THE UNIVERSITY OF BRITISH COLUMBIA

December 4, 2008

CURRICULUM COMMITTEE
Vancouver Senate
2016 - 1874 East Mall
Vancouver, B.C. Canada V6T 1Z1

To: Vancouver Senate

From: Senate Curriculum Committee

Re: December Curriculum Proposals **(approval)**

The Senate Curriculum Committee has reviewed the material forwarded to it by the faculties, and encloses those proposals it deems as ready for approval.

As such, the following is recommended to Senate:

Motion: *That the new and changed courses and programs brought forward by the Faculties of Applied Science, Commerce and Business Administration, Graduate Studies (College of Health Disciplines, College for Interdisciplinary Studies, and Education) and Science be approved.*

Respectfully submitted,

Peter Marshall, Chair
Senate Curriculum Committee

THE UNIVERSITY OF BRITISH COLUMBIA

Enrolment Services
Senate and Curriculum Services
2016 – 1874 East Mall
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T: 604-822-0140; F: 604-822-5945

2 December 2008

To: Vancouver Senate

From: Senate Curriculum Committee

Re: **CURRICULUM PROPOSALS FROM THE FACULTIES OF APPLIED SCIENCE**

Attached please find submitted category 1 curriculum proposals from the Faculties of Applied Science, Applied Science (School of Architecture and Landscape Architecture), and Land & Food Systems for your consideration.

APPLIED SCIENCE
The following **program changes**:
Minor in Arts – new option
BASc Mining Engineering, 2nd year course list

The following **new courses**:
EECE 498 (3)
EECE 499 (3)
MECH 368 (3)
MECH 433 (3)
MINE 224 (4)
MINE 291 (3)
MINE 292 (3)

Faculty: Applied Science Faculty Approval Date: November 6, 2008 Effective Date: September 2008	Date: June 30, 2008 Contact Person: Bruce Dunwoody Phone: 604-822-6556 Email: bruce.dunwoody@ubc.ca
APSC Undergraduate Program Change(s)	
Proposed Calendar Entry: **Minor in Arts** A student in an engineering program may undertake a Minor in Arts. An acceptable Minor program must comprise courses in the Faculty of Arts that are for credit toward a B.A. degree and consists of 18 upper level credits in a single subject or field of specialization. A student should design a coherent and academically sound course of studies for his or her proposed Minor. The program must be approved by an advisor in Engineering Student Services on the recommendation of an advisor from the appropriate department or program office within the Faculty of Arts. All courses must be acceptable for a B.A. major in the proposed subject area or field but the student is not bound by other requirements of the Faculty of Arts. A Minor in Mathematics, Computer Systems, Cognitive Systems or where there is significant overlap between the student's engineering program and the proposed subject or field for the Minor is not permitted. A Dual Degree and a Minor in Arts cannot be combined although a student may pursue a Minor within the B.A. degree. Upon successful completion of the Minor program, the notation "Minor in Arts" will be added to the student's transcript. Students wanting a subject-specific Minor may also undertake a Minor in a specific Arts discipline's *Minor Program*, which requires the completion of at least 30 credits in a single subject field of specialization, of which at least 18 credits must be numbered 300 or higher.	**URL**:http://www.students.ubc.ca/calendar/index.cfm?tree=12,195,272,0 The proposed entry would follow the heading for "Degree Requirements" and would precede the heading for the "Minor in Commerce". **Present Calendar Entry**: None **Type of Action**: New option. **Rationale**: Some engineering students would like to include substantial non-engineering studies within their education. This Minor in Arts provides the opportunity for a structured extension of their education and to have their extra efforts recognized on their transcripts.

Faculty: Applied Science **Department: Mining Engineering** **Faculty Approval Date: November 6, 2008** **Effective Session: September 2009**	Date: October 8, 2008 Contact Person: Dr. Michael Hitch Phone: 827-5089 Email: mhitch@mining.ubc.ca
MINE Program Course Change(s)	

URL:
http://www.students.ubc.ca/calendar/index.cfm?tree=12,195,272,45

Proposed Calendar Entry:

Second Year	
APSC 201	3
CIVL 210	4
EOSC 210	3
MINE 224	**4**
MATH 253	3
MATH 255	3
MECH 260	3
MECH 280, CIVL 215 or CHBE 251	3 (4)
MINE 291	**3**
MINE 292	**3**
MINE 293	1
STAT 251	3
Complementary Studies Electives[1]	3
Total Credits	39(40)

Present Calendar Entry:

Second Year	
APSC 201	3
CIVL 210	4
EOSC 210	3
~~EOSC 324~~	~~3~~
MATH 253	3
MATH 255	3
MECH 260	3
MECH 280, CIVL 215 or CHBE 251	3 (4)
~~MINE 290~~	~~3~~
MINE 293	1
~~MINE 295~~	~~3~~
STAT 251	3
Complementary Studies Electives[1]	3
Total Credits	38 (39)

Type of Action: Changes to curriculum.

Rationale: EOSC 324 and MINE 338 will be combined into a 4 credit MINE 224 (Applied Mineralogy and Petrology) reflecting the specialized needs of process engineers. MINE 290 will be split into two independent 3-credit courses (MINE 291 and MINE 292) reflecting increased course content for mining and mineral process components. MINE 295 will be moved to 3rd year and renamed MINE 395.

Faculty: Applied Science Department: Electrical & Computer Engineering Faculty Approval Date: November 6, 2008 Effective Session: September 2009	Date: October 8, 2008 Contact: Steve Wilton Phone: 822-1263 Email: stevew@ece.ubc.ca
Proposed Calendar Entry: **EECE 498 (3) Optimization of Power System Operation** Application of linear and nonlinear optimization methods in power systems; constrained optimization; optimal power flow; economic dispatch; electricity market; local prices for active and reactive power; security-constrained OPF; state estimation, reliability analysis [3-0-0]. Co-requisites: EECE 458	**URL:** n/a **Present Calendar Entry:** **Type of Action**: New course. **Rationale:** This course is presently offered under the temporary number 490V. Optimization methods have advanced significantly in the past decade and their application to Electrical Energy Systems is increasing rapidly. This technical elective course will be offered in the first term of the academic year in parallel with the Electrical Energy Systems Option Core course EECE 458 Power Systems Analysis. The students will develop a thorough understanding of optimization methods and their applications in power systems. Optimization is the backbone of the electricity pricing in the electricity market, transmission costing and congestion management.
Proposed Calendar Entry: **EECE 499 (3) Decision Support Methods in Power Systems Operation** Principles; acceptable regions of operation; energy management systems; load flow methods; static and dynamic security; contingency analysis; transient and voltage stability; on-line stability assessment [3-0-0]. Pre-requisites: EECE 458	**URL:** n/a **Present Calendar Entry:** None **Type of Action:** New course. **Rationale:** This course is presently offered under the temporary number 491V. Computer applications and decision support tools have advanced significantly in the past decade and their application to Electrical Energy Systems is increasing rapidly. This trend is expected to continue as the result of need for safe and economic operation of power systems, increasing complexity of the systems as well as the advancing computer technologies. This course will be offered in the second term of the academic year to follow up the Electrical Energy Systems Option core course EECE 458 Power Systems Analysis. The students will develop a thorough understanding of the main objectives and processes of power system

	operations as well as become familiar with the decision support tools required for modern power systems.

Faculty: Applied Science Department: Mechanical Engineering Faculty Approval Date: November 6, 2008 Effective Date: September 2009	Date: October 8, 2008 Contact Person: Dr. Gary Schajer Phone: 604-822-6004 Email: schajer@mech.ubc.ca
Proposed Calendar Entry: **MECH 368 (3) ENGINEERING MEASUREMENTS AND INSTRUMENTATION** Industrial measurement needs, modeling, analog sensors and instrumentation, digital sensors and instrumentation, actuators. *Prerequisite:* All of MECH 220, MECH 221, MECH 222, MECH 223. [3-1-0]	**URL:** n/a **Present Calendar Entry:** None. **Type of Action:** New course. **Rationale:** Parts of this course were implicitly covered in a mixture of other courses. This important material is consolidated in this new course so that it can be presented in an explicit and organized way. Several teachers with the required specialized knowledge are available within the Mechanical Engineering Department to teach the course.
Proposed Calendar Entry: **MECH 433 (3) BIOFLUIDS** Review of principles, biorheology, circulatory biofluid mechanics, synovial fluid in joints, biofluid dynamics of the human brain, respiratory biofluid mechanics, flow and pressure measurement techniques in human body. Credit will be granted for only one of MECH 433 or MECH 533. *Prerequisite:* One of MECH 222, MECH 280, CIVL 215. [3-0-1]	**URL:** n/a **Present Calendar Entry: None** **Type of Action:** New Course. **Rationale:** This course is designed as a technical elective available to students in the undergraduate Biomedical Option. The course content was taught in 07W as MECH 410L (Special Topics in Mechanical Engineering) and will be taught again in 08W. Student interest and enrollment have been sufficient to justify the establishment of a specialized course. The previous MECH 410L course was co-taught with MECH 550L. (A proposal to renumber 550L to 533 is being considered by the Graduate Sub-Committee).

Faculty: Applied Science Department: Mining Engineering Faculty Approval Date: November 6, 2008 Effective Date: September 2009	Date: October 8, 2008 Contact Person: Dr Michael Hitch Phone: 827-5089 Email: mhitch@mining.ubc.ca
Proposed Calendar Entry: **MINE 224 (4) Mineralogy for Mining Engineering** Fundamentals of the main techniques used by the industry to characterize raw materials and troubleshoot processing plants. [3-0-2]	**URL:** n/a **Present Calendar Entry:** **Type of Action:** New course. **Rationale:** This new course is intended to provide instruction in industry specific mineralogy and mineralogical problem solving. EOS 324 (Mineralogy and Petrology) and MINE 338 (Process Mineralogy) will be combined into a new course, eliminating duplication, focusing on mining/ processing applications.
Proposed Calendar Entry: **MINE 291 (3) Introduction to Mining** Leading practices and technologies employed in the design, planning and operation of mining systems. Life cycle of surface and underground mining systems. [3-0-2]	**URL:** n/a **Present Calendar Entry**: None **Type of Action:** New course **Rationale:** MINE 290 (Introduction to Mining and Mineral Processing) will be split into two separate courses to accommodate increased course content.
Proposed Calendar Entry: **MINE 292 (3) Introduction to Mineral Processing** Overview, and extracting a mineral or final product from an ore. [3-0-2]	**URL:** n/a **Present Calendar Entry:** None **Type of Action:** New Course **Rationale:** MINE 290 (Introduction to Mining and Mineral Processing) will be split into two separate courses to accommodate increased course content.

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2 December 2008

To: Vancouver Senate

From: Senate Curriculum Committee

Re: **GRADUATE PROPOSALS**

Attached please find submitted category 1 graduate curriculum proposals for your consideration.

College for Health Disciplines
New Course:
IHHS 409 (3) International Indigenous Experiences of Colonization

College for Interdisciplinary Studies
Program Entry:
Human-Computer Interaction Sub-specialization
Media and Graphics Interdisciplinary Centre, HCI entry

Faculty of Commerce and Business Administration
New Course:
BA 501 (1.5) M.B.A. Core Capstone
Program Entry:
Add BA 501 as requirement to M.B.A. program entries

Faculty of Education
New Course:
EPSE 684 (3) Item Response Theory

THE UNIVERSITY OF BRITISH COLUMBIA

UBC Curriculum Proposal Form
Change to Course or Program

Category: (1)

Faculty: College of Health Disciplines **Department:** Division of Aboriginal Peoples Health, Department of Family Practice **Faculty Approval Date:** April 30, 2008 **Effective Session: 2009W Term 2**	**Date:** June 18, 2008 **Contact Person:** Leah May Walker and Lyana Patrick **Phone:** 604-682-2344 (ext: 63077 or 63475) **Email:** leah.walker@ubc.ca and aph.assist@familymed.ubc.ca
Proposed Calendar Entry: IHHS 409 (3) *International Indigenous Experiences of Colonization* An online, interprofessional, comparative inquiry of indigenous experiences of global colonization and the manifestations of that experience in the contemporary socio-cultural environment. Informed and guided by indigenous knowledge and drawing upon a range of disciplines such as public health, history, sociology and public policy.	**Type of Action:** New Course **Background:** First Nations communities have described the experience and ongoing effects of the residential school system as the primary issue they want professionals, particularly health professionals, to know about. Input from First Nations people throughout the development of this project is critical. **Below is a list of the project's rationale:** • The system of residential schools in Canada, and specifically in this case, British Columbia, had, and continues to have, a profound effect on the wellbeing of and opportunities for Indigenous peoples. • Online role-playing provides educational infrastructure for students to learn about the rationale for the residential school system, as well as Indigenous responses to it. Students are generally unaware of residential schools and should consider the systems' effects in their future professional practices. • Immersion of students into a rich, multimedia role-play context provides students with an opportunity to consider the social and cultural factors which influenced decision making in other times and places. • An online role-play lends itself to international collaboration, encouraging staff and student mobility, and in this case to build upon and consolidate a relationship with University of Melbourne.

UBC Curriculum Proposal Form
Change to Course or Program

Category: 1

FACULTY: CFIS **DEPARTMENT:** MAGIC	**DATE: May 30, 2008** **Effective Date for Change:** Summer 2009
Proposed Calendar Entry: **SUB-SPECIALIZATIONS** **Human-Computer Interaction (HCI):** **Participating Graduate Programs:** Computer Science (http://www.students.ubc.ca/calendar/index.cfm?tree=12,204,828,1139), Electrical and Computer Engineering (http://www.students.ubc.ca/calendar/index.cfm?tree=12,204,828,1155), Psychology (http://www.students.ubc.ca/calendar/index.cfm?tree=12,204,828,1221), Technology Studies Education (http://www.students.ubc.ca/calendar/index.cfm?tree=12,204,828,1240 Program Overview: **The Media and Graphics Interdisciplinary Centre offers a sub-specialization in the field of Human-Computer Interaction. The program is called the "MAGIC Applied Graphics and Usability Studies" program, or MAGUS.** **MAGUS is an interdisciplinary sub-specialization for students in any UBC graduate program whose Master's-level graduate work is in the area of Human-Computer Interaction. Students who meet the requirements for the sub-specialization will have the following added to their Master's degree: "sub-specialization in Human-Computer Interaction". The sub-specialization in HCI, along with the transcript and the endorsement of the program, will identify Master's Graduates as having attained special training in the interdisciplinary field of HCI.** **All inquiries about whether a student may be enrolled as an HCI sub-specialization**	**Present Calendar entry** Nothing exists in current calendar. This will be added under a new section called: **Degree Program Sub-Specializations** http://www.students.ubc.ca/calendar/index.cfm?tree=12,204,0,0 This will be in between "Degree Programs" and "Degree Programs Administered by Disciplinary Faculties" **Type of Action**: 1. New section in Calendar to reflect the addition of "**Degree Program Sub-Specialization**". 2. addition of new sub-specialization code to read: "***Human-Computer Interaction***" **Rationale:** **Human-Computer Interaction (HCI) is an interdisciplinary field of study that explores human behaviour in technology-rich environments with the goal of informing the design and testing of new technologies. Currently, a number of students are studying and researching HCI in different departments across the university. Informally, these students have been taking HCI related courses from departments other than their home departments as the field of research spans different disciplines. The sub-specialization designation is a formal process and acknowledgement for students seeking HCI sub-specialization.** The main features of the sub-specialization are: 1. Students must fulfill the requirements for the Master's degrees in their own departments. Students graduate with a degree from their home departments. 2. Students are required to complete the Methods sequence given in the HCI sub-specialization curriculum. 3. Students are required to complete one

student should be addressed to the Director of the HCI sub-specialization program.

Admission Requirements

Students should submit their registration information to the Director of the HCI sub-specialization **as early as possible. Applicants must be students in good standing in a Master's-level degree program at UBC. Students may be admitted at any point in their program, but it is recommended that they have an HCI project or thesis topic identified. Acceptance is based upon a student's demonstrated commitment to the field of HCI. If accepted, they will then be classified as an HCI** sub-specialization **student and placed on the mailing list for announcements of HCI events (such as lectures and special courses).**

A student in good standing in his/her graduate program may petition the Director of the HCI sub-specialization for admission as an official student for the sub-specialization in HCI.

Under special circumstances a student may be admitted to the sub-specialization in HCI at the time they are first admitted to a graduate program at UBC. Such a student will have an exceptional record and a demonstrated commitment to the interdisciplinary study of HCI. Also under special circumstances a student may petition the HCI Committee for equivalent-credit for courses taken elsewhere or for independent research work.

Program Requirements

It is the student's responsibility to ensure his/her coursework meets the requirements for the Master's degree in his/her graduate program. In order to receive the sub-specialization, students must meet three additional criteria:

additional course from the list of approved HCI sub-specialization courses.

4. Students are required to complete a major project or thesis relating to HCI research. The HCI sub-Specialization Committee coordinated by MAGIC approves project/thesis topics for students wishing to obtain their HCI sub-specialization.

The intent behind the sub-specialization is that the required courses will normally count towards a student's degree, thus, no additional courses will be required for sub-specialization beyond their Department requirements for the Master's degree. The student's project/thesis project in an HCI field should be chosen so as to fulfill the requirements for a Master's degree in their home department. The sub-specialization Program is designed to be as inclusive as possible, but some may need to take extra courses and/or acquire necessary prerequisites prior to taking the Methods Sequence.

UBC currently has the curriculum in place to support the complete sub-specialization in Human Computer Interaction without additional resources. The description of the proposal attached (MAGIC 02-12-3) lists the current set of courses and a more complete discussion of the full sub-specialization.

We propose that MAGIC provide the administration of the sub-specialization through coordination of the HCI sub-specialization Committee. The Committee will work to expand the list of Qualifying Courses, establish standards, and ensure each student meets the requirements for sub-specialization.

The goal of the HCI sub-specialization designation is to provide a structured way for students enrolled in various graduate programs to study and carry out research in HCI with guidance from relevant faculty advisors, and to bring interested students from different departments together in a graduate student community integrated into the general university research community.

1. Successful completion of a sequence of qualifying Methods courses: **i. One Foundations of HCI Course** a. CPSC 544 **ii. One Empirical Methods and Analysis course** a. PSYC 546A or equivalent **iii. One Design + Evaluation course** a. CPSC 543 or **b.** EECE 596 **Additions and changes to the list of qualifying Methods courses will be made by the HCI Committee in consultation with the departments in which the courses are held. Graduate courses may not be offered every year. Students who need to take required courses that are not offered in the current year must contact the HCI director for suitable replacements.** 2. A minimum of 3 credits from at least one additional HCI theory and applications course approved by the HCI Committee. **Qualifying courses are selected so as to provide an opportunity for cross-disciplinary studies as well as permitting students to satisfy the requirements for the sub-specialization using courses from within their department. A current list of qualifying courses can be found on the Web at http://www.magic.ubc.ca. Additions to the list of qualifying courses can be proposed to the HCI Committee by students or members of the faculty.** 3. Completion of a major research project with an HCI focus (6 credit minimum). **Depending upon the requirements of the candidate's department this project may take the form of a thesis, studio project or major project. Project proposals must be approved by the HCI Committee. The student will then choose a MAGIC affiliate faculty as project advisor. The role of the project advisor will be to certify that the finished project meets**	**ID Number for supporting Documents:** **Faculty Approval Date: 16 Dec 2002**

all requirements for the sub-specialization. **HCI sub-specialization students who do not already have a MAGIC affiliate faculty supervisor will be directed toward a MAGIC affiliate faculty advisor who will advise them with regard to research requirements for the HCI sub-specialization. This faculty member may be a co-advisor if the student has a supervisor in his/her department.** MORE INFORMATION **Additional information on the sub-specialization in Human-Computer Interaction may be obtained directly from the Director of the Media and Graphics Interdisciplinary Centre (MAGIC), #3640 Forest Science Centre, 2424 Main Mall, Vancouver, BC, V6T 1Z4, Canada; telephone: +1 604 822-8990; by visiting the MAGIC website: http://www.magic.ubc.ca or from the Dean of the Faculty of Graduate Studies.**	

Category: 1

FACULTY: Graduate Studies **DEPARTMENT:** MAGIC	**DATE: 03 / Feb / 2004** **Effective Date for Change:** Summer 2009
Proposed Calendar Entry: **MEDIA AND GRAPHICS INTERDISCIPLINARY CENTRE** **The Media and Graphics Interdisciplinary Centre (MAGIC) was created at UBC to foster research covering the entire spectrum of new computer-based and computer-associated media. Typical examples include multimedia, computer animation, 3-D modelling, interactive Web-based applications, hypermedia, computer music and computer-based tools for collaboration in education, medicine and entertainment. The Centre highlights UBC's commitment to the use of advanced media technology, and brings together existing efforts and new initiatives from various research programs. MAGIC serves as a catalyst to assimilate and exploit new technology in research and education at UBC and to strengthen interaction with industry through collaborative research. Projects affiliated with MAGIC have their own funding, although MAGIC provides shared facilities and personnel to assist in the start-up phases of projects and in the design and evaluation of research prototypes.** **MAGIC coordinates the MAGIC Applied Graphics and Usability Studies (MAGUS)** sub-specialization **in Human-Computer Interaction (HCI) (refer to content to be added in above proposal (URL to be determined). Human-Computer Interaction is an interdisciplinary field of study that explores human behaviour in technology-rich environments with the goal of informing the design and testing of new technologies. MAGIC does not grant degrees, however students earning degrees in participating departments can also earn a** sub-specialization **in Human-Computer Interaction by successfully completing the** sub-specialization **requirements in addition to those necessary for their Master's degree.**	**URL:** http://www.students.ubc.ca/calendar/index.cfm?tree=10,243,662,0 **Present Calendar entry** MEDIA AND GRAPHICS INTERDISCIPLINARY CENTRE The Media and Graphics Interdisciplinary Centre (MAGIC) was created at UBC to foster research covering the entire spectrum of new computer-based and computer-associated media. Typical examples include multimedia, computer animation, 3-D modelling, interactive Web-based applications, hypermedia, computer music and computer-based tools for collaboration in education, medicine and entertainment. The Centre highlights UBC's commitment to the use of advanced media technology, and brings together existing efforts and new initiatives from various research programs. MAGIC serves as a catalyst to assimilate and exploit new technology in research and education at UBC and to strengthen interaction with industry through collaborative research. Projects affiliated with MAGIC have their own funding, although MAGIC provides shared facilities and personnel to assist in the start-up phases of projects and in the design and evaluation of research prototypes. MAGIC does not grant degrees directly. Students earn degrees in existing programs, conducting research within MAGIC projects. **Type of Action**: Update to reflect: 1. new director 2. addition of sub-specialization 3. addition of contact information **Rationale:** **1. Director has changed to Sidney Fels.** **2. see above. MAGIC will be administering the sub-specialization**

The goal of the sub-specialization **in HCI is to provide a structured way for students enrolled in various graduate programs to study and carry out research in HCI with guidance from relevant faculty advisors, and to bring interested students from different departments together in a graduate student community integrated into the general university research community.** **CONTACT INFORMATION** **Additional information on MAGIC or the** sub-specialization **in Human-Computer Interaction may be obtained directly from the Director of the Media and Graphics Interdisciplinary Centre (MAGIC), #3640 Forest Science Centre, 2424 Main Mall, Vancouver, BC, V6T 1Z4, Canada; telephone: +1 604 822-8990; by visiting the MAGIC website:** **http://www.magic.ubc.ca** **or from the Dean of Graduate Studies.**	**in HCI. The change to the calendar entry reflects the addition role of MAGIC.** **3. contact information for MAGIC is not currently listed in the calendar.** **ID Number for supporting Documents:** **Faculty Approval Date: 16 Dec 2002**

Faculty: Sauder School of Business **Department: MBA Programs Office** **Faculty Approval Date: January 2008** **Effective Session _2008W_ T2_ for Change**	**Date: January 17, 2008** **Contact Person: Dale Griffin** **Phone: 2-0156** **Email: dale.griffin@sauder.ubc.ca**
Proposed Calendar Entry: BA 501 (1.5) MBA Core Capstone Pass/Fail For the registration system: ▪ This course is restricted to students in one of these programs: MBA -OR- in one of these programs: JDMBA OR- in one of these programs: MBAMAA	**URL:** N/A **Present Calendar Entry:** N/A **Type of Action:** New course **Rationale:** Since the time when our current 15-month MBA program was re-structured in 1995, the Integrated Core portion at the start of the program has been an award-winning success. At that time, it was planned that a capstone piece would be developed. It is proposed that a second follow-up piece of the Integrated Core take place annually in our 15-month MBA at the end of Period 3. It is to be named *MBA Core Capstone* and it will contain 1.5 academic credits (minimum of 20 instruction contact hours). The objective of this additional course is to give students a chance to re-integrate their knowledge after having completed some depth of studies in post-core modules in a variety of specializations. Assessment will be on a Pass/Fail basis. No other departments or faculties will be affected by this proposal.

Faculty: Sauder School of Business **Department: MBA Programs Office** **Faculty Approval Date: January 2008** **Effective Session 2009W T1 (new class admitted in 2009W)**	**Date: January 17, 2008** **Contact Person: Dale Griffin** **Phone: 2-0156** **Email: dale.griffin@sauder.ubc.ca**
Proposed Calendar Entry: **Core (15-month)** The 15-month M.B.A. core consists of the 18-credit required course, BA 500, taken from September to December in the first year of studies **and of the 1.5 credit required course, BA 501 taken later in the program.**	**URL:** **http://www.students.ubc.ca/calendar/index.cfm?tree=12,199,506,1267** **Present Calendar Entry:** **Core (15-month)** The 15-month M.B.A. core consists of the 18-credit required course, BA 500, taken from September to December in the first year of studies. **Type of Action:** Add BA 501 to M.B.A. program requirements. Increase total credits required for M.B.A. from 51 credits to 52.5 credits. **Rationale:** The current M.B.A. contains 51 credits. Addition of the 1.5-credit required course BA 501 will make the M.B.A. a 52.5 credit program in total.

Faculty: Education **Department: ECPS** **Faculty Approval Date:** **Effective Session for Change** **W2009 T1**	**Date: Nov 22, 2006** **Contact Person: Sandra Mathison** **Phone:** **Email: sandra.mathison@ubc.ca**
Proposed Calendar Entry: EPSE 684 (3) ITEM RESPONSE THEORY. Prerequisite: EPSE 528 or equivalent introductory measurement course	**URL:** n/a **Present Calendar Entry:** n/a **Type of Action:** New course **Rationale:** This course has been developed within the umbrella of a special topics course and piloted as EPSE 681 (3) Special Topics: Item Response Theory. This course has been developed within the umbrella of a special topics course. Due to successful implementation, this course will now have a separate number and title.

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2 December 2008

To: Vancouver Senate

From: Senate Curriculum Committee

Re: **CURRICULUM PROPOSALS FROM THE FACULTY OF SCIENCE**

Attached please find the submitted category 1 undergraduate curriculum proposal from the Faculty of Science for your consideration.

The following **program changes**:
Bachelor of Science > Geography: change program description and requirements

The following **new and changed courses**:
BIOL 304 (3)
BIOL 306 (3)
BIOL 440 (3)
MRNE 402 (3-12) D
EOSC 118 (3)
EOSC 340 (3)
EOSC 372 (3)
EOSC 373 (3)
GEOG → GEOB (various courses)
GEOB 270 (3)
GEOB 308 (3)
GEOB 370 (3)
GEOB 400 (3)
GEOB 405 (3)
GEOB 472 (3)
GEOB 479 (3)
GEOB 448 (3/4) C
GEOB 490 (3)

GEOGRAPHY

Effective Date for Change: 09WT1
Proposed Calendar Entry:

Geography

The Department of Geography offers opportunities for study leading to bachelor's, master's, and doctoral degrees. **Students who wish to pursue a Bachelor of Science degree in Geography should opt for the Geographical Biogeosciences Major. The program focuses on the fundamental interactions between life (including human societies) and the Earth's atmosphere, hydrosphere, and geosphere. Students in the Geographical Biogeosciences program will build upon a broad base in the basic sciences by completing at least two of five upper year "concentrations" in biogeography, climatology, geographic information science, geomorphology or hydrology. With appropriately selected electives, this degree forms a suitable basis for completing the academic requirements for registration as a Professional Geoscientist, which is legally required of all people practicing Geoscience in Canada. Students are also encouraged to consider Biogeoscience related electives in other departments. For additional information on the program, see the Geography website. Please contact the Geography Department at 604-822-2663 with any questions.**

An honours degree in Climatology and a combined honours degree in Geographical Biogeosciences and Geology are also offered. Students entering either of the honours programs must consult the science advisor of the Department of Geography.

For information on Bachelor of Arts degrees in Geography see Geography under Bachelor of Arts in the Faculty of Arts section. For information on graduate degrees, see Geography in the Faculty of Graduate Studies section.

URL:http://www.students.ubc.ca/calendar/index.cfm?tree=12,215,410,425
Present Calendar Entry:
Geography

The Department of Geography offers opportunities for study leading to bachelor's, master's, and doctoral degrees. ~~For information on the Bachelor of Arts, see Geography under the Bachelor of Arts in the Faculty of Arts section. For information on graduate degrees, see Geography in the Faculty of Graduate Studies section.~~

~~Students entering the major, honours, or a combined honours program must consult the science advisor of the Department of Geography. Students in the upper years of a major program must choose a concentration in at least *two* topic areas (Biogeography, Climatology, Geomorphology, Hydrology) and select their courses accordingly (see Department of Geography Undergraduate Guide).~~

~~Students registered in the Bachelor of Science Geography program must take at least 6 credits of Arts courses outside the Department of Geography in addition to 100-level English.~~

~~The following geography courses may be used as free electives, with due regard to prerequisites. They may not be used for either science or Arts 'designated' credit: GEOG 210, 310, 311, 312, 315, 316, 317, 318, 319, 371, 374, 375, 410, 412.~~

~~Programs~~
~~Major (0216) Physical Geography (PGEO)~~

~~First Year~~
~~ENGL 100-level[1] 6~~
~~MATH 100 or 102 or 104 (or 120 or 180 or 184) 3(4)~~
~~MATH 101 or 103 or 105 (or 121) 3(4)~~
~~CHEM 121, 123 (111,113) 8~~

Programs
Major (0216): Geographical Biogeosciences (GEOB)

First Year

ENGL 100-level[1]	6
CHEM 121, 123 (111, 113)	8
BIOL 121[2]	3
MATH 100 or 102 or 104 or 110 or 180 or 184 (or 120)	3(4)
MATH 101 or 103 or 105 (or 121)	3(4)
PHYS 101[3] (107)	3
Electives[4,11]	6
Total Credits	32(36)

Second Year

GEOB 200[5] or 204	3
GEOB 206[2], 207[2], 270	9
MATH 200 or MATH 221 or EOSC 211	3
Electives[6,11]	15
Total Credits	30

Third and Fourth Years

Areas of Concentration[7]	18
GEOB 305, 309[8], 400[9]	9
STAT 200 or GEOG 374 or BIOL 300	3
APBI 200 or SOIL 200	3
Electives[6,10,11]	27
Total Credits	60
Minimum Credits for Degree	122

Areas of Concentration in Geographical Biogeoscience.
Students must select two of the following concentrations for a total of 18 credits:

- **Biogeography: GEOB 307 & two of GEOB 407, BIOL 304, 324**
- **Climatology: GEOB 300 & two of GEOB 304, 401, 402, ATSC 301, or 303.**
- **Geographic Information Science: GEOB 370, 373, & one of GEOB 372, 479, 472.**
- **Geomorphology: GEOB 308 & two of GEOB 404, 405, 406 or EOSC 350.**

~~GEOG 102 or 103~~	~~3~~
~~PHYS 101, (107)[2]~~	~~3~~
~~Science Elective[4]~~	~~6~~
~~Total Credits~~	~~32(34)~~

~~Second Year~~

~~GEOG 200, 206,207, SOIL 200~~	~~12~~
~~One of GEOG210, 290~~	~~3~~
~~One of STAT 200, FRST 231~~	~~3~~
~~One of MATH 200, 221 or CPSC 100-level~~	~~3~~
~~Science Electives~~	~~6~~
~~Arts Elective~~	~~3~~
~~Total Credits~~	~~30~~

~~Third Year~~

~~GEOG 305,309[6],310 and EOS 211~~	~~12~~
~~Two of GEOG 300,307,308 EOS 329~~	~~6~~
~~GEOG 373 or 376~~	~~3~~
~~Arts Elective[7]~~	~~6~~
~~Electives[7]~~	~~6~~
~~Total Credits~~	~~30~~

~~Fourth Year~~

~~Two of GEOG 318, 319, 404, 410, 412~~	~~6~~
~~Four of ATSC 301, 303, GEOG 304, 401,402,403,405,406,407,408,409, EOSC 350[5], 429, BIOL 324~~	~~12~~
~~Arts Elective~~	~~3~~
~~Electives7~~	~~9~~
~~Total Credits~~	~~30~~
~~*Minimum credits for degree*~~	~~*122*~~

~~[1] ENGL 112 is recommended. Qualified students are encouraged to consider ENGL 120 and/or 121. 3 credits of first-year English may be deferred until second year.~~
~~[2] Students without Physics 12 must take PHYS 100 prior to PHYS 101 or 107.~~
~~[3] Special arrangements may be made for students unable to take this course in first year.~~
~~[5] Prerequisite MATH 200.~~
~~[4] PHYS 102 (108) or EOSC 250[5] recommended. Students who take PHYS 107 and 108 should strongly consider PHYS 109. Students without BIOL 11 or 12 must take 3 credits of biology.~~

• **Hydrology: three of GEOB 403, 408, EOSC 329, 429** **[1] ENGL 112 is recommended. Qualified students are encouraged to consider 120 and/or 121. Three credits of English may be deferred until second year.** **[2] Students without Biology 12 must take BIOL 111 or 112 before taking BIOL 121.** **[3] Students without Physics 12 must take PHYS 100 before taking PHYS 101 or 107. Students may defer taking PHYS 101 or 107 to second year.** **[4] Students are encouraged to complete at least one of GEOB 102, 103. However, special arrangements are made for Science students who do not meet prerequisites for GEOB 206 and GEOB 207.** **[5] GEOB 200 is required to complete the climatology concentration.** **[6] Electives must be chosen so that along with required courses, the program minimum total of 121 credits includes a minimum of 72 science credits, 12 Arts** elective **credits (see below), 9 credits in fields outside the Areas of Concentration (all of GEOG and GEOB), and 48 upper-level credits, of which 30 must be in science.** **[7] See Areas of Concentration above.** **[8] Field Course must be taken in May preceding 4th year; extra fee to be paid.** **[9] Must be taken in 4th year.** **[10] Students interested in pursuing registration as a Professional Geoscientist should consult the Geography department science advisor and select their electives accordingly. Students are also encouraged to consider Biogeoscience related courses in other departments (see: http://www.geog.ubc.ca/undergraduate/index.html).** **[11] Coursework in Social Sciences & Humanities: As the natural sciences are conducted within a societal, economic and historical context, students are strongly**	~~[6] Field course taken in May; extra fee to be paid.~~ ~~[7] Enough elective credits must be numbered 300 or higher that the total 300-level or higher courses in the program, including specified courses, is at least 48 credits; at least 9 credits must be outside the field of major, the field of major comprising all courses in geography.~~ ~~[8] Selected to satisfy the requirements for two areas of concentration. See the Department of Geography Undergraduate Course Guide.~~ **Type of Action:** Change the title of the major and then reorganize and update the description of the major. **Rationale:** The rearrangement of the major will give better focus to the program and concentrations within the program. The more specialized honours degrees in Climatology and in Geography and Geology will be retained. The new title for the major reflects the increasingly interdisciplinary nature of what has traditionally been called "Physical Geography". The new proposed title accurately describes the research conducted by the physical scientists in the Geography department and also reflects the new teaching interests of the department of Geography's three most recent hires in physical science. The Geographical Biogeosciences Major includes several updates to the previous description of the Physical Geography Major. The number of required courses has been reduced in order to free up electives space to provide flexibility for students to more effectively pursue their interests. We have updated the areas of concentration to include Geographic Information Science in order to recognize the importance of data acquisition, analysis, and visualization in the Geographical Biogeosciences. The concentrations implicit in the previous PGEO degree have been more explicitly defined. A new final capstone course (GEOB400) has been added to the core of the program to reflect the Program focus. Footnote ([11]), which directs students to explore the social context within which the Biogeosciences are situated, is needed to draw

encouraged to take courses that prepare them to think critically about these issues. All Geographical Biogeoscience students are encouraged to select elective credits from the Nature and Society suite of courses (GEOG 310, 312, 315, 316, 317, 318, 319, 410, 412, 419). Students interested in a more rigorous exposure to these ideas are encouraged to complete a minor in Human Geography.	their attention to a detail that might affect their careers. **Supporting Documents: SCI-08-1-GEOB**
BIOLOGY	
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** **BIOL 304 (3) FUNDAMENTALS OF ECOLOGY.** **Dynamics of plant and animal populations, structure of ecological communities and functioning of ecosystems. Interpretation of research results and application to environmental issues. Labs meet once a month. (Consult the Credit Exclusion list within the Faculty of Science section of the Calendar.)** **Prerequisite: BIOL 121.** **[3-3*-0]**	**Present Calendar Entry:** None. **Action:** New course. **Rationale:** BIOL 302 and BIOL 303 were originally designed to be taken as a complementary pair. Although this division of the third-year ecology material into population and community ecology suited the original audience of a small number of ecology-focused students, several developments have made it untenable: (1) In both BIOL 303 and BIOL 302, only half the students have taken, or are planning to take, the partner course. In particular, a large number of Biology students (ca. 45%) are now in the Cell Biology & Genetics stream in which students take only one of BIOL 302 or BIOL 303. This means that many Biology students are currently not obtaining the breadth of ecological knowledge required to become informed citizens. We propose to fix this by covering a wide range of ecological concepts in BIOL 304, but at an introductory level. The syllabus in BIOL 306 will extend the concepts learnt in BIOL 304 to a more advanced level. (2) As BIOL 303 is currently not a prerequisite for BIOL 302, nor vice versa, concepts developed in one course cannot be built upon in the other course. Thus both courses must be taught at an introductory level. We propose to fix this by making BIOL 304 a prerequisite for BIOL 306. Students taking both courses will develop a deeper and more integrated understanding of ecology than

	possible in the current system. BIOL 304 will be taught both fall and spring terms. (3) Course size has increased substantially over time. BIOL 303 currently has two sections of >250 students each, and BIOL 302 has two sections of >200 students each. Funding has not kept pace, with the result that labs were replaced in the mid-1980s with a one-hour tutorial that meet 3 times a term. Our ecology students therefore experience no hands-on ecology in the third year. We propose to fix this by having monthly outside labs in BIOL 304 and 306 which will allow students to apply abstract theory to real natural systems. In other courses, students report that such field experiences have a profound impact on their understanding of ecology. **Supporting Documents: SCI-08-1-BIOL 304**
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** **BIOL 306 (3) ADVANCED ECOLOGY. Ecology of populations, communities and ecosystems. Tests of ecological theory with experiments and application to environmental issues. Labs meet once a month. (Consult the Credit Exclusion list within the Faculty of Science section of the Calendar.) Prerequisite: One of BIOL 302, 303, 304.** **[3-3*-0]**	**URL:** **Present Calendar Entry:** None. **Action:** New course. **Rationale:** BIOL 302 and BIOL 303 were originally designed to be taken as a complementary pair. Although this division of the third-year ecology material into population and community ecology suited the original audience of a small number of ecology-focused students, several developments have made it untenable: (1) In both BIOL 303 and BIOL 302, only half the students have taken, or are planning to take, the partner course. In particular, a large number of Biology students (ca. 45%) are now in the Cell Biology & Genetics stream in which students take only one of BIOL 302 or BIOL 303. This means that many Biology students are currently not obtaining the breadth of ecological knowledge required to become informed citizens. We propose to fix this by covering a wide range of ecological concepts in BIOL 304, but at an introductory level. The syllabus in BIOL 306 will extend the concepts learnt in BIOL 304 to a more advanced level. (2) As BIOL 303 is currently not a prerequisite for

	BIOL 302, nor vice versa, concepts developed in one course cannot be built upon in the other course. Thus both courses must be taught at an introductory level. We propose to fix this by making BIOL 304 a prerequisite for BIOL 306. Students taking both courses will develop a deeper and more integrated understanding of ecology than possible in the current system. BIOL 304 will be taught both fall and spring terms. (3) Course size has increased substantially over time. BIOL 303 currently has two sections of >250 students each, and BIOL 302 has two sections of >200 students each. Funding has not kept pace, with the result that labs were replaced in the mid-1980s with a one-hour tutorial that meet 3 times a term. Our ecology students therefore experience no hands-on ecology in the third year. We propose to fix this by having monthly outside labs in BIOL 304 and 306 which will allow students to apply abstract theory to real natural systems. In other courses, students report that such field experiences have a profound impact on their understanding of ecology. Regarding the prerequisites: Although most students will enter BIOL 306 after taking BIOL 304, we allow BIOL 302 or 303 to also be prerequisites to BIOL 306 to ensure that no existing student has his or her degree planning disrupted by changes in the third year ecology courses. **Supporting Documents**: **SCI-08-1-BIOL 306**
Effective Date for Change: 09W Term 1 **Proposed Calendar Entry:** **BIOL 440 (3) PLANT GENOMICS.** **Concepts, principles, and recent discoveries in genome structure and comparative genomics in plants with a focus on economically important plants. Applications of genomics approaches to questions in plant genetics, evolution, and ecology. Co-requisite: BIOL 335. [3-0-0]**	**Present Calendar Entry:** None. **Action:** Add new course. **Rationale:** Structural and comparative genomics is a very dynamic and rapidly expanding field with major discoveries being made from genome sequencing projects and analyses of the genomes of several agricultural and model system plants. There are numerous applications of genomics approaches to questions in genetics, evolution, and ecology. The proposed course will help keep the

	Biology curriculum current. **Supporting Documents: SCI-08-1-BIOL 440**
Effective Date for Change: 09S **Proposed Calendar Entry:** MRNE 402 (3-**12**) **D**. SPECIAL TOPICS IN MARINE BIOLOGY. This course will be offered, as opportunities arise, by distinguished scientists visiting at the Bamfield Marine Sciences Centre. This course will be of a specialized nature and at a level appropriate to graduate or senior undergraduate students.	**Present Calendar Entry:** MRNE 402 (3). SPECIAL TOPICS IN MARINE BIOLOGY. This course will be offered, as opportunities arise, by distinguished scientists visiting at the Bamfield Marine Sciences Centre ~~who are prepared to offer a course extending over a 3-week period~~. This course will be of a specialized nature and at a level appropriate to graduate or senior undergraduate students. **Action:** Increase the number of life-time credits. **Rationale:** The change is needed to permit students to take the course more than once for credit. MRNE 402 is a special topics course whose content changes depending on availability of visiting scientists at the Bamfield Marine Sciences Centre. Students often stay at Bamfield over the summer and take several versions in sequence; see www.bms.bc.ca/university/courses2008/index.htm for examples of topics. These hands-on offerings incorporating laboratory and field work provide an invaluable and enriching experience, and therefore we very much support the students' interest in taking the course multiple times with different topics. The department would assign credit ("D") so as to enforce the restriction that credit would be assigned for multiple instances only if their topics were different. The maximum of 12 credits is not overly generous; a full summer slate of courses at Bamfield would be 18 credits. **Supporting Documents: SCIE-08-1-MRNE 402**
EARTH AND OCEAN SCIENCES	
Effective Date for Change: 09S **Proposed Calendar Entry:** **EOSC 118 (3) Earth's Treasures: Gold and Gems.** **Origin, properties, valuation, prospecting and geology of gold, platinum, silver, diamonds, rubies, emeralds, and other precious metals and gems. [3-0-0]**	**Present Calendar Entry:** None. **Action:** Add new course. **Rationale:** Use existing EOSC department expertise in gold and gems to enable students to understand the characteristics and value of these natural treasures. This survey course with no prerequisites will form one of our suite of first year

	courses that introduce students to the breadth of EOSC – a discipline not taught in high school. We will initially offer it as a distance education course and then add face-to-face lecture sections later. **Supporting Documents: SCI-08-1-EOSC 118**
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** **EOSC 340 (3) Global Climate Change. Mechanisms and processes of past and future global environmental and climate change. Prerequisites: Either (a) one of PHYS 101, PHYS 107, PHYS 153 and one of CHEM 111, CHEM 121, CHEM 154 and one of MATH 101, MATH 103, MATH 105, MATH 121; or (b) SCIE 001. [3-0-0]**	**Present Calendar Entry:** None. **Action:** New course. **Rationale:** It is our societal obligation to teach as many Science students as possible the science of global climate change so that they can participate in the debates and the preparation of mitigating solutions and adaptation from an informed position. EOSC plans to reach Science students through two courses: a modified EOSC 112 course and the third year course described here. Comparable material is not taught to science students elsewhere. This course is intended for a broad range of UBC science students including: Environmental Science, Earth and Ocean Science, General Science, Biology, Geography, Chemistry, Physics, Psychology and for Applied Science students. It is expected to be a large enrollment course (200 students) **Supporting Documents: SCI-08-1-EOSC 340**
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** **EOSC 372 (3): Introductory Oceanography: Circulation and Plankton.** **Physical and chemical processes and their controls on the distribution of plankton in the ocean.** **Prerequisites: Either (a) one of PHYS 101, PHYS 107, PHYS 153 and one of CHEM 111, CHEM 121, CHEM 154 and one of MATH 101, MATH 103, MATH 105, MATH 121; or (b) SCIE 001. [3-0-0]**	**Present Calendar Entry:** None **Action:** New course. **Rationale:** We propose to replace EOSC 370, 371 with two new courses EOSC 372, 373 which cover much the same material but in a different order and with a different emphasis. Oceanography is switching from being multidisciplinary to interdisciplinary and as we "do" oceanography we are attacking a problem from a number of disciplines at the same time. We wish to teach the subject in the same way. This course will have ERTH credit for General Science students. **Supporting Documents: SCI-08-1-EOSC 372**
Effective Date for Change: 09WT1	**Present Calendar Entry:**

Proposed Calendar Entry: **EOSC 373 (3): Introductory Oceanography: Climate and Ecosystems.** **Physical, chemical and biological processes in the ocean and their interaction with climate and marine food-webs.** **Prerequisite: EOSC 372. [3-0-0]**	None. **Action:** New course. **Rationale:** We propose to replace EOSC 370, 371 with two new courses EOSC 372, 373 which cover much the same material but in a different order and with a different emphasis. Oceanography is switching from being multidisciplinary to interdisciplinary and as we "do" oceanography we are attacking a problem from a number of disciplines at the same time. We wish to teach the subject in the same way. This course will have ERTH credit for General Science students. **Supporting Documents: SCI-08-1-EOSC 373**
GEOGRAPHY	
Effective Date for Change: 09W Term 1 **Proposed Calendar Entry:** **GEOB: Geographical Biogeosciences** Faculty of Science **Geography courses identified with the subject code GEOB have Science credit.** GEO**B** 101 (6) Introduction to Physical Geography…**[3-2*-0;3-2*-0]** GEO**B** 102 (3) Introduction to Physical Geography: Climate and Vegetation…**[3-2*-0]** GEO**B** 103 (3) Introduction to Physical Geography: Water and Landscapes…**[3-2*-0]** GEO**B** 200 (3) Atmospheric Environments… **[3-2*-0]** GEO**B** 204 (3) Forest and Agricultural Climatology…**[3-2-0]** GEO**B** 206 (3) Principles of Geomorphology… **[3-2*-0]** GEO**B** 207 (3) Introduction to Biogeography… **[3-2*-0]** GEO**B** 270 (3) Introduction to Geographic Information **Science**…**[2-2-0]** GEO**B** 300 (3) Microscale Weather and Climate… **[3-0-0]** GEO**B** 304 (3) Synoptic Meteorology and Climatology… **[2-2-0]** GEO**B** 305 (3) Introduction to Hydrology…	**Present Calendar Entry:** **GEO~~G~~ 101…** **…** **GEO~~G~~ ~~443~~…** **GEO~~G~~ ~~444~~…** **…** **GEO~~G~~ 479…** ***List of course descriptions not included to save space/paper but except for 448 and 490 each course changed to GEOB corresponds to the original GEOG course with the corresponding number .*** **Type of Action:** Change the prefix of the GEOG courses with science credit to GEOB and place them in a separate section of the calendar under the heading GEOB – Geographical Biogeosciences. Leave the human geography courses in the original GEOG section of the calendar. Add the appropriate vector to most of the GEOB courses (but not GEOG courses). Change the course number for GEOG 443 to GEOB 490. Change the course number of GEOG 444 to GEOB 448 and place them in the correct numerical sequence for the GEOB courses. In all the other listings the original GEOG number was retained when the course was given the GEOB prefix. Delete the GEOG entry for the courses that were

[3-2*-0] GEO**B** 307 (3) Biogeography and Global Change…**[3-2*-0]** GEO**B** 308 (3) Quaternary and Applied Geomorphology…**[3-2*-0]** GEO**B** 309 (3) Physical Geography Field Course…**[0-3-0]** GEO**B** 370 (3) Advanced Geographic Information Science…**[2-2-0]** GEO**B** 372 (3) Cartography…**[2-2-0]** GEO**B** 373 (3) Introductory Remote Sensing… **[3-2*-0]** GEO**B** 401 (3) Urban Meteorology…**[3-0-0]** GEO**B** 402 (3) Air Pollution Meteorology…**[3-0-0]** GEO**B** 403 (3) Catchment Hydrology…**[3-0-0]** GEO**B** 404 (3) Natural Hazards Analysis…**[3-0-0]** GEO**B** 405 (3) Fluvial Geomorphology…**[2-3-0]** GEO**B** 406 (3) Watershed Geomorphology… **[2-2-0]** GEO**B** 407 (3) Vegetation Dynamics: Disturbance, Climate and Human Impacts…**[2-3-0]** GEO**B** 408 (3) Snow and Ice Processes…**[3-0-0]** GEO**B 448** (3/4) c Directed Studies in Physical Geography… GEO**B** 449 (3/6) d Honours Essay… GEO**B** 472 (3) Research in Cartography…**[3-2*-0]** GEO**B** 479 (3) Research in Geographic Information **Science**…**[2-2-0]** GEO**B 490** (3) Student Directed Seminar in Physical Geography	changed to GEOB. **Rationale:** It is currently awkward to distinguish geography courses with arts credit from geography courses with Science credit.Geography courses that have Arts credit will be identified using the existing GEOG subject code and all courses with Science credit will be identified using the new GEOB subject code. Vectors already exist but are not shown in Arts course listings. The vectors are now listed to bring GEOB course listings into line with science practice. GEOG 443 and 444 were changed to GEOB 490 and 448 to bring them in line with the numbering system used for other Science courses with a similar purpose
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** GEO**B** 270 (3) Geographic Information **Science** … **[2-2-0]**	**Present Calendar Entry:** GEO~~G~~ 270 (3) Geographic Information ~~Systems~~ **Type of Action:** Change course prefix, update course title and add vector **Rationale:** Revised course title reflects the current name for this topic area. Vector reflects GEOB science designation. The revised prefix shows it has Science credit.
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** GEO**B** 308 (3) Quaternary and Applied Geomorphology Quaternary landscape development emphasizing the history of glaciation with special reference to	**Present Calendar Entry:** GEO~~G~~ 308 (3) Quaternary and Applied Geomorphology Quaternary landscape development emphasizing the history of glaciation with special reference to

western North America; applications of geomorphology in resource development and land management; interpretation of quarternary materials. Weekend field trips required. *Prerequisite:* **GEOB 206**. **[3-2*-0]**	western North America; applications of geomorphology in resource development and land management; interpretation of quarternary materials. Weekend field trips required. *Prerequisite*~~: One of GEOG 306, EOSC 330.~~ **Type of Action:** Change course prefix, update prerequisite and add vector. **Rationale:** GEOG 306 changed to GEOG 206 in 07W and is being changed to GEOB 206 this winter session. Vector reflects GEOB science designation. The revised vector shows that it has Science credit.
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** GEO**B** **370** (3) Advanced Geographic Information **Science** Theoretical and practical aspects of Geographic Information Systems, including cartographic modelling, digital terrain models, management issues and spatial interpolation. Preclusion: Not available to those who completed GEOG 470 before September 2005. *Prerequisite:* GEO**B** 270 or completed second year of Geography B.Sc. with some introductory knowledge of GIS. **[2-2-0]**	**Present Calendar Entry:** GEO~~G~~ ~~376~~ (3) Advanced Geographic Information ~~Systems~~ Theoretical and practical aspects of Geographic Information Systems, including cartographic modelling, digital terrain models, management issues and spatial interpolation. Preclusion: Not available to those who completed GEOG 470 before September 2005. *Prerequisite:* GEO~~G~~ 270 or completed second year of Geography B.Sc. with some introductory knowledge of GIS. **Type of Action:** Change course prefix, update in course number and course title. Add vector. **Rationale:** The change in number brings course in line with departmental numbering stream. The slight change in course title reflects the current name for this topic. Vector reflects GEOB science designation. The revised vector shows that it has Science credit.
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** **GEOB 400 (3)** **GLOBAL BIOGEOCHEMISTRY** **Processes controlling the planetary cycles of elements like carbon, nitrogen and phosphorus, the human perturbation of these biogeochemical cycles, and the consequences for the atmosphere, terrestrial ecosystems, and aquatic ecosystems. Prerequisite: BIOL121 and CHEM 121(111).**	**Present Calendar Entry:** None. **Action:** New course. **Rationale:** This course is necessary to provide students with the essential conceptual and scientific foundation necessary to understand the changing chemistry of the Earth System, and global challenges like climate change, land use change and nutrient pollution. It will be the final integrative

[3-0-1]	component of the Geographical Biogeosciences core. **Supporting Documents: SCI-08-1-GEOB**
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** GEO**B** 405 (3) Fluvial Geomorphology Introduction to open channel flow and sediment transport. River morphology and channel types. Palaeohydrology. The development of channel networks. *Prerequisite:* GEO**B 206**. **[2-3-0]**	**Present Calendar Entry:** GEO~~G~~ 405 (3) Fluvial Geomorphology Introduction to open channel flow and sediment transport. River morphology and channel types. Palaeohydrology. The development of channel networks. *Prerequisite:* GEO~~G 306~~. **Type of Action:** Change course prefix, update prerequisite. Add vector. **Rationale:** GEOG 306 was changed to GEOG 206 in 07W. GEOG 206 has now been changed to GEOB 206. Vector reflects GEOB science designation
Effective Date for Change: 09W T1 **Proposed Calendar Entry:** GEO**B** 472 (3) **Research in** Cartography **Use of cartography in primary research applications.** Discuss contemporary topics in cognitive, social and technical cartography and data visualization. *Prerequisite:* One of GEO**B** 270, GEO**B** 372. **Preference given to Human Geography or Geographical Biogeoscience Majors with at least 75 credits completed.** **[3-2*-0]**	**Present Calendar Entry:** GEO~~G~~ 472 (3) ~~Advanced~~ Cartography ~~Seminar course to~~ discuss ~~a wide range of~~ contemporary topics in cognitive, social and technical cartography and data visualization. ~~Includes reading assignments, discussions and computer mapping projects.~~ *Prerequisite:* One of GEO~~G~~ 270, GEOG 372 or permission of instructor. **Type of Action:** Change course prefix, update title and prerequisite. Clarify description. Add vector. **Rationale:** Course title and description better reflects the current name for this topic and the research nature of course content. The prerequisite allows us to limit class-size and facilitate research experience for senior Majors. Vector reflects GEOB science designation. The revised prefix shows that it has Science credit.
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** GEO**B 479** (3) **Research in** Geographic Information **Science** **Students use GIS in primary research a**pplications in conservation biology, crime analysis, and health geography; theoretical and practical aspects considered in a hands-on	**Present Calendar Entry:** GEO~~G 471~~ (3) ~~Applied Concepts~~ in Geographic Information Systems ~~A~~pplications in conservation biology, crime analysis, and health geography; theoretical and practical aspects considered in a hands-on environment.

environment. *Prerequisite:* **GEOB 370. Preference given to Human Geography or Geographical Biogeoscience Majors with at least 75 credits completed.** **[2-2-0]**	*Prerequisite:* ~~GEOG 376~~. **Type of Action:** Update title and prerequisite. Clarify description. **Rationale:** Course title and description better reflects the current name for this topic and the research nature of course content. The prerequisite is narrowed in order to limit class-size and facilitate research experience for senior Majors. **Type of Action:** Change course prefix. Change in course number, title and prerequisite. Add vector. **Rationale:** The change in number brings course in line with departmental numbering stream. The prerequisite statement changed to reflect change to GEOG 376 and narrowed in order to limit class-size and facilitate research experience for senior Majors. The course title and description change reflects the current name for this topic and emphasizes the research nature of course content. Vector reflects GEOB science designation. The revised prefix shows that it has Science credit.
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** GEO**B 448** (3/4) C Directed Studies in **Geographical Biogeoscience** For fourth-year students in Geography to permit investigation of a topic to be agreed upon by a member of the faculty and the student. Permission of the department head and of a supervisory faculty member is required. Credit will be given for only one of GEO**B 448 and GEOG 448**.	**Present Calendar Entry:** GEO~~G 444~~ (3/4) C Directed Studies in ~~Physical Geography~~ For fourth-year students in Geography to permit investigation of a topic to be agreed upon by a member of the faculty and the student. Permission of the department head and of a supervisory faculty member is required. Credit will be given for only one of GEO~~G 444~~ and 448. **Type of Action:** Change course prefix. Change course number and course title. **Rationale:** Bring course into line with the faculty of Science number system for directed studies. Change title to reflect new title of Major. The revised prefix shows that it has Science credit.
Effective Date for Change: 09WT1 **Proposed Calendar Entry:** GEO**B 490** (3) Student Directed Seminar in **Geographical Biogeoscience** Self-directed, collaborative studies in physical geography, in a group-learning environment, initiated and coordinated by senior undergraduate students with the supervision of a faculty advisor.	**Present Calendar Entry:** GEO~~G 443~~ (3) Student Directed Seminar in ~~Physical Geography~~ Self-directed, collaborative studies in physical geography, in a group-learning environment, initiated and coordinated by senior undergraduate students with the supervision of a faculty advisor.

Course structure, enrolment, and delivery methods will comply with the "Handbook for Student Directed Seminars." This course carries science credit. Credit will not be granted for both GEOG 442 and **GEOB 490**. *Prerequisite:* Third-year standing in **Geographical Biogeoscience** (GEO**B**).	Course structure, enrolment, and delivery methods will comply with the "Handbook for Student Directed Seminars." This course carries science credit. Credit will not be granted for both GEOG 442 and ~~GEOG 443~~. *Prerequisite:* Third-year standing in ~~physical geography~~ (~~P~~GEO). **Type of Action:** Change course prefix. Change course number and course title. **Rationale:** Bring course into line with the faculty of Science number system for directed studies. Change title to reflect new title of Major. The revised prefix shows that it has Science credit.