete the Minor in Climate Change and Society will be able to demonstrate:

Objective 1: Foundational scientific knowledge of climate change

- (a) Recall and explain scientific foundations of the greenhouse effect.
- (b) Explain the complexity of the climate system and identify linkages between its components, including stocks, flows, and feedback processes.
- (c) Explain the carbon cycle and its relationship to climate change.
- (d) Think critically about the science behind natural and human disruptions to the climate system.

Objective 2: An understanding of the processes, practice, and evaluation of knowledge creation in climate change research

- (a) Find, read, and critically assess published academic research on the causes and effects of climate change.
- (b) Understand the scientific approach in climate change research.
- (c) Describe how scientists are able to isolate human from natural influences on climate change.
- (d) Differentiate between evidence-based claims and pseudo-science.

Objective 3: An understanding of the relationship between the biophysical and social processes shaping the drivers and effects of, and responses to, climate change

- (a) Building from foundational science, recall and explain the social, political and economic drivers of climate change
- (b) Building from foundational science, recall and explain the social, political-economic and distributional impacts of climate change
- (c) Evaluate climate change mitigation and adaptation efforts, and their differential socio-ecological effects, across multiple scales

- (d) Critically assess the implications, possibilities, and limitations of policy and institutional responses to climate change at different scales.

Objective 4: Effective reading, writing, oral, and visual communication skills

- (a) Practice diverse modes of communication of climate change causes, impacts, and solutions, demonstrating awareness of audience.

Objective 5: The application of climate change knowledge in advancing our global community

- (a) Use scientific and social scientific knowledge to inform evidence-based thinking about climate change issues at multiple scales.
- (b) Practice skills to engage in discussions and decision-making processes, and to envision and evaluate climate change solutions.

The above learning objectives of the Climate Change and Society Minor are summarized in a curriculum map (page 17), along with each course in the curriculum, thereby showing how the learning objectives are achieved within the program.

3.5 Work experience/field/practicum placement

Not directly applicable. However, we plan to build a strong set of co-op connections and opportunities to help students achieve their professional and career goals.

4 Program Resources

4.1 Target audience and enrolment plan

The Climate Change and Society minor targets students with an interest in climate change and/or pursuing careers related to climate change. The minor aims to be attractive and accessible to a range of students across the curricular spectrum (from the humanities to the social and natural sciences and engineering). The content and delivery of our courses will be tailored to students with a variety of academic backgrounds. Faculty in FENV have experience in making courses work for a diverse audience, as many courses already accommodate students with different aptitude for science and social science approaches. We anticipate that students with virtually any academic background will be able to thrive in this program.

We anticipate that the Department will be able to host at least 25-30 minor students at any one time.

4.2 Resources

This program will not reduce nor significantly impact other programs or resources within the Department of Geography. However, should it prove very popular (which we anticipate), we may be forced to respond by increasing both our teaching lab capacity or number of sections offered and faculty teaching capacity.

This minor can be mounted initially without any new faculty appointments, however as the program grows it will be significantly strengthened by hires in climate science (climate change and extreme events) and the social dimensions of climate change. These positions are prioritized in the Department of Geography's Faculty Renewal Plan.

Currently, we do not anticipate charging extra fees for equipment use or tuition.

Contributing faculty members

Kirsten Zickfeld, Professor (GEOG), 100% of teaching load
Geoff Mann, Professor (GEOG), 25% of teaching load
Nick Blomley, Professor (GEOG), 25% of teaching load
Rosemary Collard, Assistant Professor (GEOG), 25% of teaching load
Tara Holland, Lecturer (GEOG), 25% of teaching load
Andrew Perkins, Lecturer (GEOG), 25% of teaching load
Karen Kohfeld, Professor (REM and EVSC), 50% of teaching load
Mark Jaccard, Professor (REM), 25% of teaching load
Jon Axsen, Associate Professor (REM), 25% of teaching load

5 Program Review and Academic/Administrative Oversight

The Department of Geography is routinely assessed every 7 years. This Climate Change and Society Minor will be assessed as part of the external review process.

This program will be administered as a Geography minor for pragmatic reasons. The Geography Department may modify details of the Minor as various data becomes available on the performance of the program. We highly value the participation and support of faculty from other departments, particularly REM, and well recognize the value of their courses in this minor. Our intent is to seek ongoing input from faculty involved with this Minor, if revisions are needed after the initial performance of the program can be assessed.

6 Program Consultation

The proposal for our Climate Change and Society Minor has involved consultation with pertinent faculty in other departments within FENV and elsewhere across the university. During the spring semester of 2020, we began circulating a draft proposal, having discussions, and seeking support from pertinent faculty members. The Notice of Intent (NOI) was approved by the Geography Department on November 26, 2020. We received unanimous support to proceed with the NOI for the proposed minor from the FENV Undergraduate Curriculum Committee on December 8, 2020.

The NOI was approved unanimously at SCUS on January 7, 2021 and by SCUP on January 20, 2021 with strong expressed principled support. We also followed up with all participating departments to solidify support, address any concerns, and finalize the course offerings. There are no relevant regulatory or professional bodies to be consulted.

7 Evidence of Student Interest and Labour Market Demand

Student Interest

We base our estimates of student interest on the high and increasing enrollment in our dedicated climate change courses (GEOG 104, 214, 314, 414). Enrolment in these courses has increased approximately 180% in the last 3 years, from 190 in 2016-17 to 527 in 2019-20. The number of course offerings has increased by 75% over the same period, from 4 in 2015-16 to 7 in 2019-20. Enrollment in the most recent offerings of GEOG 104 have exceeded 300 students.

We have also run a popular lecture on climate change, “What if winter is not coming? Climate change science, impacts and what people are doing about it,” as part of SFU and FENV high school recruitment. This lecture appears to be popular, not just because of the topic, but also because of how it is delivered jointly by Kirsten Zickfeld (a climate scientist) and Rosemary Collard (a social scientist). Students seem to like how both the scientific issues and consequences to society are brought together in a way that effectively brings out why people should care about climate change.

The full registration list in departmental course offerings and engaged students indicate high interest in climate change among incoming students. We expect this interest stems in part from the global student climate change movement, #FridaysForFuture, which has swept the globe since Greta Thunberg initiated it in summer 2018. Millions of people have participated in strikes and marches for the climate, including thousands of high school and university students in the Lower Mainland. This groundswell of mobilization and interest among youth suggests there would be significant demand for a climate change focused minor.

While interest in climate change is high, knowledge is relatively low, indicating the need for climate change dedicated educational opportunities. A comprehensive survey of 3,196 Canadians by Lakehead University and Learning for a Sustainable Future (LSF: <http://www.lsf-lst.ca/cc-survey>) found 80 percent of Canadians have a high level of awareness and concern about climate change. But only half the Canadians surveyed feel well-informed about climate change, and 86 percent indicated they need more information about it. And almost half of the surveyed Canadians failed a basic knowledge test about climate change and its impacts, with only 14 percent correctly answering at least eight of its ten questions. As reported in Education Canada Magazine, “this gap between Canadians’ high level of concern about climate change and their level of knowledge signifies a critical learning moment for both public and formal education” <https://www.edcan.ca/articles/climate-change-education-canada/>.

Labour market demand

Most experts suggest climate change will result in net employment growth. Organizations ranging from the Organization for Economic Cooperation and Development (OECD) to the International Labour Organization (ILO) have identified action on climate change as an imminent major source of job creation. In the transition to a less carbon-intensive economy, as well as within that new economy, new jobs are being and will be created and new responsibilities added to current jobs. As the corporate, governmental, and non-profit sectors incorporate climate change mitigation and adaptation goals into their operations, significant employment opportunities have been and will be created. Environmental Careers Organization of Canada (ECO Canada) has identified four key areas of climate-related employment: GHG mitigation, management and reporting; training, communication, and public awareness; adaptation and impact assessments; and compliance and auditing (<https://www.eco.ca/blog/carbon-tax-green-jobs/>). ECO

Canada reports that Canada's environmental job market expanded in 2018 with 24,500 online job ads – an 8 percent increase from 2017 (<https://www.eco.ca/research/report/environmental-job-market-trends-2018/>). Within this emerging job market, a comprehensive grasp of climate change is essential.

Many of these jobs are being created as part of federal and provincial/territorial governments' investments in climate change plans and green sectors jobs more generally. The BC Government's CleanBC plan and its CleanBC Workforce Readiness Plan suggest that "making B.C. cleaner will create good jobs that support families and sustain our communities. We need new skilled workers, and new skills to equip those already at work across the province. As new jobs and professions emerge, post-secondary education and training need to keep pace" (https://blog.gov.bc.ca/app/uploads/sites/436/2019/02/CleanBC_Highlights_Report_Updated_Mar2019.pdf). Interdisciplinary training on climate change is a key way SFU can "keep pace" with these emerging labour market demands. In our minor program students will gain this knowledge and thereby be positioned to capitalize on emerging employment demand.

8 Appendices

8.1 Calendar entry

A complete proposed Calendar entry must be attached.

8.2 New Courses

Attach new course approval forms, sample course outlines, and library reviews for each course.

8.3 Market analysis – student interest and labour market demand

Include any data, student surveys, and letters of support from industry, employers, or accrediting bodies, that provide evidence of student and labour demand.

8.4 Consultation comments and letters of support

Attach any written endorsements or comments, from both internal and external sources.

8.5 Resources

Include any supportive memos indicating that sufficient space and other resources (such as confirmation from the Dean's Office, library reports, etc.) are available for the program.

8.6 Financial plan (only if additional resources required)

Outline the initial start-up costs, such as curriculum development and online design, as well as anticipated costs in offering the program (instructional salaries and benefits, administrative overhead, student services, and online support).

8.7 Abbreviated curriculum vitae for faculty

(needed only for new programs requiring Ministry of Advanced Education final approval) Include a CV for each faculty member in the program. In the case of cross-disciplinary programs, include a CV for each member of the steering committee and for faculty members likely to be teaching core courses. It is strongly suggested that short (e.g. 2 pages), standardized CVs be submitted, providing brief information on: current position; credentials; research interests; publications, grants and graduate supervision over a defined period (e.g. last seven years).

Department of Geography Curriculum Map - Climate Change and Society Minor

EDUCATIONAL GOALS	Lower Division Required		Climate Science		Climate Justice		Climate Change Solutions	
	One of	Two of	One of	Two of	One of	Two of	One of	Two of
	GEOG 104	EVS 100	GEOG 104	GEOG 100	GEOG 104	GEOG 100	GEOG 104	GEOG 100
1. Foundational scientific knowledge of climate change								
a. Recall and explain scientific foundations of the greenhouse effect.	I, E, T	I, T	E, T	I	R, A, T	R, A, T	I	R, A, T
b. Explain the complexity of the climate system and identify linkages between its components, including stocks, flows, and feedback processes.	I, E, T	I	E, T	I	R, A, T	R, A, T	I	R, A, T
c. Explain the carbon cycle and its relationship to climate change.	I, E, T	I, T	E, T	I	R, A, T	R, A, T	I	R, A, T
d. Explain the relationship between the climate system and the atmosphere.	I, E, T	I, T	E, T	I	R, A, T	R, A, T	I	R, A, T
2. An understanding of the processes, practice, and evaluation of knowledge creation in climate change research								
a. Find, read, and critically assess published academic research on the causes and effects of climate change.	I, E, T	I	E, A, T	I, A, T	R, A, T	R, A, T	E	R, A, T
b. Understand the scientific approach in climate change research.	I, E	I, E	E, A, T	I	R, A, T	R	E	R, A, T
c. Describe how scientists are able to isolate human from natural influences on climate change.	I, E, T	I, T	E, T	I	R, A, T	R	E	R, A, T
d. Explain the relationship between climate change and the earth system.	I, E, T	I, T	E	I	R, A, T	R	E	R, A, T
3. An understanding of the relationship between the biophysical and social processes shaping the drivers and effects of, and responses to, climate change								
a. Building from foundational science, recall and explain the social, political and economic drivers of climate change	I, T	I, T	I, T	I	E, I, T	R, T	R, A, T	E, T
b. Building from foundational science, recall and explain the social, political-economic and institutional impacts of climate change	I, E, T	I, T	I, T	I	R, A, T	R, A, T	R	R, T
c. Explain the relationship between mitigation and adaptation efforts, and their differential socio-ecological effects, across multiple scales	I, T	I, T	I, T	I, A	R, T	R, T	R	E, T
d. Critically assess the implications, possibilities, and limitations of policy and institutional responses to climate change at different scales.	I, T	I, T	I, T	I, A	R, A, T	R, A, T	R	E, A, T
4. Effective reading, writing, oral, and visual communication skills								
a. Practice diverse modes of communication of climate change causes, impacts, and solutions, demonstrating awareness of audience	I, A, T	I	E, T	I	R, A, T	R	R	R
b. Use appropriate oral and written communication skills to advance our global community	I, T	I	I	I	R, A, T	R, A, T	R	R, A, T
a. Use appropriate oral and written communication skills to inform evidence-based thinking about climate change issues at multiple scales.	I, T	I	I	I, T	R, A, T	R, A, T	R, T	E, T
b. Practice skills to engage in discussions and decision-making processes, and to envision and evaluate climate change solutions	I, A, T	I	I, T	I, A, T	R, A, T	R, A, T	R	E, A, T

INTRODUCES: Students are not expected to be familiar with the content or skill at the beginning of the course. Instructional activities focus on basic knowledge, skills, and/or competencies and an entry-level complexity.

EMPHASIZES: Students are expected to possess a basic knowledge and familiarity with the content or skills at the collegiate level. Instruction and learning concentrates on enhancing and strengthening knowledge, skills, and expanding complexity.

REINFORCES: Students are expected to possess a strong foundation in the knowledge, skills, and/or competencies and learning activities continue to build upon previous competencies and increased complexity.

APPLIES: Students are expected to possess an advanced level of knowledge, skill, or competency at the collegiate level. Instructional and learning activities focus on the use of the content or skills in multiple contexts and at multiple levels of complexity.

TRANSFERABLE: This goal is assessed for grades in some way in the course (6 g), through testing, assignments, etc).

APPENDIX 8.1 - Calendar Entry

Climate Change and Society Minor

Admission Requirements

All students must be in good academic standing and must obtain approval from the Geography Academic Advisor to be enrolled in the Climate Change and Society Minor. Students may apply for admission to this minor program at any time.

Program Requirements

Students must complete a minimum of 23 units as follows:

Lower division requirements (9 units)

Complete both of:

GEOG 111 – Earth Systems (3)

GEOG 104 – Climate Change, Water, and Society (3)

Complete one of:

GEOG 214 – Weather and Climate (3)

GEOG 100 – Our World: Introducing Human Geography (3)

EVSC 100 – Introduction to Environmental Science (3)

REM 100 – Global Change (3)

Upper division requirements (minimum of 14 units as specified below)

Climate Science Group - Complete two of:

EVSC 334/REM 334 – Earth’s Past Climate (3)

GEOG 314 – The Climate System (4)

GEOG 414 – Climate Change (4)

REM 370 – Global Resource Issues in Oceanography (4)

Climate Justice Group - Complete one of:

GEOG 333 – Climate Crisis: Understanding a World on Fire (4)

GEOG 389W – Nature and Society (4)

LBST 311 – Labour and the Environment (3)

INDG 433 – Indigenous Environmental Justice and Activism (4)

Climate Change Solutions Group - Complete one of:

REM 350 – Sustainable Energy and Materials Management (4)

REM 355 – Sustainable Transportation Management (3)

REM 356W – Environmental Policy (3)

IS 373 – Global Environmental Politics (4)
POL 452W – Energy Policy (4)

Residency Requirements and Transfer Credit

At least half of the program's total units must be earned through Simon Fraser University study.

At least two thirds of the program's total upper division units must be earned through Simon Fraser University study.

APPENDIX 8.4 - Consultation Comments and Letters of Support

SUMMARY OF RESPONSES TO COMMENTS ABOUT THE CLIMATE CHANGE AND SOCIETY NOI

FENV UCC comment - The NOI was passed subject to a request that some of the language in the goals should be edited to emphasize the hybrid nature of the Minor and to better contextualize scope of its climate science elements.

Response - We tried to make it very clear from the outset that this is an interdisciplinary program that builds on foundational climate science to explore the climate change issue in an integrated way. We purposely avoided stating in the NOI that the program is "science-driven". Instead, we stated repeatedly that students will acquire "knowledge of the scientific /foundations/ of climate change". This aspect should be accomplished regardless of which route students take through the upper division climate science courses. The NOI was very clear that 13-14 of the 23-25 required credits (i.e. >50%) are from science courses.

Some minor editing of the program description, along with learning objective 1 (b) and objective 2 was done to ensure that nature of the Minor was clearly an interdisciplinary program linking pertinent science with social science, and thus not misleading.

SCUS comments - possibly add climate change related course from Indigenous Studies (David Hik)

Response - We consulted with the Department of Indigenous Studies (including Dr. Deanna Reder and Dr. Annie Ross) and have now incorporated INDG 433 (Indigenous Environmental Justice and Activism) into the "Climate Justice" course options of the upper division in our Minor. We thank Dr. Hik for the original suggestion and think this is a good option to include. An important aspect that makes this viable is that INDG 433 does not have any limiting prerequisites. It also fits with some of the educational goals in our curriculum map (page 17).

The following may provide important context for potentially adding a course such as INDG 433 to our course options. During earlier consultation within FENV about the NOI, the Archaeology Department suggested that a course on the long-term human-climate relationship would be an enriching element for a proposal such as this. We agreed in principle, however, such a course needs to fit within the upper division options for the minor, and none of the suggested courses appeared to directly address the "Climate Justice" and "Climate Change Solutions" themes we organized the UD social science courses around. There is also a prerequisite issue when adding courses, particularly in a minor where the entire program consists of only 7 courses.

Kirsten Zickfeld carefully assessed ARCH 365, which did not have a prerequisite issue. She noted there was only one unit in the course outline that mentions climate explicitly and that, within the context of this minor, it is important for the upper division climate science courses to build on the basic climate science provided by GEOG 111 and

104 in the lower division. ARCH 365 certainly provides an alternative perspective about climate change, but it doesn't provide the higher-level climate science content of the other courses in the upper division list. This would have been an appealing course to consider if the proposed program had been a major where the number of courses involved wasn't as much of an issue.

SCUP comments - (1) make sure student lower division advising is clear for 3 streams in upper division; and (2) make accessible for as many students as possible.

Response (1) - The Geography Department has multiple majors, minors, and certificates among its programs, including the science and social science hybrid Major Global Environmental Systems. The department is aware of the lower division decisions that students must make to efficiently get through the differing upper division pathways in the Climate Change and Society Minor. The department has extensive experience with advising students and creating advisory documentation to help students navigate their way through its interdisciplinary programs, and will undertake this carefully in the case of this Minor.

Response (2) - Designing this Minor with no hidden prerequisites, and with flexibility built into the program design should facilitate accessibility to a wide range of possible students.

LETTERS OF SUPPORT FROM THE FOLLOWING UNITS ARE APPENDED STARTING NEXT PAGE

- (1) Resource and Environmental Management - REM / FENV**
- (2) Environmental Science - EVSC / FENV**
- (3) Archaeology - ARCH / FENV**
- (4) Political Science - POL / FASS**
- (5) Indigenous Studies - INDG / FASS**
- (6) Labour Studies - LBST / FASS**
- (7) International Studies - IS / FASS**



ATTENTION Dr. Lance Lesack, UGSC Chair, Department of Geography

FROM Dr. Mark Jaccard, Director, REM

RE REM Support for GEOG's Minor in Climate Change and Society Proposal

DATE July 2, 2021

Dear Lance,

This letter is intended to show REM's support for the Minor in Climate Change and Society proposed by Geography. Climate Change is obviously a critical area of academic focus, and the Faculty of Environment is an obvious location for such programming. For example, REM also has expertise in the Climate Change area that complements the expertise contained within Geography. Given the wide range of issues associated with the key environmental challenge of our time, there is an expectation that further programming building on REM's particular expertise may be forthcoming in the future to complement this initiative from Geography.

Geography's Climate Change Minor is an important first step in developing a range of climate change offerings within the Faculty of Environment. As such, it is to be commended and we fully support it.

Sincerely,

Mark Jaccard

A handwritten signature in black ink, appearing to read 'Mark Jaccard', written in a cursive style.

Director, REM



Simon Fraser University
8888 University Drive
Burnaby, BC
V5A 1S6, Canada

Reception
TASC II 8703
TEL 778.782.9032
<http://www.sfu.ca/EVSC/>

Director, Jeremy Venditti
TASC II 8903
TEL 604.767.2247
EVSC_Director@sfu.ca

MEMORANDUM

ATTENTION	Dr. Lance Lesack, UGSC Chair, Department of Geography	DATE	July 9, 2021
FROM	Dr. Jeremy Venditti, Director, School of Environmental Science	PAGES	1
RE:	GEOG's Minor in Climate Change and Society Proposal		

Dear Lance,

The School of Environmental Science would like acknowledge the changes GEOG made to address concerns about the new Minor in Climate Change and Society Proposal. This is obviously a critical area of training in the Faculty of Environment and we appreciate the effort GEOG put into developing the proposal and addressing concerns we had about the educational goals and scientific content of the program.

Members of the School of Environmental Science have some remaining concerns about the academic preparation non-science students will have entering upper division science courses designed for the EVSC undergraduate program. However, we see no obvious way to address the concerns at this time. We will work with GEOG to adaptively manage any issues that arise though the first offerings the minor program.

We believe this is an important first step in developing climate change-themed programming in the Faculty of Environment and look forward to the launch of the program.

Regards,

Jeremy G. Venditti

Professor & Director
School of Environmental Science
Simon Fraser University
Burnaby BC, Canada
Email: EVSC_Director@sfu.ca
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Professor
Department of Geography
Simon Fraser University
Burnaby BC, Canada
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FACULTY OF ENVIRONMENT
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Sept 1st, 2021

Re: Support letter for the Department of Geography's proposed Climate Change and Society Minor

Dear Dr. Lesak,

The Climate Change and Society Minor was brought before the Archaeology UCC several times following the proper procedure and the Archaeology Faculty also had the opportunity to review it and provide feedback and input. Based on our discussions, I agree with the Department of Geography's assertion that the proposed minor *"... is well aligned with SFU's strategic goal 'To equip SFU students with the knowledge, skills, and experiences that prepare them for life in an ever-changing and challenging world' and with SFU's Strategic Sustainability Plan 2020-2025 that prioritizes climate action"*. As such this minor provides interested ARCH majors with the opportunity to acquire such knowledge and skills. While the minor contains no archaeology courses it does represent a complimentary area of research and a logical addition to an ARCH major program – whether students are specifically interested in environmental arch research or not. It's also an easily accessible minor for interested ARCH majors to add to their program. I would anticipate that such a minor would be attractive to both those ARCH majors interested in following an academic-oriented career path and those who may be focused more on a career in archaeology and cultural resources management where it would represent an attractive addition to their CV. Obviously, most archaeological research has a strong climate component – both from the point of view of the role climate/environment plays in the organization of past societies and on the effects that past human behaviours have had on the climate and environment. Thus, students of archaeology tend to bring a unique long-view to the topic of climate change and ARCH majors with this minor would be in a position to make important contributions to discussions of current climate change issues and potential solutions. Considering that climate change is THE most pressing problem we face today, giving our majors access to such a minor should be something we are in support of.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Hugo Cardoso', with a long horizontal flourish extending to the right.

Hugo Cardoso

Professor and Chair, Department of Archaeology

Dear Lance Lesack,

This is a letter of qualified support from the Department of Political Science for the proposed new interdisciplinary minor in Climate Change and Society. Given the importance of climate change on political agendas, your department's initiative is a very important and timely one and we hope it leads to this necessary addition to the SFU arsenal of programs.

Please note that there is another course in political science that we would like to contribute to the curriculum for the minor. POL349: Global Climate Change Politics is currently offered as a special topics course this fall (syllabus attached). The course explores the international politics of climate change and covers the following topics: the causes and consequences of climate change, history of international discussions, UN negotiations and policy agreements, the positions of key countries and the global shift to low-carbon development. We focus on international negotiations, recent agreements that define the global response to the problem, and the domestic policies of major countries.

The course draws on the instructor's experience in UN diplomacy, as member of the European Union delegation in climate change negotiations. An important part of the course that will be of interest and particular value to students' training is an extensive simulation of negotiations on global climate policy. Students represent different countries and negotiate international climate policy, based on information from insider materials available to actual diplomats. We expect the course to be made a permanent course in political science starting September 2022 when your proposed minor begins.

Here are some additional comments and suggestions regarding the proposal. The general goals of the minor (page 3) and also curriculum goals (pages 10-11) should include an additional one: providing students with knowledge on climate policymaking and the sociopolitical obstacles to effective climate policy. This is particularly important for anyone who is concerned with effective solutions.

On credentials recognition (page 6) the text currently reads "There are no regulatory ... bodies..." I suggest including text on government agencies at different levels of government where climate policy expertise is increasingly needed.

We salute you for launching this proposal and remain ready to contribute to the success of your initiative.

Best,

Radoslav Dimitrov
Associate Professor
Department of Political Science



SFU
INDIGENOUS STUDIES

ARTS AND SOCIAL SCIENCES
INDIGENOUS STUDIES

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SFU.CA/INDG

UGSC Chair
Department of Geography
Simon Fraser University
2 September 2021

Dear Professor Lesack,

Thank you for sharing the Department of Geography's planned Full Program Proposal for your proposed Climate Change and Society Minor. We support the addition of a course from our department, INDG 433: Indigenous Environmental Justice and Activism, be accepted as part of your minor, and hope this opens the door to future collaborations.

I understand that your Minor is about to go forward to SCUS for approval. Given the current context and the distressing climate disasters that we have witnessed this summer, I think this minor is incredibly timely. I also hope you will find that the connections with the Department of Indigenous Studies supports your aspirations to provide "an interdisciplinary program linking pertinent science with social science and thereby provide students across SFU with knowledge of the scientific foundations of climate change as well as its social, political, and economic dimensions." The work that we do in Indigenous Studies has a similar focus, in our analysis of the results upon the environment of colonialism and attempted Indigenous epistemicide.

Yours truly,

Deanna Reder, PhD
Chair, Department of Indigenous Studies
Member, College of New Scholars, Royal Society of Canada (2018)
dhr@sfu.ca



FACULTY OF ARTS &
SOCIAL SCIENCES

**The Labour Studies
Program**

September 3, 2021

Re: Climate Change and Society Minor

I am writing in support of Minor in Climate Change and Society being proposed by the Department of Geography at Simon Fraser University. Socio-spatial perspectives on climate change and its impacts are essential to equip students to understand and tackle the current climate emergency. The proposed Program is timely, innovative, inter-disciplinary, and well designed. It has the full and enthusiastic support of the Labour Studies Program.

Particular strengths of the Minor are that it is focused on scientific, social, political, and economic dimensions of climate change; that it incorporates courses from a range of fields and disciplines including Political Science, International Relations, Geography, and Resources and Environmental Management; and that it explicitly recognizes and addresses the growing need for workers in a range of sectors to have a sound understanding of climate change that can be applied critically to problems and issues. The Notice of Intent (NOI) clearly demonstrates these strengths. The NOI also demonstrates the originality of the Minor, which combines social and physical sciences, relative to similar courses in BC (which are in any case limited in number). As noted, the proposed Minor also aligns very closely with SFU's strategic goals and commitments to being a community-engaged university.

Labour Studies students are increasingly interested in understanding climate change and environmental politics as they relate to labour markets, workers' struggles, and the politics of a just transition to a greener economy. Our Labour Studies course, LBST 311 - Workers and the Environment, which is included in the proposed Minor is both an excellent fit and will provide a bridge for students from the Faculty of Arts and Social Sciences interested in pursuing a course of study dedicated to climate change. We are excited to be a part of this proposed Minor and look forward to its approval and implementation at SFU.

Sincerely,

A handwritten signature in black ink that reads 'Kendra Strauss'.

Dr Kendra Strauss
Director and Professor,
The Labour Studies Program
Department of Sociology & Anthropology
Associate Member, Department of Geography
Simon Fraser University

Director: Dr. Kendra Strauss
Professor of Labour Studies
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Subject: Re: Climate Change and Society Minor - support letter?

From: Lance Lesack <LLesack@sfu.ca>

Date: 2021-08-25, 2:33 p.m.

To: Brenda Lyshaug <brenda_lyshaug@sfu.ca>

CC: Tamir Moustafa <tmoustafa@sfu.ca>, Kirsten Zickfeld <kirsten_zickfeld@sfu.ca>

Hi Brenda:

Thank you for your feedback on our proposal for a Climate Change and Society minor.

We are happy to hear that your department supports the inclusion of IS 373 in the upper division of our proposed minor.

We can see why you have suggested the possibility of also including IS 101 in the lower division courses. However, because of the limited number of courses that can fit within a minor, we had to limit the scope of what to include. Our proposed minor is based on 9 units lower division (= 3 courses) + 14-16 units upper division (= 4 courses). All courses included in the lower division serve as prerequisites to various options at the upper division, whereas IS 101 would not serve that role.

Kirsten Zickfeld also noted from the course outline that, as a stand-alone course, IS 101 only addresses climate change explicitly in one lecture. IS 101 might be appropriate if we were trying to build a major program rather than a minor, but that is not the case here.

Let me know if we have misinterpreted anything or if you have other questions or concerns that you would like to discuss. I'm hoping your department is nevertheless willing to provide a letter of support that we can include with our proposal for submission to SCUS. The support letter can be brief, or even an email, and we need the "letter" by the FIRST WEEK OF SEPTEMBER to meet the SCUS deadline.

Thank you for your efforts on our behalf. Hope all else is well at your end.

Regards,
Lance Lesack
Department of Geography

On 2021-08-16 3:47 p.m., Brenda Lyshaug wrote:

Dear Lance,

>
> Thank you for sharing this proposal for a new minor in Climate Change and > Society. It looks like a worthwhile initiative.

>
> As you may know, we have a formal concentration in our undergraduate > International Studies program that addresses Economic, Development, and > Environmental Issues. Within this concentration, we cover social, political, > and economic issues associated with environmental change, including climate > change.

>
> /IS 373 *Global Environmental Politics*/, which is part of our concentration, is > well suited to your proposed new minor, and we are happy to have it included. > We would also like to propose that/IS 101 Global Challenges of the 21st > Century/be included in the program's lower division requirements.

>
> IS 101 introduces students to the pressing global problems of our time, > including the challenges posed by environmental change, and it highlights the > interconnected nature of these problems. More specifically, the course > introduces students to some of the key processes and institutions of global > governance, as they relate to these challenges. It also introduces students to > the broader regional and global context that is crucial for understanding not > only the challenges of climate change but also potential solutions. For these > reasons, IS 101 would help provide students with a foundation that is crucial > to two of your proposed new minor's concentrations, in/climate > justice/and/climate solutions/. I have attached a copy of a recent syllabus.

>
> I look forward to hearing your thoughts on this and would be happy to discuss > any questions by phone or on Zoom.

>
> Best wishes,
> Brenda Lyshaug

From: Tamir Moustafa
Sent: Friday, June 25, 2021 4:53 PM
To: Lance Lesack
Cc: Paul Kingsbury; Brenda Lyshaug
Subject: Re: Climate Change and Society Minor - support letter?
Thank you for sharing this, Lance.

I'm sharing it here with Brenda Lyshaug, our undergraduate chair. We'll be back in touch after we've had a chance to review.

Best wishes,
Tamir

Tamir Moustafa
Professor and Stephen Jarislowsky Chair
Director, School for International Studies
Simon Fraser University, Canada
www.sfu.ca/internationalstudies/moustafa.html
<<http://www.sfu.ca/internationalstudies/moustafa.html>>

> On Jun 25, 2021, at 4:05 PM, Lance Lesack <LLesack@sfu.ca> <<mailto:LLesack@sfu.ca>> wrote:

>
> Dear Dr Moustafa:
>
> By way of prior discussion with Dr Kirsten Zickfeld of our Department, you may > be aware of the Geography Department's proposal for a Minor in Climate Change > and Society (see attached proposal). My understanding is that Kirsten likely > contacted your department about including one of your courses as an upper > division option for students to learn about "Climate Justice" or "Climate > Change Solutions" in our proposed Minor. Are you able to provide a brief > letter of support for this proposed Minor, as part of our documentation that > will be forwarded to SCUS for its assessment of the proposal? We are hoping > the proposal will be submitted for the September SCUS meeting, so we would > like to obtain letters of support by around ****August 1st****.

>
> We hope we have captured any feedback you may have provided in this > penultimate version of the proposal in way that you will approve of. If you > have any questions or concerns that you would like addressed before deciding > to provide such a letter, please feel free to let me know.

>
> In brief summary, this minor was designed to be an interdisciplinary program > linking pertinent science with social science and thereby provide students > across SFU with knowledge of the scientific foundations of climate change as > well as its social, political and economic dimensions. Climate change affects > all aspects of society and climate change literacy is becoming increasingly > relevant to a broad range of careers, including environmental consulting, > planning, conservation, resource management, engineering, finance, healthcare > to name just some. Whereas students could choose to take a sampling of climate > change-related courses without undertaking the minor, we believe that having a > recognized credential in a well-known and sought-after field is more > desirable. In addition, it will help employers recognize their specialized > literacy and skills.

>
> We hope you will share our enthusiasm for this new Minor. We think it will be > a valued addition to SFU's curriculum, and that it will generate enrollments > in your courses as students move through this program. Thank you very much for > your efforts on behalf of this initiative and students interested in the > broader aspects of climate change.

>
> Very best regards,
> Lance Lesack
> UGSC Chair, Geography
> <climate-society-minor-fpp-LL.doc>