



OFFICE OF THE ASSOCIATE VICE-PRESIDENT, ACADEMIC AND  
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**MEMORANDUM**

<b>ATTENTION</b>	Senate	<b>DATE</b>	August 3, 2012
<b>FROM</b>	Bill Krane, Chair	<b>PAGES</b>	1/1
<b>RE:</b>	Senate Committee on Undergraduate Studies Faculty of Applied Sciences and Faculty of Environment (SCUS 12-34)		

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For information:

Acting under delegated authority at its meeting of August 2, 2012, SCUS approved the following curriculum revisions effective Summer 2013:

1. New cross-listed Course Proposal: ENV/ENSC 412-3, Technologies, Cultures and a Sustainable World.
  
2. B-Sci designation for ENSC 412 and the B-Soc designation for ENV 412

Senators wishing to consult a more detailed report of curriculum revisions may do so by going to DocuShare: <https://docushare.sfu.ca/dsweb/View/Collection-12682>  
If you are unable to access the information, please call [778-782-3168](tel:778-782-3168) or email [shelley\\_gair@sfu.ca](mailto:shelley_gair@sfu.ca).



FACULTY OF ENVIRONMENT

MEMO

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ATTENTION	Bill Krane, Chair, SCUS
FROM	Duncan Knowler, Associate Dean, Rob Cameron, Associate Dean, FAS
RE	Faculty of Environment/Faculty of Applied Sciences – New Cross-listed Course Proposal, ENV 412-3/ENSC 412-3
DATE	July 24, 2012

The following new cross-listed course proposal was approved by the Faculties of Environment and Applied Sciences Undergraduate Curriculum Committees and is being forwarded to SCUS for approval and recommendation to Senate.

- Faculty of Environment (ENV)
  - ENV 412-3 – new cross-listed course proposal
- Faculty of Applied Sciences (ENSC)
  - ENSC 412-3 – new cross-listed course proposal

Note that this is a single course cross-listed in both Faculties as ENV 412-3/ENSC 412-3.

Would you please place these proposed changes on the agenda of the next meeting of SCUS.

Thanks,



FENV 12-9

COURSE SUBJECT/NUMBER ENV 412/ENSC 412 (cross listed)

COURSE TITLE

LONG — for Calendar/schedule, no more than 100 characters including spaces and punctuation  
Technologies, Cultures and a Sustainable World

AND

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

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

COURSE DESCRIPTION (FOR CALENDAR). 50-60 WORDS MAXIMUM. ATTACH A COURSE OUTLINE TO THIS PROPOSAL.

An overview of technologies relevant to global sustainable development. This seminar course brings

LIBRARY RESOURCES

NOTE: Senate has approved (S.93-11) that no new course should be approved by Senate until funding has been committed for necessary library materials. Each new course proposal must be accompanied by a library report and, if appropriate, confirmation that funding arrangements have been addressed.

Library report status

RATIONALE FOR INTRODUCTION OF THIS COURSE

This course is addressed both to students in the Faculty of Applied Science who seek to know more about the global context of their disciplines and to students in other Faculties, notably the Faculty of the Environment, seeking a non-technical understanding of the role of technology in sustainability. The course will extend the current curriculum by teaching FAS students to apply their skills in a global context, broadening their knowledge of the issues and institutions important to them as global citizens. For those from other disciplines, the course will serve as an introduction to the technical aspects of the introduction of new technologies for sustainability.

SCHEDULING AND ENROLLMENT INFORMATION

Indicate effective term and year course would first be offered and planned frequency of offering thereafter:

SUMMER 2013

First offering ~~Spring 2013~~, offered biennially

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

What is the probable enrollment when offered? Estimate: 30 students

CREDITS

Indicate number of credits (units): 3

Indicate number of hours for:  Lecture  Seminar  Tutorial  Lab  Other

**Fwd: ENSC/ENV 412**

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**From :** Jo Hinchliffe <joah@sfu.ca>

Fri, 21 Sep, 2012 10:02

**Subject :** Fwd: ENSC/ENV 412 TO DO**To :** Kris Nordgren <kdn1@sfu.ca>, mlg7 <mlg7@sfu.ca>, Rosa Balletta <rballett@sfu.ca>**Reply To :** Jo Hinchliffe <joah@sfu.ca>

The missing course description.

**ENSC 412**

"Technology issues relevant to global sustainable development are considered from engineering, historical and anthropological perspectives. Topics include hydroelectric dams, alternative power generation systems, and the science of climate change.

In-depth case studies emphasize interdisciplinary exploration of these themes.

Students may take only one of ENSC 412 and ENV 412 for credit. Students wishing B-Soc credit should take ENV 412. B-Sci.

**ENV 412**

"Technology issues relevant to global sustainable development are considered from engineering, historical and anthropological perspectives. Topics include hydroelectric dams, alternative power generation systems, and the science of climate change.

In-depth case studies emphasize interdisciplinary exploration of these themes.

Students may take only one of ENSC 412 and ENV 412 for credit. Students wishing B-Sci credit should take ENSC 412. B-Soc.

Jo Hinchliffe, BA, MALS  
Associate Registrar  
Senate and Academic Services  
Student Services, Simon Fraser University  
778-782-5350  
778-782-5732(fax)



**FACULTY** Which of your present CFL faculty have the expertise to offer this course?  
Ross Jamieson (Arch) / John Jones (EnSc) team-teaching

**WQB DESIGNATION** (attach approval from Curriculum Office)

Submitting paperwork for B-Soc and B-Sci designation

**PREREQUISITE**

Does this course replicate the content of a previously-approved course to such an extent that students should not receive credit for both courses?  
If so, this should be noted in the prerequisiite.

minimum 60 credit hours

**COREQUISITE**

none

**STUDENT LEARNING OUTCOMES**

Upon satisfactory completion of the course students will be able to:

- gain experience working in a multidisciplinary team environment to seek solutions to issues in sust

**FEES**

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

**RESOURCES**

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

none

**OTHER IMPLICATIONS**

Articulation agreement reviewed?  YES  NO  Not applicable  
Exam required:  YES  NO  
Criminal Record Check required:  YES  NO



APPROVALS

1 Departmental approval indicates that the Department or School has approved the content of the course, and has consulted with other Departments/Schools/Faculties regarding proposed course content and overlap issues.

Chair, Department/School [Signature] Date July 23, 2012
Chair, Faculty Curriculum Committee [Signature] Date

2 Faculty approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/School/Department commits to providing the required Library funds.

[Signature] Date July 23, 2012
Dean or designate [Signature] Date

LIST which other Departments, Schools and Faculties have been consulted regarding the proposed course content, including overlap issues. Attach documentary evidence of responses.

Course has been developed in close consultation with FWSB & FAS

Other Faculties approval indicated that the Dean(s) or Designate of other Faculties AFFECTED by the proposed new course support(s) the approval of the new course:

[Signature] Date
[Signature] Date

3 SCUS approval indicates that the course has been approved for implementation subject, where appropriate, to financial issues being addressed.

COURSE APPROVED BY SCUS (Chair of SCUS):

[Signature] Date

APPROVAL IS SIGNIFIED BY DATE AND APPROPRIATE SIGNATURE.

## ENSC 412/ENV 412

# TECHNOLOGIES, CULTURES AND A SUSTAINABLE WORLD

A proposal for the development and piloting of a new interdisciplinary  
course

John Jones, School of Engineering Science, and Ross Jamieson, Department of  
Archaeology

### INTRODUCTION

This course is addressed both to students in the Faculty of Applied Science who seek to know more about the global context of their disciplines and to students in other Faculties, notably the Faculty of the Environment, seeking a non-technical yet deep understanding of the role of technology in sustainability and development. It is designed as a pair of cross-listed ENSC and ENV courses, intended to be co-scheduled and co-taught. ENSC 412 is proposed to be designated B-Sci, while ENV 412 is proposed to be designated B-Soc.

Engineering students will have been introduced to these issues in courses such as ENSC 100 (Engineering Technology and Society), ENSC 201 (The Business of Engineering), and ENSC 406 (Social Responsibility and Professional Practice). However, more can be done to build on these foundational courses and the evidence suggests that the courses currently available are not enough to keep pace with the advances in global engineering education made by other universities across North America. This new upper-division engineering/environment course, *Technologies, Culture and a Sustainable World*, will extend the current curriculum by teaching engineering students to apply their skills in a global context, and by broadening their knowledge of the issues and institutions important to them as global citizens and professionals. To encourage engineers to take this course and consider these issues from the broad perspective, the B-Soc label is proposed for ENV 412.

For students from other faculties, this course offers an Introduction to the technical issues underlying development, with a particular focus on hydroelectric and solar power, water quality, urban planning, and global warming. To encourage interest in this course for students outside of science and applied sciences, the B-Sci label is proposed for ENSC 412.

### DETAILED BREAKDOWN OF THE MERITS OF THE COURSE

The course has three main aims:

1. To provide the knowledge and analytical skills necessary to bridge the gap between the specialized, technical nature of the Applied Sciences and the nontechnical, more socially focused Arts and Social Sciences subjects.



2. To produce better professionals and citizens of global society, and to prepare them for the challenges of the 21st century.
3. To impart a better understanding of technology to students of all academic backgrounds, and to facilitate interdisciplinary exchange between students of technical and nontechnical backgrounds.

### 1ST AIM

The intention of the university's Breadth policy is to encourage more interdisciplinary study and interaction. This is an important goal, and this course has been designed to assist the Breadth policy in attaining it. This course will not discourage Applied Sciences students from registering in courses of other disciplines. In fact, one intended effect of this course is to instill in Applied Sciences students a healthy appreciation for the non-technical disciplines. The course will fulfill its role as a bridge between the Applied Sciences and SFU's other Faculties by imparting knowledge and analytical skills that will serve the students well when they take other courses outside their disciplines.

Conversely, many students outside the Applied Sciences are interested in issues of sustainability and global development, have studied the political and social dimensions of development issues, and would like an introduction to the technical aspects of development that will not require calculus. The course will provide a broad, minimally mathematical introduction to technical issues in development, in particular, energy and water, at a level suitable for a Breadth-Science course.

### 2ND AIM

The ability of Applied Sciences professionals to advance technology, solve technical problems, and to raise the standard and change modes of living is undisputed. However, the demands made of these professionals have changed over the years. In the previous century it was sufficient for technical professionals to focus on technical issues related to the application and commercialization of technology. There was a seemingly limitless supply of resources at the disposal of industrialized society, and few environmental concerns. All of this has changed, and it is now no longer sufficient for these professionals to concern themselves only with technical problems. It is now more important to overlap the technical and non-technical disciplines, and to ensure that SFU is producing professionals that can see the bigger picture, the effect of their work on society and the planet, and the needs of society. These concerns have been a primary motivator for the design of this course. For Applied Science students, this course will impart the nontechnical skills and knowledge necessary to prepare them for the challenges of the 21st century. For students from the Faculty of the Environment, the course will provide a solid yet non-mathematical foundation for understanding the technical issues involved in sustainability and development. Professionals who can combine the intricacies of science and technology with sensitivity to the human, economic and social aspects of development can make an essential contribution to society.

### 3RD AIM

The world is increasingly dependent on new technological and scientific developments to solve the most pressing problems, and thus it is vital for students from all nontechnical academic backgrounds to develop



an improved understanding of technology and its effects on society and the environment. The nontechnical nature of this course makes it suitable for students of any academic background and the technological focus of the course material makes this course an ideal vehicle for encouraging interdisciplinary interaction. Students from outside the Applied Sciences will find that their effectiveness in addressing problems of development and sustainability can be greatly enhanced by an improved understanding of technology and by increased interaction with their technically-oriented peers, who will be the future technological innovators.

## A TRULY INTERDISCIPLINARY EFFORT

The course is intended to be an interdisciplinary course drawing students from all of SFU, and to serve as both a B-Sci and a B-Soc complementary elective. Thus students interested in the subject will have a strong incentive to take the course. The SFU Chapter of *Engineers Without Borders* has been a driving force behind advocating this course, and are willing to help organize and facilitate the course in conjunction with faculty. The Chapter can also aid in the promotion and recruitment of students from outside the Faculty of Applied Science.

We have considered the issue of potential course overlaps with existing ENSC courses, and have discussed it with faculty responsible for the relevant courses. Existing ENSC courses by design serve only as an introduction to many of the topics they cover. For example, ENSC 100 introduces topics such as the history of engineering, the development of technology, and social and environmental issues with relation to technology, but does not go into depth because of practical constraints. A course that delves deeper into these important topics is thus of interest to the department.

The course proposed here is also of much interest to ENSC students and can serve as a strong motivation for some. To illustrate this point, we note that ENSC 100 receives great student feedback. However, the material taught in ENSC 100 is essentially never revisited by students as they progress past first year. As students advance in their core applied science curriculum, many lose sight of the big picture and become buried under the vast amount of technical material. They become so involved with the "how" of engineering and computing that they lose sight of the "why". Since this course is designed for students to take in the middle of their degree, right when they are becoming immersed in the technical foundation courses, it can serve to strengthen motivation and help reinforce the big picture.

For those students coming from FENV and other faculties across campus, the course will provide a unique opportunity to use their own background to interact with students, and ideas, from the ENSC program. This in many ways mimics real-world situations, in which large-scale projects of various types might include engineers, anthropologists, biologists, etcetera, who are expected to work together and yet often do not "speak the same language." It is hoped that this course provides a small taste of the types of situations that can arise in attempting to provide technical solutions to problems in global sustainability.

## COURSE STRUCTURE

The course will be seminar and project focused. The class will be split into groups of ten or fewer students for seminars to encourage discussion. These groups will be selected to ensure a blend of disciplines. There will be readings, three research papers, and a final project.

The course will be organized around four case-studies of particular historical events. The course instructors will present the history and technical background to these events, bringing in guest speakers where appropriate.

The tutorial component of the course will consist of discussion based on assigned readings covering the topics listed in the course outline.

The research papers will require individual students to apply critical thinking to analyse a societal problem involving the use of engineering and technology. The analysis must acknowledge and allow for the social, economic, environmental, technical and political aspects of the problem. Knowledge gained in writing the research paper can be applied to the course project.

The course project will require small groups of students to apply the knowledge they have gained through the seminars, readings, and discussions. The project will involve a substantial amount of research and problem analysis. The goal is to apply the concepts explored during the course to analyze and develop a solution for an important world problem. The solution should have both a technological and a policy component.

To ensure that students taking the course are getting a truly interdisciplinary experience, part of the grading for the course will require that those students taking the course (ENV 412) for B-Soc credit be orally examined on the social-science elements of their team's proposed solution, while those students taking the course (ENSC 412) for B-Sci credit will be orally examined on the technical elements of their team's proposed solution. In this way, we ensure that all participants will be moved out of their comfort zone.

## COURSE CONTENT

The course will consist of four case studies, each approached from both a technical and a social science, approach, in order to better understand both the technical aspects of the case, and the historical and social aspects of the relationship of technology to human society.

### CASE 1: THE ASWAN HIGH DAM

A study of the 1960s construction of the Aswan High Dam on the Nile River in Egypt. This case brings forward issues of:

- Technological advances in dam construction
- Ancient history of water management on the Nile
- Hydroelectric power and water management in a global context
- The Cold War and its relationship to large-scale development projects
- Cultural resource management and the UNESCO response to ancient sites rescue
- Sustainability and appropriate river control technologies for the 21<sup>st</sup> century
- River-bottom agriculture in the global south, and the relationship to state water control

## **CASE 2: CLIMATE CHANGE AND GLOBAL WARMING: SCIENCE AND SOLUTIONS**

This study will focus on the science behind reconstructing past climate change, exploring the data and techniques used to reconstruct past climates. This will then move into studies of proposals for technological solutions to global climate problems. The case will cover:

- Scientific data collection on past climates (glaciers, corals, etcetera)
- Reconstructing past climates
- International efforts at cooperation on mitigating climate change
- Technological solutions to climate change problems
- Climate change politics and social responses

## **CASE 3: WIND, WAVES AND SUN ON HAIDA GWAI**

This case will explore the long-term global history of human use of wind, wave and solar power, and the changing technologies humans have devised to capture these energy sources. The case study will then move on to modelling solutions for provision of power to the people of Haida Gwaii, an isolated island system in a unique ecosystem, where sustainable power solutions may be possible. Case study will include coverage of:

- Power generation in different environments
- Appropriate scales and types of power generation for various applications
- History of human use of wind, solar and wave power generation
- Transfer of sustainable technologies to different social settings
- Relationship of sustainable power production to larger state entities

## **CASE 4: ENGINES OF CHANGE**

This case will explore the history of powering vehicles, particularly the emergence of the private automobile and the contrast between internal combustion engines, steam, electricity, etcetera. Case study will include coverage of:

- The history of the development of motorized transportation, and personal ownership of motorized vehicles
- Contrasts between powering personal vehicles and public transportation vehicles
- The ways that vehicle propulsion technology interacts with public policy in choices about urban transport solutions



UNIVERSITY CURRICULUM & INSTITUTIONAL LIAISON  
OFFICE OF THE VICE PRESIDENT ACADEMIC AND PROVOST

MEMO

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CANADA

ATTENTION Jo Hinchliffe, Associate Registrar	TEL
FROM SUSAN RHODES, Assistant Director, University Curriculum and Institutional Liaison	
RE B-Soc/Sci designation for ENSC 412/ENV 412	
DATE August 2, 2012	
TIME 11:30 AM	

Please be advised that the University Curriculum Office has approved B-Soc/Sci designations for the cross-listed course proposal:

ENSC 412/ENV 412 Technologies, Cultures and a Sustainable World  
to be effective May 2013.

The intent of the dual-B designations is to allow B-Soc for ENSC students and B-Sci for ENV students, and a choice of B type for students outside both programs.

Cc: Rob Cameron, Faculty of Applied Sciences  
Duncan Knowler, Faculty of Environment