

OFFICE OF THE ASSOCIATE VICE-PRESIDENT, ACADEMIC AND ASSOCIATE PROVOST

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MEMORANDUM				
ATTENTION	Senate	0	DATE	November 9, 2012
FROM	Gordon Myers, Chair	F	PAGES	1/2
	Senate Committee on			
RE:	Undergraduate Studies Faculty of Science (SCUS 12	2-41(iii))		Landhuppes

For information:

Acting under delegated authority at its meeting of November 8, 2012, SCUS approved the following curriculum revisions effective Summer 2013:

- 1. Department of Biomedical Physiology and Kinesiology (SCuS 12-41)
 - (i) Continuance requirement for the Biomedical Physiology Major and Kinesiology Major

2. Management & Systems Science (SCUS 12-47a)

(i) Requirement changes to the BSc Major in Management and Systems Science (ii) Requirement changes to the BSc Honours in Management and Systems Science

- 3. Earth Sciences (SCUS 12-47b) (effective Fall 2013)
 - (i) Title and/or description and/or prerequisite changes for EASC 101, 206, 207, 210, 301, 306, 314, 403, 404, 411.
 - (ii) W designation for EASC 315
 - (iii) Change to course number, description and prerequisite for EASC 303W and 406
 - (iv) New Course Proposal: EASC 311-3, Metamorphic Petrology, effective Spring 2014
 - (v) Requirement changes to EASC Major Program and Geology and Environmental Geoscience Streams
 - (vi) Requirement changes to EASC Honours Program and Geology and Environmental Geoscience Streams
 - (vii) Requirement changes to EASC-CHEM Joint Major Program
 - (viii) Requirement changes to EASC-CHEM Joint Major Honours Program

(ix) Requirement changes to the Earth Sciences Certificate Program

4. Department of Biological Sciences (SCUS 12-47c)

(i) Course number change to BISC 418

5. Department of Biomedical Physiology and Kinesiology (SCUS 12-47d)

(i) W Designation for KIN 451-3, Practicum III

6. Department of Math (SCUS 12-47e)

(i) Requirement changes to elective courses in the Mathematics Major and Honours Programs

(ii) Requirement changes to the Operations Research Major and Honours Programs (iii) Prerequisite change to MATH 348

(iv) Deletion of MATH 402 (non-W)

7. Department of Statistics & Actuarial Science (SCUS 12-47f)

(i) Prerequisite changes to STAT 302, 403 and ACMA 320

- 8. Department of Physics (SCUS 12-47g)
 - (i) Prerequisite changes to PHYS 100 and 125

Senators wishing to consult a more detailed report of curriculum revisions may do so by going to Docushare: <u>https://docushare.sfu.ca/dsweb/View/Collection-12682</u> If you are unable to access the information, please call<u>778-782-3168</u> or email <u>shelley gair@sfu.ca</u>.



G. Myers, Chair, SCUS

Faculty of Science Dean's Office TASC 11 - 9900 8888 - University Drive Burnaby, BC V5A 1S6

> FROM: G. Agnes, Associate Dean Faculty of Science

RE: SCUS 12-41

TO:

DATE: October 26, 2012

Attached is the resubmission of agenda item SCUS 12-41, 1, part iii - continuance requirement for the Biomedical Physiology Major and the Kinesiology Major.

G. Agnes

Enclosure

c. J. Hinchliffe, C. Cupples, R.Dill

Calendar Statement for Biomedical Physiology and Kinesiology Majors

After a student has completed 24 credits, a Science cumulative grade point average (CGPA) of not less than 2.20 is required for continuance in the major. Students, whose Science CGPA falls below 2.20, will be sent a warning letter and if in the subsequent term the Science CGPA is less than 2.20, these students shall be withdrawn from the BIF or KIN Major. Students who have completed 90 or more units and whose Science CGPA fall below a 2.20 but are at a minimum of 2.00 will be allowed to complete their Biomedical Physiology or Kinesiology major. Students must achieve a minimum of a C- grade in all required courses.

Additional Clarification will be posted on BPK's websites http://www.sfu.ca/bpk/undergraduate/bsc_kin/ http://www.sfu.ca/bpk/undergraduate/biomedical_physiology_major/

Items for web site:

How will each student whose CGPA falls below the continuance requirement be advised?

- Students under warning will be advised to make use of university academic support systems such as the student learning commons.
- Withdrawn students will be advised about alternative programs including the B. Sc. General Science double minor program.



TO: G. Myers, Chair, SCUS

FROM: G. Agnes, Associate Dean Faculty of Science

RE: Faculty of Science Curriculum **DATE:** October 24, 2012 Items

The Faculty of Science has approved the following, which must now be considered by SCUS. Please place these items on the agenda of the next SCUS meeting.

1. Management & Systems Science

- a) Changes to the MSSC Major program
- b) Changes to the MSSC Honours program

2. Earth Sciences

a) Changes to EASC 101, 206, 207, 210, 301, 306, 314, 315, 403, 404, 411

b) Changes to course number, description, prerequisites & learning outcomes to EASC 303W

- c) Changes to course number, description, prerequisites & learning outcomes to EASC 406
- d) New course proposal EASC 311
- e) Changes to EASC Majors/Honours programs mainly reflects course changes above
- f) Changes to EASC-CHEM Joint Majors/Honours programs mainly reflects course changes above
- g) Changes to EASC Earth Sciences Certificate restructured for clarity
- h) Changes to EASC Forestry Geoscience Certificate renamed & restructured

3. Biological Sciences

- a) Change to course number for BISC 418 to BISC 318
- b) Change to program requirements for BISC Open Stream

4. Biomedical Physiology& Kinesiology

- a) KIN 451W approval from the W office
- b) Certificate of Occupational Ergonomics Notice of Intent

5. Mathematics

- a) Changes to Mathematics Major and Honours Programs
- b) Changes to Operations Research Major and Honours Programs
- c) Prerequisite change to MATH 348-3
- d) Deletion of MATH 402-4
- 6. Statistics & Actuarial Science
 - Prerequisite Changes to STAT 302, STAT 403 and ACMA 320
- 7. Physics

Prerequisite Changes to PHYS 100 and PHYS 125-3

Enclosure c. J. Hinchliffe, C. Cupples

Proposed changes to the BSc Major in Management and Systems Science:

The Steering Committee for the Management and Systems Science (MSSC) program, administered in the Faculty of Science, proposes the following changes to the MSSC program and corresponding calendar listing. These changes were approved by the steering Committee by electronic vote on July 3, 2012. Steering Committee Members are: Tom Loughin, MSSC program director, Department of Statistics and Actuarial Science; Joe Peters, School of Computing Science; Abraham Punnen, Department of Mathematics; Dianne Cyr, Beedie School of Business, and Gord Myers, Department of Economics.

Summary of Changes:

- Explicitly listing CMPT 120 as a LD requirement, which had previously been implicitly required as it was a required course based on prerequisites.
- Change the sequence FROM CMPT (125 or 126) and 275, TO CMPT 120, 125, and 275.
- Added a new sequence of 3 courses, CMPT 130, 135, 276, as a series-option to list of LD requirements
- Add new course MATH 208 to list of LD requirements
- Correct an editorial error in the title of the course BUS 251
- Moved MSSC 180 from UD requirements list to LD requirements list
- In the list of recommended UD courses, the STAT 4xx courses were replaced with new list of STAT courses

Rationale for Changes:

- Computing Science has added a special stream of courses in Surrey taught using the computing language C++ rather than Java. These courses are CMPT 130, 135, 276. In Surrey they no longer offer the sequence CMPT 120, 125, 126, or 275, which are taught using the Java language. The content of either set of courses is essentially the same, so students may choose to take either sequence to fulfill program requirements.
- Within the current calendar description, the sequence of computing courses (CMPT 125 and 126) did not explicitly list CMPT 120. CMPT 120 was always however a prerequisite for CMPT 125. Therefore, this calendar change makes the requirement of CMPT 120 explicit.
- Mathematics has introduced a new course, MATH 208-3: Introduction to Operations Research, which teaches introductory-level material very close to the core of what students will take in upper-division courses. Exposure of students to this material at an introductory and very applied level early in the program should better prepare and motivate them for the more technical coursework that they take later in the program.
- This change is a correction to an editorial error in the calendar. The title of the course, BUS 251-3, currently had a typographical error in its title that is now deleted with this change.
- MSSC 180 is now listed among the lower-division courses. This is a seminar based, 1credit, course where students get exposure to 10 presentations from individuals who are
 invited from the community. The intent of moving this course to the LD requirements is
 to stimulate student imagination and planning with respect to their undergraduate
 program.
- The Department of Statistics and Actuarial Science have recently revised their 300- and 400-level offerings, so changes need to be made reflecting these changes. All of the new courses teach data analysis for different types of data and/or different kinds of data-gathering studies. Therefore, all of these courses can be useful additions to a student's program in accordance with their interests.

Change **FROM** Current MSSC Calendar description:

Management and Systems Science Major Program

Management and Systems Science Program I Faculty of Science Simon Fraser University Calendar 2012 Summer

The Faculty of Science, with the Departments of Mathematics, Statistics and Actuarial Science, Economics, the Beedie School of Business, and the School of Computing Science, offer a major in management and systems science (MSSC) at the Surrey campus leading to a bachelor of science (BSc) degree. This is a highly structured program providing a multidisciplinary approach to quantitative methods for business and industry in an environment of rapid changes in technology.

The program is managed by the Faculty of Science at the Surrey campus. A steering committee consisting of representatives from the above mentioned departments and faculty serve as liaison between participating departments and the program director. Where possible, the director and steering committee members will be based on the Surrey campus.

Students formally apply to be admitted into the program. Applications can be considered both for students entering Simon Fraser University, and for students already enrolled. Admission into the program is decided on a competitive basis. Students must maintain a 2.7 cumulative grade point average (CGPA) in MSSC program course work to remain in the program and to graduate. It is strongly recommended that students contact the Surrey science advisor or program director early about admission and scheduling.

Program Requirements

Students complete 120 units, as specified below.

Under program and University regulations, a general degree requires a total of 120 units, 44 of which are in upper division courses. Completion of all lower and upper division courses shown below is required. However, students should be aware of particular department requirements for course entry. Contact those departments for information.

Lower Division Requirements

Students complete a total of 51-52 units.

Business Administration

Students complete all of

- BUS 207-3 Managerial Economics*
- BUS 251-3 Financial Accounting I Computing Science
- BUS 272-3 Behavior in Organizations

*may be waived if the student has credit for ECON 301-4

Computing Science

Students complete one of

- CMPT 125-3 Introduction to Computing Science and Programming II
- CMPT 126-3 Introduction to Computing Science and Programming

and both of

- CMPT 225-3 Data Structures and Programming
- CMPT 275-4 Software Engineering

Economics

Students complete both of

- ECON 103-4 Principles of Economics (I) Microeconomics
- ECON 105-4 Principles of Economics (II) Macroeconomics

Mathematics and Computing Science

Students complete both of

- MACM 101-3 Discrete Mathematics I
- MACM 201-3 Discrete Mathematics II

Mathematics

Students complete one of

- MATH 150-4 Calculus I with Review
- MATH 151-3 Calculus I
- MATH 154-3 Calculus I for the Biological Sciences
- MATH 157-3 Calculus for the Social Sciences I

and both of

- MATH 152-3 Calculus II
- MATH 251-3 Calculus III

and one of

- MATH 232-3 Applied Linear Algebra
- MATH 240-3 Algebra I: Linear Algebra

Statistics

Students complete both of

- STAT 270-3 Introduction to Probability and Statistics
- STAT 285-3 Intermediate Probability and Statistics

Recommended Courses

The following course is recommended.

CMPT 212-3 Object-oriented Applications Design in C++

Upper Division Requirements

Students complete a total of 43-44 units.

Students should note that the prerequisites for the following courses must also be completed. However, BUS 237and 336 (prerequisite for BUS 440 and 473) are waived for MSSC majors and honours.

Business Administration

Students complete all of

- BUS 343-3 Introduction to Marketing
- BUS 360-4 Business Communication
- BUS 361-3 Project Management
- BUS 473-4 Operations Management

Computing Science

Students complete one of

- BUS 440-4 Simulation in Management Decision Making
- CMPT 305-3 Computer Simulation and Modelling

and all of

- CMPT 307-3 Data Structures and Algorithms
- CMPT 354-3 Database Systems |
- CMPT 370-3 Information System Design

Management and Systems Science

Students complete both of

- MSSC 180-1 Undergraduate Seminar in Management and Systems Science†
- MSSC 481-1 Undergraduate Seminar in Management and Systems Science†

†cannot be completed concurrently

Mathematics

Students complete both of

- MATH 308-3 Linear Optimization
- MATH 348-3 Probabilistic Models in Operations Research

and one of

- MACM 316-3 Numerical Analysis I
- MATH 310-3 Introduction to Ordinary Differential Equations
- MATH 343-3 Applied Discrete Mathematics
- MATH 345-3 Introduction to Graph Theory

Statistics

Students complete both of

- STAT 350-3 Linear Models in Applied Statistics
- STAT 380-3 Introduction to Stochastic Processes

Recommended Courses

- BUS 312-4 Business Finance
- · BUS 445-3 Analysis of Data for Management
- BUS 488-3 Group Dynamics and Teamwork
- BUEC 396-3 The Structure of Industry
- CMPT 405-3 Design and Analysis of Computing Algorithms
- CMPT 417-3 Intelligent Systems
- ECON 431-5 Intermediate Mathematical Economics
- MATH 309-3 Continuous Optimization
- MATH 408-3 Discrete Optimization
- MATH 448-3 Network Flows
- STAT 300-3 Statistics Communication
- STAT 400-3 Data Analysis
- STAT 410-3 Statistical Analysis of Sample Surveys
- STAT 430-3 Statistical Design and Analysis of Experiments
- STAT 460-3 Bayesian Statistics

Change **TO** Proposed new Calendar description:

Management and Systems Science Major Program

Management and Systems Science Program I Faculty of Science Simon Fraser University Calendar 2012 Summer

The Faculty of Science, with the Departments of Mathematics, Statistics and Actuarial Science, Economics, the Beedie School of Business, and the School of Computing Science, offer a major in management and systems science (MSSC) at the Surrey campus leading to a bachelor of science (BSc) degree. This is a highly structured program providing a multidisciplinary approach to quantitative methods for business and industry in an environment of rapid changes in technology.

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Students formally apply to be admitted into the program. Applications can be considered both for students entering Simon Fraser University, and for students already enrolled. Admission into the program is decided on a competitive basis. Students must maintain a 2.7 cumulative grade point average (CGPA) in MSSC program course work to remain in the program and to graduate. It is strongly recommended that students contact the Surrey science advisor or program director early about admission and scheduling.

Program Requirements

Students complete 120 units, as specified below.

Under program and University regulations, a general degree requires a total of 120 units, 44 of which are in upper division courses. Completion of all lower and upper division courses shown below is required. However, students should be aware of particular department requirements for course entry. Contact those departments for information.

Lower Division Requirements

Students complete a total of 57-59 units.

Business Administration

Students complete all of

- BUS 207-3 Managerial Economics*
- BUS 251-3 Financial Accounting I
- BUS 272-3 Behavior in Organizations

*may be waived if the student has credit for ECON 301-4

Computing Science

Students complete all of[‡]

- <u>CMPT 120-3 Introduction to Computing Science and Programming I</u>
- CMPT 125-3 Introduction to Computing Science and Programming II
- <u>CMPT 275-4 Software Engineering</u>

or all of

- <u>CMPT 130-3 Introduction to Computer Programming I</u>
- CMPT 135-3 Introduction to Computer Programming II
- <u>CMPT 276-3 Introduction to Software Engineering</u>

and

CMPT 225-3 Data Structures and Programming

⁺ CMPT 126-3 Introduction to Computing Science and Programming can be substituted for CMPT 120 and CMPT 125.

Economics

Students complete both of

- ECON 103-4 Principles of Economics (I) Microeconomics
- ECON 105-4 Principles of Economics (II) Macroeconomics

Mathematics and Computing Science

Students complete both of

- MACM 101-3 Discrete Mathematics I
- MACM 201-3 Discrete Mathematics II

Management and Systems Science

Students complete

MSSC 180-1 Undergraduate Seminar in Management and Systems Science

Mathematics

Students complete one of

- MATH 150-4 Calculus I with Review
- MATH 151-3 Calculus I
- MATH 154-3 Calculus I for the Biological Sciences
- MATH 157-3 Calculus for the Social Sciences I

and <u>all</u> of

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- MATH 152-3 Calculus II
- MATH 208/3 Introduction to Operations Research
- MATH 251-3 Calculus III

and one of

- MATH 232-3 Applied Linear Algebra
- MATH 240-3 Algebra I: Linear Algebra

Statistics

Students complete both of

- STAT 270-3 Introduction to Probability and Statistics
- STAT 285-3 Intermediate Probability and Statistics

Recommended Courses

The following course is recommended for students who took CMPT 125.

CMPT 212-3 Object-oriented Applications Design in C++

The following course is recommended for students who took CMPT 135.

<u>CMPT 213-3 Object-oriented Design in Java</u>

Upper Division Requirements

Students complete a total of 43-44 units.

Students should note that the prerequisites for the following courses must also be completed. However, BUS 237 and 336 (prerequisite for BUS 440 and 473) are waived for MSSC majors and honours.

Business Administration

Students complete all of

- BUS 343-3 Introduction to Marketing
- BUS 360,4 Business Communication
- BUS 361-3 Project Management
- BUS 473-4 Operations Management

Computing Science

Students complete one of

- BUS 440-4 Simulation in Management Decision Making
- CMPT 305-3 Computer Simulation and Modelling

and all of

- CMPT 307-3 Data Structures and Algorithms
- CMPT 354-3 Database Systems I
- CMPT 370-3 Information System Design

Management and Systems Science

Students complete

MSSC 481-1 Undergraduate Seminar in Management and Systems Science†

BUS 360 W - 4

† MSSC 180 and MSSC 481 cannot be taken concurrently

Mathematics

Students complete both of

- MATH 308-3 Linear Optimization
- MATH 348-3 Probabilistic Models in Operations Research

and one of

- MACM 316-3 Numerical Analysis I
- MATH 310-3 Introduction to Ordinary Differential Equations
- MATH 343-3 Applied Discrete Mathematics
- MATH 345-3 Introduction to Graph Theory

Statistics

Students complete both of

• STAT 350-3 Linear Models in Applied Statistics

STAT 380-3 Introduction to Stochastic Processes

Recommended Courses

- BUS 312-4 Business Finance
- BUS 445-3 Analysis of Data for Management
- BUS 488-3 Group Dynamics and Teamwork
- BUEC 396-3 The Structure of Industry
- CMPT 405-3 Design and Analysis of Computing Algorithms
- CMPT 417-3 Intelligent Systems
- ECON 431-5 Intermediate Mathematical Economics
- MATH 309-3 Continuous Optimization
- MATH 408-3 Discrete Optimization
- MATH 448-3 Network Flows
- STAT <u>300W</u>-3 Statistics Communication
- STAT <u>340-3</u> Statistical Computing and Exploratory Data Analysis
- STAT 410-3 Statistical Analysis of Sample Surveys
- STAT 430-3 Statistical Design and Analysis of Experiments
- STAT 475-2 Applied Discrete Data
- STAT 445-2 Applied Multivariate Analysis
- STAT 460-3 Bayesian Statistics
- STAT 485-2 Applied Time Series Analysis
- STAT 490-3 Selected Topics in Probability and Statistics

Scus 12-47a (ii)

Proposed changes to the BSc Honours in Management and Systems Science:

The Steering Committee for the Management and Systems Science (MSSC) program, administered in the Faculty of Science, proposes the following changes to the MSSC Honours program and corresponding calendar listing. These changes were approved by the steering Committee by electronic vote on July 3, 2012. Steering Committee Members are: Tom Loughin, MSSC program director, Department of Statistics and Actuarial Science; Joe Peters, School of Computing Science; Abraham Punnen, Department of Mathematics; Dianne Cyr, Beedie School of Business, and Gord Myers, Department of Economics.

Summary of Changes:

b)

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- Explicitly listing CMPT 120 as a LD requirement, which had previously been implicitly required as it was a required course based on prerequisites.
- Change the sequence FROM CMPT (125 or 126) and 275, TO CMPT 120, 125, and 275.
- Added a new sequence of 3 courses, CMPT 130, 135, 276, as a series-option to list of LD requirements that may be taken in lieu of the sequence CMPT 120, 125, and 275
- Add new course MATH 208 to list of LD requirements
- Correct an editorial error in the title of the course BUS 251
- Moved MSSC 180 from UD requirements list to LD requirements list
- In the list of recommended UD courses, the STAT 4xx courses were replaced with new list of STAT courses

Rationale for Changes:

- Computing Science has added a special stream of courses in Surrey taught using the computing language C++ rather than Java. These courses are CMPT 130, 135, 276. In Surrey they no longer offer the sequence CMPT 120, 125, 126, or 275, which are taught using the Java language. The content of either set of courses is essentially the same, so students may choose to take either sequence to fulfill program requirements.
- Within the current calendar description, the sequence of computing courses (CMPT 125 and 126) did not explicitly list CMPT 120. CMPT 120 was always however a prerequisite for CMPT 125. Therefore, this calendar change makes the requirement of CMPT 120 explicit.
- Mathematics has introduced a new course, MATH 208-3: Introduction to Operations Research, which teaches introductory-level material very close to the core of what students will take in upper-division courses. Exposure of students to this material at an introductory and very applied level early in the program should better prepare and motivate them for the more technical coursework that they take later in the program.
- This change is a correction to an editorial error in the calendar. The title of the course, BUS 251-3, currently had a typographical error in its title that is now deleted with this change.
- MSSC 180 is now listed among the lower-division courses. This is a seminar based, 1credit, course where students get exposure to 10 presentations from individuals who are
 invited from the community. The intent of moving this course to the LD requirements is
 to stimulate student imagination and planning with respect to their undergraduate
 program.
- The Department of Statistics and Actuarial Science have recently revised their 300- and 400-level offerings, so changes need to be made reflecting these changes. All of the new courses teach data analysis for different types of data and/or different kinds of data-gathering studies. Therefore, all of these courses can be useful additions to a student's program in accordance with their interests.

Change **FROM** Current MSSC Calendar description:

Management and Systems Science Honours Program

Management and Systems Science Program I Faculty of Science Simon Fraser University Calendar 2012 Fall

The Faculty of Science, with the Departments of Mathematics, Statistics and Actuarial Science, Economics, the Beedie School of Business, and the School of Computing Science, offer an honours in management and systems science (MSSC) at the Surrey campus leading to a bachelor of science (BSc) with honours degree. These are highly structured programs providing a multidisciplinary approach to quantitative methods for business and industry in an environment of rapid changes in technology.

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Program Requirements

Students complete 132 units, as specified below.

Under University regulations, an honours degree requires completion of a minimum of 60 upper division units in courses numbered 300 and above, including at least 50 upper division units in the honours program, and completion of at least 132 units. honours students require a graduation grade point average of not less than 3.00.

Lower Division Requirements

Students complete a total of 54-55 units.

Business Administration

Students complete all of

- BUS 207-3 Managerial Economics*
- BUS 251-3 Financial Accounting I
- BUS 272-3 Behavior in Organizations

*may be waived if the student has credit for ECON 301

Computing Science

Students complete one of

- CMPT 125-3 Introduction to Computing Science and Programming II
- CMPT 126-3 Introduction to Computing Science and Programming

and both of

- CMPT 225-3 Data Structures and Programming
- CMPT 275-4 Software Engineering

Economics

Students complete both of

- ECON 103-4 Principles of Economics (I) Microeconomics
- ECON 105-4 Principles of Economics (II) Macroeconomics

Mathematics and Computing Science

Students complete both of

- MACM 101-3 Discrete Mathematics I
- MACM 201-3 Discrete Mathematics II

Mathematics

Students complete one of

- MATH 150-4 Calculus I with Review
- MATH 151-3 Calculus I
- MATH 154-3 Calculus I for the Biological Sciences
- MATH 157-3 Calculus for the Social Sciences I

and both of

- MATH 152-3 Calculus II
- MATH 251-3 Calculus III

and one of

- MATH 232-3 Applied Linear Algebra
- MATH 240-3 Algebra I: Linear Algebra

Statistics

Students complete both of

STAT 270-3 Introduction to Probability and Statistics

STAT 285-3 Intermediate Probability and Statistics

Recommended Courses

The following course is recommended.

CMPT 212-3 Object-oriented Applications Design in C++

Upper Division Requirements

Students complete a total of 55-56 units. Students should note that the prerequisites for the following courses must also be completed. However, BUS 336 is waived for MSSC majors and honours.

Business Administration, Economics

Students complete all of

- BUS 343-3 Introduction to Marketing
- BUS 360-4 Business Communication
- BUS 361-3 Project Management
- BUS 473-4 Operations Management

and at least three business administration or economics units at the 400 division.

Computing Science

Students complete one of

- BUS 440-4 Simulation in Management Decision Making
- CMPT 305-3 Computer Simulation and Modelling

and all of

- CMPT 307-3 Data Structures and Algorithms
- CMPT 354-3 Database Systems I
- CMPT 370-3 Information System Design

and one of

- CMPT 405-3 Design and Analysis of Computing Algorithms
- CMPT 417-3 Intelligent Systems

Management and Systems Science

Students complete both of

- MSSC 180-1 Undergraduate Seminar in Management and Systems Science†
- MSSC 481-1 Undergraduate Seminar in Management and Systems Science†

†cannot be completed concurrently

Mathematics

Students complete both of

- MATH 308-3 Linear Optimization
- MATH 348-3 Probabilistic Models in Operations Research

and one of

- MATH 309-3 Continuous Optimization
- MATH 408-3 Discrete Optimization
- MATH 445-3 Graph Theory
- MATH 448-3 Network Flows

and one of

- MACM 316-3 Numerical Analysis I
- MATH 310-3 Introduction to Ordinary Differential Equations
- MATH 343-3 Applied Discrete Mathematics
- MATH 345-3 Introduction to Graph Theory

Statistics

Students complete all of

- STAT 330-3 Introduction to Mathematical Statistics
- STAT 350-3 Linear Models in Applied Statistics
- STAT 380-3 Introduction to Stochastic Processes

Recommended Courses

- BUS 312-4 Business Finance
- BUS 445-3 Analysis of Data for Management
- BUS 488-3 Group Dynamics and Teamwork
- BUEC 396-3 The Structure of Industry
- CMPT 405-3 Design and Analysis of Computing Algorithms
- CMPT 417-3 Intelligent Systems
- ECON 431-5 Intermediate Mathematical Economics
- MATH 309-3 Continuous Optimization
- MATH 408-3 Discrete Optimization
- MATH 448-3 Network Flows
- STAT 300-3 Statistics Communication
- STAT 400-3 Data Analysis
- STAT 410-3 Statistical Analysis of Sample Surveys
- STAT 430-3 Statistical Design and Analysis of Experiments
- STAT 460-3 Bayesian Statistics

Change **TO** Proposed new Calendar description:

Management and Systems Science Honours Program

Management and Systems Science Program | Faculty of Science Simon Fraser University Calendar 2012 Fall

The Faculty of Science, with the Departments of Mathematics, Statistics and Actuarial Science, Economics, the Beedie School of Business, and the School of Computing Science, offer an honours in management and systems science (MSSC) at the Surrey campus leading to a bachelor of science (BSc) with honours degree. These are highly structured programs providing a multidisciplinary approach to quantitative methods for business and industry in an environment of rapid changes in technology.

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Program Requirements

Students complete 132 units, as specified below.

Under University regulations, an honours degree requires completion of a minimum of 60 upper division units in courses numbered 300 and above, including at least 50 upper division units in the honours program, and completion of at least 132 units. honours students require a graduation grade point average of not less than 3.00.

Lower Division Requirements

Students complete a total of 54-55 units.

Business Administration

Students complete all of

- BUS 207-3 Managerial Economics*
- BUS 251-3 Financial Accounting I
- BUS 272-3 Behavior in Organizations

*may be waived if the student has credit for ECON 301

Computing Science

Students complete all oft

- <u>CMPT 120-3 Introduction to Computing Science and Programming I</u>
- CMPT 125-3 Introduction to Computing Science and Programming II
- CMPT 275-4 Software Engineering

or all of

- CMPT 130-3 Introduction to Computer Programming I
- <u>CMPT 135-3 Introduction to Computer Programming II</u>
- CMPT 276-3 Introduction to Software Engineering

and

CMPT 225-3 Data Structures and Programming

<u>**‡** CMPT 126-3 Introduction to Computing Science and Programming can be</u> <u>substituted for CMPT 120 and CMPT 125.</u>

Economics

Students complete both of

- ECON 103-4 Principles of Economics (I) Microeconomics
- ECON 105-4 Principles of Economics (II) Macroeconomics

Mathematics and Computing Science

Students complete both of

- MACM 101-3 Discrete Mathematics I
- MACM 201-3 Discrete Mathematics II

Management and Systems Science

Students complete

MSSC 180-1 Undergraduate Seminar in Management and Systems Science

Mathematics

Students complete one of

- MATH 150-4 Calculus I with Review
- MATH 151-3 Calculus I
- MATH 154-3 Calculus I for the Biological Sciences
- MATH 157-3 Calculus for the Social Sciences I

and both of



- MATH 152-3 Galculus II
- MATH 208-3 Introduction to Operations Research
- MATH 251-3 Calculus III

and one of

- MATH 232-3 Applied Linear Algebra ٠
- MATH 240-3 Algebra I: Linear Algebra ٠

Statistics

Students complete both of

- STAT 270-3 Introduction to Probability and Statistics
- STAT 285-3 Intermediate Probability and Statistics

Recommended Courses

The following course is recommended for students who took CMPT 125.

CMPT 212-3 Object-oriented Applications Design in C++ •

The following course is recommended for students who took CMPT 135.

• CMPT 213-3 Object-oriented Design in Java

Upper Division Requirements

Students complete a total of 55-56 units.

Students should note that the prerequisites for the following courses must also be completed. However, BUS 336 is waived for MSSC majors and honours.

Business Administration. Economics

Students complete all of

- BUS 343-3 Introduction to Marketing BUS 340 W 4
- BUS 360-4 Business Communication
- BUS 361-3 Project Management
- **BUS 473-4 Operations Management**

and at least three business administration or economics units at the 400 division.

Computing Science

Students complete one of

- BUS 440-4 Simulation in Management Decision Making
- CMPT 305-3 Computer Simulation and Modelling

and all of

- CMPT 307-3 Data Structures and Algorithms
- CMPT 354-3 Database Systems I
- CMPT 370-3 Information System Design

and one of

- CMPT 405-3 Design and Analysis of Computing Algorithms
- CMPT 417-3 Intelligent Systems

Management and Systems Science

Students complete ±

MSSC 481-1 Undergraduate Seminar in Management and Systems Science†

<u>†MSSC 180 and MSSC 481</u> cannot be completed concurrently

Mathematics

Students complete both of

- MATH 308-3 Linear Optimization
- MATH 348-3 Probabilistic Models in Operations Research

and one of

- MATH 309-3 Continuous Optimization
- MATH 408-3 Discrete Optimization
- MATH 445-3 Graph Theory
- MATH 448-3 Network Flows

and one of

- MACM 316-3 Numerical Analysis I
- MATH 310-3 Introduction to Ordinary Differential Equations
- MATH 343-3 Applied Discrete Mathematics
- MATH 345-3 Introduction to Graph Theory

Statistics

Students complete all of

- STAT 330-3 Introduction to Mathematical Statistics
- STAT 350-3 Linear Models in Applied Statistics
- STAT 380-3 Introduction to Stochastic Processes

Recommended Courses

- BUS 312-4 Business Finance
- BUS 445-3 Analysis of Data for Management
- BUS 488-3 Group Dynamics and Teamwork
- BUEC 396-3 The Structure of Industry
- CMPT 405-3 Design and Analysis of Computing Algorithms
- CMPT 417-3 Intelligent Systems
- ECON 431-5 Intermediate Mathematical Economics
- MATH 309-3 Continuous Optimization
- MATH 408-3 Discrete Optimization
- MATH 448-3 Network Flows
- STAT <u>300W</u>-3 Statistics Communication
- STAT 340-3 Statistical Computing and Exploratory Data Analysis
- STAT 410-3 Statistical Analysis of Sample Surveys
- STAT 430-3 Statistical Design and Analysis of Experiments
- STAT 475-2 Applied Discrete Data
- STAT 445-2 Applied Multivariate Analysis
- STAT 460-3 Bayesian Statistics
- STAT 485-2 Applied Time Series Analysis
- STAT 490-3 Selected Topics in Probability and Statistics

SCUS 12-47b(i)

SFU	SENATE COMMITTEE ON UNDERGRADUATE STUDIES	COURSE CHANGE/DELETION				
EXISTING COURSE, CHANGES	RECOMMENDED					
Please check appropriate revision	(s):					
Course number Credit	Title Description	Prerequisite Course deletion	Learning Outcomes			
Indicate number of hours for: Lee	cture Seminar	Tutorial	Lab 2			
FROM Course Subject/Number_EAS	SC 101	TO Course Subject/Number				
Credits		Credits				
TITLE	chedule, no more than 100 characters inc					
Physical Geology		Dynamic Earth				
FROM:	nd transcript, no more than 30 characters	TO:				
Physical Geology		Dynamic Earth				
DESCRIPTION FROM:		DESCRIPTION TO:				
rocks, earth structure, ear	lents with credit for GEOG	An-introduction to the Origin and character of m surface processes and plate tectonic theory. E deliver prerequisite information to EASC major degrees in other Departments and Faculties th in Earth Science. Non-Science curgents are en other EASC breath reourses.	rs/honours and students pursuing hat require a strong foundational course			
PREREQUISITE Does this course replicate the con If so, this should be noted in the	tent of a previously approved course to su prerequisite.	PREREQUISITE ach an extent that students should not re	ceive credit for both courses?			
FROM:		то:				

LEARNING OUTCOMES

Students successfully completing this course will be able to demonstrate an understanding of: 1) the Layered Earth and Plate Tectonics; 2) Earth Materials (Minerals, Rocks, Sediments, Economic Resources) and the relationship between Earth Materials and Plate Tectonics; 3) Earth's Interior and Geologic Processes (Mountain Building, Earthquakes); 4) Geologic Time and Earth History; 5) Environments and Surface Processes (Mass Wasting, Surface Water, Glaciers, Groundwater, Deserts); 6) Coastlines and Marine Geology.

RATIONALE

This is a foundational course for the EASC program students (e.g., honours, major, minor, joint EASC-CHEM major) and students pursuing degrees in other Departments and Faculties that require a strong foundational knowledge in Earth Sciences. Students seeking Breadth-Science credits are better served with the other EASC 100-level (103,104, 106, 107, 108) courses. The title change better reflects the scope of the content now taught.

Effective term and year Summer 2013

FALL

SFU	SENATE COMMITTEE ON UNDERGRADUATE STUDIES	COUR	SE CHANGE/DELETION
EXISTING COURSE, CHANGES	RECOMMENDED		
Please check appropriate revision(s):		
Course number Credit	Title Description	Prerequisite Course deletic	Learning Outcomes
Indicate number of hours for: Lec			Lab
	C 206		
Credits		Credits	
TITLE (1) LONG title for calendar and so FROM: Field Geology	chedule, no more than 100 characters inc	cluding spaces and punctuation. TO:	
(2) SHORT title for enrollment at FROM:	nd transcript, no more than 30 characters	s including spaces and punctuation TO:	n.
Field Geology I			
DESCRIPTION FROM:		DESCRIPTION TO:	
	cursions to demonstrate Columbia. Field locations year.	and the interpretation of geologi the geological time scale, and s	of field navigation, geological mapping ical field data including cross sections, tratigraphic sections and columns. s. Field locations may vary from year to are mandatory.
PREREQUISITE		PREREQUISITE	
Does this course replicate the cont If so, this should be noted in the	ent of a previously approved course to su prerequisite.	uch an extent that students should	not receive credit for both courses?
FROM: Prerequisite: EASC prerequisite/corequi	101 and site EASC 210.	то:	
LEARNING OUTCOMES			
their textures and mineral cons tools, including a Brunton comp	ng this course will be able to: 1) ident tituents, and the processes that forme pass; 3) recognize faults, fractures, fo ogical information on a field map; 4) p lumns and geological maps.	ed them; 2) navigate safely in the local them; 2) navigate safely in the local them in the local term in the local term is the local term in the local term is the local term in the local term is the local term	he field and use basic geological diguaternary sections in the field

RATIONALE

This field school has recently been completely overhauled and the new description better describes the material to be covered.

Effective term and year Spring 2014 FALL 2013

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EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):	
Course number Credit Title Description P	rerequisite 🗌 Course deletion 🔳 Learning Outcomes
Indicate number of hours for: Lecture 2 Seminar	Tutorial Lab 3
FROM Course Subject/Number_EASC 207	TO Course Subject/Number
Credits <u>3</u>	Credits
TITLE (1) LONG title for calendar and schedule, no more than 100 characters inc FROM:	luding spaces and punctuation. TO:
Introduction to Applied Geophysics	
(2) SHORT title for enrollment and transcript, no more than 30 characters FROM: Introduction to Applied Geophysics	including spaces and punctuation. TO:
Introduction to Applied Geophysics	
DESCRIPTION FROM:	DESCRIPTION TO:
An introduction to geophysics emphasizing seismic, magnetic and gravimetric observations of the Earth. Applied geophysics.	
PREREQUISITE Does this course replicate the content of a previously approved course to su If so, this should be noted in the prerequisite .	PREREQUISITE the an extent that students should not receive credit for both courses?
MATH 152, PHYS 121 or 102 or 141, and PHYS 130 or 131 unless FROM: PHYS 141 taken, all with a grade of C-or higher. Quantitative	T0: MATH 152, PHYS 102 or 121 or 126 or 141, and PHYS 130 or 131 (unless PHYS 141 taken). Quantitative

LEARNING OUTCOMES

Students successfully completing this course will be able to demonstrate an understanding of the physical properties related to, and applicability of, geophysical surveys employing gravity, magnetic, electrical, and seismic refraction methods. Students will understand how field data are manipulated or processed to produce useful information about the subsurface.

RATIONALE

Prerequisite change adds PHYS 126 as it is equivalent to 102, 121 and 141. Furthermore, minimum grade requirements for MATH and PHYS are stated in the relevant program descriptions.

Effective term and year Fall 2013



EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number Credit Title Description	Prerequisite Course deletion 🔲 Learning Outcomes
Indicate number of hours for: Lecture 2 Seminar	Tutorial Lab
FROM FASC 210	TO Course Subject/Number
3	Credits
TITLE (1) LONG title for calendar and schedule, no more than $1\dot{0}0$ characters inc FROM:	cluding spaces and punctuation. TO:
Historical Geology	
(2) SHORT title for enrollment and transcript, no more than 30 characters FROM:	including spaces and punctuation. TO:
Historical Geology	
DESCRIPTION FROM:	DESCRIPTION TO:
The study of the evolution of the Earth, the geological time scale, fossils and evolution, stratigraphic concepts, geological history of western Canada.	
PREREQUISITE	PREREQUISITE
Does this course replicate the content of a previously approved course to su If so, this should be noted in the prerequisite .	ich an extent that students should not receive credit for both courses?
EASC 101 or GEOG 111. Students with credit for EASC 102 prior FROM: to 05-3 may not take this course for credit. Breadth-Science.	TO: EASC 101. Breadth-Science.
LEARNING OUTCOMES	
Students successfully completing this course will: 1) know the geologic time scale and unders broken record pieced together to form the geologic time scale, 3) demonstrate understanding and oceans evolve over geologic time, and relate this to specific evidence preserved in the ro	of geologic principles used to analyze Earth history. 4) understand how Earth's continents

and oceans evolve over geologic time, and relate this to specific evidence preserved in the rock record, 5) recognize the relationships between life (first life, evolution of life, extinctions) and plate tectonics, 6) document the history of the North American continent through geologic time, with a focus on orogenic events, epeiric seas, climate, and the rock record, 7) be able to identify a variety of invertebrate fossils and use the identified fossils to refine interpretations of Earth history, 8) be able to evaluate and interpret the geologic history of an area, 9) appreciate how the acquired knowledge and skills can be carried forward to future learning within Earth Sciences, and 10) become better learners and feel confident in the learning process.

RATIONALE

EASC 101 is required by EASC majors/honours as well as Physical Geography and EVSC students with concentrations in Water Science and Environmental Earth Systems. Furthermore, the course content of GEOG 111 varies quite significantly from that of EASC 101 and Historical Geology requires a strong background in the foundational material taught in EASC 101. EASC 102 has not been offered in 8 years and therefore this note is no longer deemed necessary.

Effective term and year Fall 2013

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COURSE CHANGE/DE	LE	ETI	ON
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EXISTING COURSE, CHANGES RECOMMENDED					
Please check appropriate revision(s):					
Course number Credit Title Description					
Indicate number of hours for: Lecture 2 Seminar	Tutorial Lab <u>3</u>				
FROM Course Subject/Number_EASC 301					
Credits	Credits				
TITLE (1) LONG title for calendar and schedule, no more than 100 characters inc FROM:	cluding spaces and punctuation. TO:				
Igneous and Metamorphic Petrology	Igneous Petrology				
(2) SHORT title for enrollment and transcript, no more than 30 characters FROM: Igneous and Metamorphic Petrology	including spaces and punctuation. TO: Igneous Petrology				
DESCRIPTION FROM:	DESCRIPTION TO:				
Mineralogy, phase relations, origin of igneous rocks; classification of igneous rocks. Mineralogy and textures of metamorphic rocks; hand sample and thin sections.	Integrated theoretical and practical investigation of igneous rocks. Topics include melt generation, ascent and modification of magma, and solidification of magma in plutonic and volcanic environments. Emphasis will be placed on mineralogy, geochemistry and petrography. Relations between magmatic and tectonic processes will be explored.				
PREREQUISITE Does this course replicate the content of a previously approved course to su If so, this should be noted in the prerequisite .	PREREQUISITE ach an extent that students should not receive credit for both courses?				
FROM: EASC 205 and 208	то:				
LEARNING OUTCOMES					
Students successfully completing this course will be able to: 1) describe volcanic classify igneous rocks according to mineralogy, geochemistry and texture; 3) des viscosity, and style of emplacement or eruption; 4) describe processes of melting petrologic calculations based on phase diagrams and geochemical compositions 7) relate chemical and physical characteristics of magmatism to tectonic process pet unoffunde.	cribe relations among magma chemistry, temperature, volatile content, , mixing, assimilation, crystallization and volatile exsolution; 5) perform				

and worldwide.

This course, which currently covers both igneous petrology and metamorphic petrology, is being split into two separate courses to allow for greater treatment of each subject. EASC 301 will focus on igneous petrology as reflected in the new title and course description.

Effective	term	and	year	Fall 2014
				2013



COURSE	CHANGE/	DELETION
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EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number Credit Title Description P	rerequisite 🔲 Course deletion 🔳 Learning Outcomes
Indicate number of hours for: Lecture 2 Seminar	Tutorial Lab
FROM Course Subject/Number_EASC 306	TO Course Subject/Number
Credits 3	Credits
TITLE (1) LONG title for calendar and schedule, no more than 100 characters inc FROM:	luding spaces and punctuation. TO:
Field Geology II	
(2) SHORT title for enrollment and transcript, no more than 30 characters FROM: Field Geology II	including spaces and punctuation. TO:
DESCRIPTION FROM:	DESCRIPTION TO:
A 12 day field camp held after final exams in the spring term. Students will learn how to observe, record and interpret geological features, and will carry out geological mapping and analysis. Approximately five 1-hour lectures on field methods, equipment and safety will precede the field camp. Field locations may vary from year to year.	A 10-14 day field camp held after final exams in the spring term. Students will learn how to observe, record and interpret geological features, and will carry out geological mapping and analysis. Approximately five 1-hour lectures on field methods, equipment and safety will precede the field camp. Field locations may vary from year to year.
PREREQUISITE Does this course replicate the content of a previously approved course to su If so, this should be noted in the prerequisite .	PREREQUISITE the an extent that students should not receive credit for both courses?
FROM: EASC 201, 204, 205, 206 and GEOG 213	TO: EASC 201, 204, 205, and 206

LEARNING OUTCOMES

Students successfully completing this course will be able to: 1) design and undertake a program of field investigation and undertake multi-day, mapping projects that integrate observations from all available scales; 2) map and interpret sedimentary, igneous and metamorphic rocks and processes as well as structural and surficial features; 4) understand rock movement within the crust over geologic time involving processes such as original deposition or emplacement, burial, metamorphism, hydrothermal activity and deformation, and exhumation; 5) understand the principle of the "metamorphic veil" in the context of protolith recognition and Isotopic dating; 6) integrate knowledge from field observations, and derivative maps, columns, sections and diagrams, to define a series of geological events for a given project. To combine the knowledge pained from individual studies into a comprehensive regional depolecial history. project; 7) combine the knowledge gained from individual studies into a comprehensive regional geological history.

RATIONALE

The prerequisite and description change better address the content of the field school as it is currently taught.

Effective term and year

Spring 2014 FALL 2013



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EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number	Credit	Title	Description	Prerequisite	Course deletion	Learning Outcomes	
Indicate number of h	ours for: Lect	ure 2	Seminar		_ Tutorial	<u>Lab</u>	
FROM Course Subject/Num	ber_EAS	C 314		TO Course Sub	pject/Number		
Credits 3			5	Credits			

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation. FROM: TO:

Principles of Glaciology

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation. FROM: TO:

Principles of Glaciology

DESCRIPTION FROM:

An introduction to the study of ice in the environment from a geophysical perspective, with attention to glaciers and ice sheets as (1) components of the global climate system, (2) indicators and archives of environmental conditions, (3) agents of catastrophic change, and (4) resources. Topics include the physical and chemical properties of ice, glacier and ice-sheet thermomechanics, dynamics of Greenland and Antarctica, ice cores, subglacial lakes, unstable ice flow, and resource exploitation in glacierized areas.

DESCRIPTION

PREREQUISITE

TO:

An introduction to the study of ice in the modern environment from a geophysical perspective, with a focus on glaciers and ice sheets. Topics include the physical and chemical properties of ice, glacier mass and energy balance, glacier and ice-sheet hydraulics and dynamics, fast ice flow and the relationship between ice and climate.

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 prerequisite**.

60 units, including MATH 152 (with a grade C or higher), PHYS 126 or 121 FROM: or 141 or 102 (with a grade of C or higher), and GEOG 213 or permission of the instructor. Quantilative 60 units, including MATH 152, PHYS 102 or 121 or 126 or 141, and any T0: 100-level EASC course or permission of the instructor. Recommended: EASC 101, Quantitative

LEARNING OUTCOMES

Students successfully completing this course will be able to: 1) understand the mass and energy exchange between the atmosphere/ocean and cryosphere 2) describe the rheology of ice and understand the basic thermomechanics of glaciers, 3) relate the macroscopic (bulk) properties and processes of glaciers and ice sheets to the microscopic properties of ice, 4) identify terms in the governing equations of ice flow with the physical processes and properties they represent and understand the origin of these terms, 5) recognize the role of water in glacier and ice-sheet dynamics and 6) understand the basic dynamics of ice sheets, streams and shelves and how these dynamics shape the behaviour of Greenland and Antarctica.

RATIONALE

Prerequisite change standardizes minimum grade requirements (for MATH and PHYS) within our program. It also increases the accessibility of the course to quantitatively oriented students who have some familiarity with geoscience through introductory courses.

Effective term and year Fall 2013



COURSE	CHANGE/	DELETION
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EXISTING COURSE, CHANGES RECOMMENDED

Please	check	appropriate	revision(s):	
Ficase	LIICCK	appropriate	revision(s).	

Course number	└─ Credit	L Title	Description	Prerequisite	Course deletion	Learning Outcomes	
Indicate number of h	ours for: Lect	ure 2	Seminar		Tutorial	3	
FROM Course Subject/Nun	EAS	C 403		TO Course Sub	oject/Number		
Credits 3				Credits			

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation. FROM: TO:

Quaternary Geology

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation. FROM: TO:

Quaternary Geology

DESCRIPTION
FROM:
Stratigraphy and history of the Quaternary Period with emphasis on glaciation, glacial sediments, and landforms. The course

DESCRIPTION

PREREQUISITE

TO:

Stratigraphy and history of the Quaternary Period with emphasis on glaciation, glacial sediments, and landforms. The course includes several 1-day trips and at least one 3-day trip.

PREREQUISITE

(2-0-3)

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 prerequisite**.

FROM: Prerequisite: EASC 201 and GEOG 213. Recommended: EASC 303 and GEOG 313.

includes several field trips, including one or two weekend trips.

TO: Prerequisite: EASC 201, EASC 209W or GEOG 213, and EASC 308.

LEARNING OUTCOMES

Students successfully completing this course will be able to: 1) understand the recent geologic record in four dimensions (space and time); 2) evaluate important natural processes that have shaped the landscape during the Quaternary; 3) recognize and interpret Quaternary processes, sediments and landforms.

RATIONALE

Description change eliminates course vector (no longer used) and clarifies the associated field trips. Prerequisite change addresses changes to Environmental Geoscience (to become EASC 209W) and Field Geology III (to become EASC 308).

Effective term and year Fall 2013



EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number Credit Title Description P	rerequisite Course deletion 🔳 Learning Outcomes
Indicate number of hours for: Lecture 2 Seminar	Tutorial Lab
	T0 Course Subject/Number
Credits	Credits
TITLE (1) LONG title for calendar and schedule, no more than 100 characters incl FROM:	uding spaces and punctuation. TO:
Structural Geology II	
(2) SHORT title for enrollment and transcript, no more than 30 characters FROM: Structural Geology II	including spaces and punctuation. TO:
DESCRIPTION FROM:	DESCRIPTION TO:
Application of advanced concepts in structural geology to a variety of tectonic problems; deformation mechanisms; flow concepts applied to ductile deformation; description and interpretation of microstructural fabrics; strain partitioning from grain scale to global scale.	
PREREQUISITE	PREREQUISITE
Does this course replicate the content of a previously approved course to su If so, this should be noted in the prerequisite .	ch an extent that students should not receive credit for both courses?
FROM: EASC 204, 301 and 309	T0: Prerequisite: EASC 204 Pre/Corequisite: EASC 301 and 309

LEARNING OUTCOMES

Students successfully completing this course will be able to: 1) demonstrate a more complete understanding of the concepts of deformation, deformation mechanisms, stress and strain, material properties and their relationship to the types of deformation (e.g., brittle versus ductile), and the processes responsible for the development of geologic structures; 2) identify, property describe and measure most deformational structures at all scales (regional to microscopic); carry out a structural analysis at all scales, draw and palinspastically restore balanced cross sections, and interpret the geologic history of a region based on assessment of their data, maps and cross sections; 3) understand how to carry out a kinematic analysis (e.g., determine shear sense) and how to infer, and possibly measure, the states of stress and strain that led to the development of the structures; 4) demonstrate a sound comprehension of the relationship between deformation, orogenesis and plate tectonics.

RATIONALE

EASC 404 is only offered every other year. This means certain student cohorts can only take EASC 404 in their 3rd year since it would not be offered the following year. Unfortunately, the current prerequisites prevent most students in their 3rd year from taking EASC 404. By changing EASC 301 and 309 to pre/corequisites, this problem is eliminated.

Effective term and year

Fall 2013



COURSE CHANGE/	DEL	LETION	I
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EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number Credit Title Description P	
Indicate number of hours for: Lecture 2 Seminar	Tutorial Lab
FROM Course Subject/Number_EASC 411	TO Course Subject/Number
Credits 3	Credits
TITLE (1) LONG title for calendar and schedule, no more than 100 characters inc FROM:	luding spaces and punctuation. TO:
Terrain Analysis	
(2) SHORT title for enrollment and transcript, no more than 30 characters FROM:	including spaces and punctuation. TO:
Terrain Analysis	
DESCRIPTION FROM:	DESCRIPTION TO:
Application and role of Quaternary Geology in terrain mapping and terrain analysis and will emphasize the British Columbia Terrain Classification System. Applications of terrain maps, including landslide, earthquake and volcanic hazard mapping will be discussed. The lab sessions will cover morphological mapping, surficial material genesis, geomorphic processes and finally, production of a terrain and terrain stability map. The course includes three days in the field to ground truth the map.	
PREREQUISITE	PREREQUISITE
Does this course replicate the content of a previously approved course to su	ich an extent that students should not receive credit for both courses?

If so, this should be noted in the prerequisite.

FROM: Prerequisite: EASC 206, 303. Recommended: GEOG 252, 313.

Prerequisite: EASC 206 and 209W or GEOG 213. TO: Recommended: GEOG 252 and 313.

LEARNING OUTCOMES

Students successfully completing this course will be able to: 1) use the B.C. Terrain Classification System and procedures for terrain mapping; 2) understand the application of terrain mapping and assessment to stability mapping, earthquake hazard mapping, debris flow studies, and gully assessment procedures; 3) show an understanding of urban geology and drift prospecting.

RATIONALE

Prerequisite change addresses proposed change of EASC 303W to EASC 209W.

Effective term and year Fall 2013



SCUS 12-47b(ii)

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

MEMO

ADDRESS 8888 UNIVERSITY DRIVE BURNABY BC V5A 186 CANADA

FROM	SUSAN RH	IODE	S, Assistant Instituti				y Curri	culum an	ıd	
RE W	/ designa	tion	approval	for	EASC	315				
DATE	October	26,	2012	•••••						

The University Curriculum Office has approved a W designation for:

EASC 315 Geochemistry of Natural Waters - effective 1134

Please forward this memo to the Faculty of Science Undergraduate Curriculum Committee and then SCUS for additional approval.



COURSE CHANGE/DELETION	CC	UR	SE	CHAN	GE/	DEL	ETION
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EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number	Credit	Title	Description	Prerequisite	Course deletion	Learning Outcomes	
Indicate number of h	ours for: Lect	ure 2	Seminar		Tutorial	3	
FROM Course Subject/Nun	EAS	C 315		TO Course Sub	ject/Number EAS	C 315W	
Credits 3				Credits 3			

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation. FROM: TO:

Geochemistry of Natural Waters

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation. FROM: TO:

Geochemistry of Natural Waters

DESCRIPTION

FROM:

Emphasis is on the fundamentals of water-rock interactions and the chemistry of natural waters, developing an understanding of the physical and chemical principles that govern the geochemistry of water within Earth's crust. Topics will include water sample collection and analysis, chemical thermodynamics, gas-water-rock interactions and geochemical modeling. The applications range from weathering and recharge to acid rock drainage and diagenesis.

PREREQUISITE

interactions and geochemical modeling. The applications range from weathering and recharge to acid rock drainage and diagenesis. Writing.

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 prerequisite.

FROM: Prerequisite: CHEM 122 and 126. Corequisite or TO: prerequisite: EASC 304.

LEARNING OUTCOMES

Students successfully completing this course will be able to: 1) show an understanding of the physical and chemical processes that control the geochemistry of water; 2) collect water samples and analyze them; 3) use chemical thermodynamics and knowledge of gas-water-rock interactions to develop geochemical models.

RATIONALE

This course already has a significant writing component and as such we are seeking certification as a Writing intensive course. Furthermore, this course will now meet upper division W requirements for students in the Environmental Geoscience stream.

Effective term and year

Fall 2013

JANUARY 2012

DESCRIPTION

TO:

Emphasis is on the fundamentals of water-rock interactions and the chemistry of natural waters, developing an understanding of the physical and chemical principles that govern the geochemistry of water within Earth's crust. Topics will include water sample collection and analysis, chemical thermodynamics, gas-water-rock

SCUS 12-47b(iii)

SFU	SENATE COMMITTEE ON UNDERGRADUATE STUDIES	COURSE CHANGE/DELETION				
EXISTING COURSE, CHANGES	RECOMMENDED					
Please check appropriate revision(s):					
Course number Credit		rerequisite Course deletion	Learning Outcomes			
FROM Course Subject/Number_EAS	SC 303W	TO Course Subject/NumberEASC Credits	C 209W			
TITLE (1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation. FROM: TO:						
Environmental Geoscie	ence					
(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation. FROM: TO: Environmental Geoscience						
DESCRIPTION FROM:		DESCRIPTION TO:				
of people to their geological habitat. Top	g; erosion and sedimentation in rural and ents in mountainous terrain. The course	Environmental geology is a branch of Earth Scien their geological habitat. Topics covered will includ and logging; erosion and sedimentation in rural ar in mountainous terrain. The course includes two This course is primanly designed for EASC progr other Departments and Faculties that require a st Geoscience. Writing.	e environmental impact of mineral extraction id urban environments; and mass movements -day field tips that usually occur on Saturdays. Im students and those oursuing degrees in			
PREREQUISITE		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 prerequisite .						
FROM: 60 units including size GEOG 213.	x units in Earth Sciences and	TO: EASC 101 . STUDEN EASC 303W MAY N	ITS WITH CREDIT FOL			
LEARNING OUTCOMES		FOR CREDIT.				
Students successfully completing this course will be able to: 1) understand and use terrain and applied maps to solve geologic problems; 2) recognize and understand mitigation techniques for natural hazards such as floods, earthquakes, mass wasting and volcanic; 3) solve geologic problems and reduce risk in both the urban environment and associated with resource development; 4) communicate geologic knowledge via field notes and synthesizing geologic information for various stakeholders and other geologists.						

RATIONALE

This course provides a broad introduction to environmental geoscience topics that we would like to move to the 200-level. Presently EASC students choose between the Geology or Environmental Geoscience streams at the end of second year without having been exposed to the field of environmental geoscience. Moving this course to second year will therefore allow students to make an informed choice and this addresses one of the suggestions from a recent departmental review. Furthermore, this course will now meet lower division W requirements.

Effective term and year

Fall 2013



COURSE CHANGE/DELETION

EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number	Credit	Title	Description	Prerequisite	Course deletion	Learning Outcomes	
Indicate number of h	ours for: Lectu		Seminar	1	Tutorial	Lab	
FROM Course Subject/Num	ber_EAS	C 406		TO Course Sub	ject/Number EAS	C 308	
Credits 3				Credits			

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation. FROM: TO:

Field Geology III

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation. FROM: TO:

Field Geology III

DESCRIPTION

FROM:

An advanced field study course that provides real-world examples of major topics in the earth sciences. The course includes both a classroom component throughout the term and a field component of about 2-3 weeks. The field component is usually held shortly after the spring examination period (generally late April to early May). The field component is an excursion to a variety of field sites that change yearly. Prior to student enrolment, the faculty member, in consultation with the students, will determine the field course location, and determine the mandatory supplementary course fees for that offerings. Some offerings of EASC 406 may require oversees travel and possibly a eignificant change in the timing and cost of the field coursent. Students should be aware that they must also cover the costs of food and personal items on the field course.

DESCRIPTION

PREREQUISITE

TO:

A 10-14 day field school held at the end of the summer term. Students will observe and interpret sedimentary and glacial geomorphic features, investigate natural hazard mechanisms and become acquainted with environmental geoscience topics. Students will carry out geological, geotechnical and geophysical surveying and analysis. Field locations may vary from year to year.

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 prerequisite**.

FROM: science courses (or permission of the instructor). Recommended: EASC 309.

EASC 201, 206 and 209W. Recommended: EASC 207. Students T0: with credit for EASC 406 may not take this course for credit.

LEARNING OUTCOMES

Students successfully completing this course will: 1) have acquired field skills and data analysis/interpretation relating to environmental geoscience, sedimentology, and applied geophysics; 2) be able to describe geologic units and sections, construct a terrain map, reconstruct glacial history, sample groundwater, and conduct a geophysical survey; 3) be able to integrate a variety of digital data sets into a simple graphical visualization.

RATIONALE

EASC 306 Field Geology II teaches a wide range of fundamental skills related to igneous, metamorphic and structural geology. However, due to logistical and time constraints, it cannot adequately cover material related to sedimentology, environmental geoscience and applied geophysics. As such, re-purposing EASC 406 as EASC 308 will ensure that all EASC students receive the breadth of field skills necessary to practice as Professional Geoscientists in the fields of Geology and Environmental Geoscience. Prerequisites reflect the new course content.

Effective term and year

Summer 2013

SCUS 12-47b(iv)



NEW COURSE PROPOSAL I OF 3 PAGES

COURSE SUBJECT/NUMBER EASC 311

COURSE TITLE

LONG - for Calendar/schedule, no more than 100 characters including spaces and punctuation

Metamorphic Petrology

AND

SHORT - for enrollment/transcript, no more than 30 characters including spaces and punctuation

Metamorphic Petrology

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.

Investigation of the physicochemical processes responsible for the origin of metamorphic rocks. Integrated study of the mineralogy, textures and phase relations through examination of hand sample and petrographic thin sections.

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 Completed and attached.

RATIONALE FOR INTRODUCTION OF THIS COURSE

In order to allow for a more in depth study of the material, this course is being split from EASC 301 Igneous and Metamorphic petrology. This will also better align with the curriculum structure set by APEGBC, the provincial professional registration body for geoscientists.

SCHEDULING AND ENROLLMENT INFORMATION

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

Spring 2014. To be offered every year.

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

What is the probable enrollment when offered? Estimate: 15

CREDITS

Indicate number of credits (units): 3

Indicate number of hours for: 🚺 Lecture	Seminar	Tutorial	🖌 Lab	Other 2 hrs lecture 2 hrs lab
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NEW COURSE PROPOSAL 2 OF 3 PAGES

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

Marshall, Thorkelson, Gibson, Cameron

WQB DESIGNATION (attach approval from Curriculum Office)

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**.

EASC 301 and 302

COREQUISITE

EASC 301 and 302

STUDENT LEARNING OUTCOMES

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

1) understand the processes of metamorphic rock formation at deeper crustal levels; 2) describe metamorphic rocks at the outcrop, hand specimen, and microscope scales; 3) understand interactions between metamorphic rocks, crustal fluids, and ore deposits; 4) utilize mineralogy, geochemistry and texture to understand formation and tectonic environments; 5) use mineral and bulk-rock chemical analyses with thermodynamic calculations to predict equilibrium temperatures and pressures for a variety of geological environments; 6) utilize the timing of mineral growth and geochronology in the context of crustal processes.

FEES

Are there any proposed student fees associated with this course other than tuition fees?



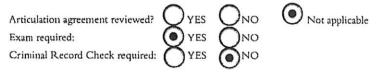
Up to \$200

RESOURCES

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

none

OTHER IMPLICATIONS





NEW COURSE PROPO	SAL
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3 OF 3 PAGES

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.

Jamos Mac Pacheen	28/09/2012		
Chair, Department/School	Date		
- Aak	0.J. 26/2012		
Chair, Esculty Corriculum Committee	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.

_	- /		
En	sail	cons	sultation

Dean or designate

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Date

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

Faculty of Science departments

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:

Date
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):

__ Date ____

APPROVAL IS SIGNIFIED BY DATE AND APPROPRIATE SIGNATURE.

SCUS 12-47b(v)

Present Calendar Description	Proposed Calendar Description changes Underlined
Earth Sciences Major Program	Earth Sciences Major Program
The department offers a bachelor of science degree with three	The department offers a bachelor of science (BSc) degree with
course stream options leading to course concentrations: geology	three course stream options leading to course concentrations:
stream, environmental geoscience stream, and general earth	geology stream, environmental geoscience stream, and general
sciences stream.	earth sciences stream.
The geology stream and the environmental geoscience stream are	The geology and environmental geoscience streams are designed
designed to permit a student to enrol as a geologist or	to permit a student to enrol as a geologist or environmental
cnvironmental geoscientist respectively, in the Association of Professional Engineers and Geoscientists of British Columbia	geoscientist respectively, in the Association of Professional
(APEGBC), the governing body that regulates geoscience	Engineers and Geoscientists of British Columbia (APEGBC), the governing body that regulates geoscience practice in BC. All
practice in BC. All students intending to practice as a geoscientist	students intending to practice as a geoscientist in BC must be
in BC must be licensed by APEGBC, and are strongly advised to	licensed by APEGBC, and are strongly advised to pursue one of
pursue one of these two streams. Many other Canadian provinces	these two streams. Many other Canadian provinces also require
also require professional licensing.	professional licensing.
Students who are not intending to practice as professional	Students who are not intending to practice as professional
geoscientists, or seek accreditation, may choose to pursue the	geoscientists, may choose to pursue the general earth sciences
general earth sciences stream. This stream may best accommodate students in some joint major programs.	stream. This stream may best accommodate students in some joint major programs.
	joint major programs.
Students should seek the advice of a departmental program	Students should seek the advice of a departmental program
advisor.	advisor.
Minimum Grade Requirement	Minimum Grade Requirement
Students wishing to register for earth sciences courses must	Students wishing to enroll in Earth Sciences courses must obtain
obtain a C- grade or better in prerequisite courses.	a C- grade or better in prerequisite courses.
Program Requirements Students complete 120 units, as specified below.	Program Requirements Students complete <u>a minimum of</u> 120 units, as specified below.
•	Students complete <u>a minimum or</u> 120 units, as specified below.
Lower Division Requirements	Lower Division Requirements
All students, no matter which streams they will choose, will complete a minimum of 54 units including all of	All students, no matter which streams they will choose, will
	complete a minimum of 54 units including all of
CHEM 121-4 General Chemistry and Laboratory I	CHEM 121-4 General Chemistry and Laboratory I
CHEM 122-2 General Chemistry II CHEM 126-2 General Chemistry Laboratory II	CHEM 122-2 General Chemistry II
EASC 101-3 Physical Geology	CHEM 126-2 General Chemistry Laboratory II EASC 101-3 Dynamic Earth
EASC 201-3 Stratigraphy and Sedimentation	EASC 201-3 Stratigraphy and Sedimentation
EASC 202-3 Introduction to Mineralogy	EASC 202-3 Introduction to Mineralogy
EASC 204-3 Structural Geology I	EASC 204-3 Structural Geology I
EASC 205-3 Introduction to Petrology	EASC 205-3 Introduction to Petrology
EASC 206-2 Field Geology I	EASC 206-2 Field Geology I
EASC 207-3 Introduction to Applied Geophysics	EASC 207-3 Introduction to Applied Geophysics
EASC 208-3 Introduction to Geochemistry EASC 210-3 Historical Geology	EASC 208-3 Introduction to Geochemistry
GEOG 213-3 Introduction to Geomorphology	EASC 209W-3 Environmental Geoscience EASC 210-3 Historical Geology
MATH 152-3 Calculus II	MATH 151-3 Calculus I or MATH 150-4 Calculus I with Review
	MATH 152-3 Calculus I
and one of MATH 150-4 Calculus I with Review	and one of
MATH 150-4 Calculus I with Review MATH 151-3 Calculus I	and one of STAT 201-3 Statistics for the Life Sciences
arter 191 141-4 Adhening t	STAT 270-3 Statistics for the Life Sciences STAT 270-3 Introduction to Probability and Statistics
and one of	Sector 200-5 introduction to Frobability and Statistics
STAT 201-3 Statistics for the Life Sciences	and one of
STAT 270-3 Introduction to Probability and Statistics	PHYS 101-3 Physics for the Life Sciences I*
and one of	PHYS 120-3 Mechanics and Modern Physics
and one of PHYS 101-3 Physics for the Life Sciences 1*	PHYS 125-3 Mechanics and Special Relativity
CALLS TO LA CUASION IN THE FUE SCIENCES IT	PHYS 140-4 Studio Physics - Mechanics and Modern Physics

PHYS 120-3 Mechanics and Modern Physics	
PHYS 125-3 Mechanics and Special Relativity	and one of
PHYS 140-4 Studio Physics - Mechanics and Modern Physics	PHYS 102-3 Physics for the Life Sciences II*
	PHYS 121-3 Optics, Electricity and Magnetism
and one of	PHYS 126-3 Electricity, Magnetism and Light
PHYS 102-3 Physics for the Life Sciences II*	PHYS 141-4 Studio Physics - Optics, Electricity and Magn
PHYS 121-3 Optics, Electricity and Magnetism	
PHYS 126-3 Electricity, Magnetism and Light	and if not completing PHYS 140/141, one of
PHYS 141-4 Studio Physics - Optics, Electricity and Magnetism	PHYS 130-2 Physics for the Life Sciences Laboratory*
	PHYS 131-2 Physics Laboratory 1
and if not completing PHYS 140/141, one of	
PHYS 130-2 Physics for the Life Sciences Laboratory*	*Students are encouraged to complete the standard stream (
PHYS 131-2 Physics Laboratory I	120, 121, 131) or the advanced stream (PHYS 125, 126, 13
	Students may also choose to complete the studio physics str
*Students are encouraged to complete the standard stream (PHYS	(PHYS 140, 141). Students who complete the life sciences s
120, 121, 131) or the advanced stream (PHYS 125, 126, 131).	(PHYS 101, 102, 130) (which has a corequisite of BISC 100
Students may also choose to complete the studio physics stream	101 or 102) with a minimum B grade should have sufficient
(PHYS 140, 141). Students who complete the life sciences stream	preparation for the major program.
(PHYS 101, 102, 130) (which has a corequisite of BISC 100 or	
101 or 102) with a minimum B grade should have sufficient	
preparation for the major program.	
Upper Division Requirements	Inner Division Departments
Students are encouraged to select upper division elective courses	Upper Division Requirements Students are encouraged to select upper division elective con
in consultation with an academic advisor, as APEGBC has	
specific groupings of elective courses for each stream,	in consultation with an academic advisor, as APEGBC has
respectively.	specific groupings of elective courses for each stream,
	respectively.
Geology Stream	Cashara Street
Students who choose this stream will complete a minimum of 41	Geology Stream Students who choose this stream will complete a minimum of
units, including all of	units, including
	tinta, including
EASC 301-3 Igneous and Metamorphic Petrology	all of
EASC 302-3 Sedimentary Petrology	EASC 301-3 Igneous Petrology
EASC 306-3 Field Geology II	EASC 302-3 Sedimentary Petrology
EASC 309-3 Global Tectonics	EASC 306-3 Field Geology II
EASC 310W-3 Paleontology	EASC 308-3 Field Geology III
-	EASC 309-3 Global Tectonics
and at least one of	EASC 310W-3 Paleontology
EASC 303W-3 Environmental Geoscience	EASC 311-3 Metamorphic Petrology
EASC 304-3 Hydrogeology	
EASC 313-3 Introduction to Soil and Rock Engineering	and at least one of
EASC 403-3 Quaternary Geology	EASC 304-3 Hydrogeology
	EASC 313-3 Introduction to Soil and Rock Engineering
and at least one of	EASC 403-3 Quaternary Geology
EASC 406-3 Field Geology III	
EASC 416-3 Field Methods in Hydrogeology	and at least 21 units chosen from
	EASC 300-3 Selected Topics in Earth Sciences
and at least 18 units chosen from	EASC 304-3 Hydrogeology
EASC 300-3 Selected Topics in Earth Sciences	EASC 305-3 Quantitative Methods for the Earth Sciences
EASC 303W-3 Environmental Geoscience	EASC 307-3 Applied Geophysics
EASC 304-3 Hydrogeology	EASC 312-3 Stratigraphy
EASC 305-3 Quantitative Methods for the Earth Sciences	EASC 313-3 Introduction to Soil and Rock Engineering
EASC 307-3 Applied Geophysics	EASC 314-3 Principles of Glaciology
EASC 312-3 Stratigraphy	EASC 315W-3 Geochemistry of Natural Waters
	EASC 317-3 Global Geophysics
EASC 313-3 Introduction to Soil and Rock Engineering	EASC 400-3 SCIECTED LODICS IN FAITH Sciences
EASC 313-3 Introduction to Soil and Rock Engineering EASC 314-3 Principles of Glaciology	EASC 400-3 Selected Topics in Earth Sciences EASC 401-3 Mineral Deposits
EASC 313-3 Introduction to Soil and Rock Engineering EASC 314-3 Principles of Glaciology EASC 315-3 Geochemistry of Natural Waters	EASC 401-3 Mineral Deposits
EASC 313-3 Introduction to Soil and Rock Engineering EASC 314-3 Principles of Glaciology	

EASC 402-3 Sedimentology	EASC 405-3 Water Cycles and Resources: Environmental and
EASC 403-3 Quaternary Geology	Climate Change Impacts
EASC 404-3 Structural Geology II	EASC 408-3 Regional Geology of Western Canada
EASC 405-3 Water Cycles and Resources: Environmental and	EASC 410-3 Groundwater Contaminant and Transport
Climate Change Impacts	EASC 411-3 Terrain Analysis
EASC 406-3 Field Geology III	EASC 413-3 Resource Geotechnics
EASC 408-3 Regional Geology of Western Canada	EASC 416-3 Field Techniques in Hydrogeology
EASC 410-3 Groundwater Contaminant and Transport	EASC 420-3 Petroleum Geology
EASC 411-3 Terrain Analysis	EASC 421-3 Volcanology
EASC 413-3 Resource Geotechnics	EASC 491-1 Directed Reading*
EASC 416-3 Field Techniques in Hydrogeology	EASC 492-2 Directed Reading*
EASC 420-3 Petroleum Geology	EASC 493-3 Directed Reading*
EASC 421-3 Volcanology	
EASC 491-1 Directed Reading*	
EASC 492-2 Directed Reading*	
EASC 493-3 Directed Reading*	
Other Requirements: Students in the geology stream must also	
complete at least two additional units in the Faculty of Science or	
physical geography at the upper division. These courses may be	
used toward the minor requirements in another department. Some	
of these courses may also satisfy APEGBC requirements.	
Environmental Geoscience Stream	Environmental Geoscience Stream
Students who choose this stream will complete all of	Students who choose this stream will complete a minimum of 45
	units, including
EASC 303W-3 Environmental Geoscience	
EASC 304-3 Hydrogeology	all of
EASC 306-3 Field Geology II	EASC 304-3 Hydrogeology
EASC 313-3 Introduction to Soil and Rock Engineering	EASC 306-3 Field Geology II
EASC 403-3 Quaternary Geology	EASC 308-3 Field Geology III
LASC 405-5 Quaternary Geology	EASC 313-3 Introduction to Soil and Rock Engineering
and one of	EASC 315W-3 Geochemistry of Natural Waters
GEOG 311-4 Hydrology	EASC 403-3 Quaternary Geology
GEOG 317-4 Soil Science	Erroe 403-5 Quaternary Geology
	and at least one of
and at least one of	EASC 301-3 Igneous Petrology
EASC 301-3 Igneous and Metamorphic Petrology	EASC 302-3 Sedimentary Petrology
EASC 302-3 Sedimentary Petrology	EASC 309-3 Global Tectonics
EASC 309-3 Global Tectonics	EASC 310W-3 Paleontology
EASC 310W-3 Paleontology	LASC 510 W-51 alcolitology
EASC STOW-ST ACOMONOGY	and a minimum of 24 units chosen from
and at least one of	EASC 300-3 Selected Topics in Earth Sciences
EASC 406-3 Field Geology III	EASC 300-3 Selected Topics in Earth Sciences EASC 301-3 Igneous Petrology
EASC 400-3 Field Geology III EASC 416-3 Field Techniques in Hydrogeology	EASC 302-3 Sedimentary Petrology
EVER 410-2 LICIA LECINIMARES IN UNALOREOIORA	EASC 302-3 Sedimentary Perrology EASC 305-3 Quantitative Methods for the Earth Sciences
and a minimum of 19 units chosen from	EASC 303-3 Quantitative Methods for the Earth Sciences
EASC 300-3 Selected Topics in Earth Sciences	EASC 307-3 Applied Geophysics EASC 309-3 Global Tectonics
EASC 301-3 Igneous and Metamorphic Petrology	EASC 310W-3 Paleontology
EASC 302-3 Sedimentary Petrology	
	EASC 311-3 Metamorphic Petrology
EASC 305-3 Quantitative Methods for the Earth Sciences	EASC 312-3 Stratigraphy
EASC 307-3 Applied Geophysics	EASC 314-3 Principles of Glaciology
EASC 309-3 Global Tectonics	EASC 317-3 Global Geophysics
EASC 310W-3 Paleontology	EASC 400-3 Selected Topics in Earth Sciences
EASC 312-3 Stratigraphy	EASC 401-3 Mineral Deposits
EASC 314-3 Principles of Glaciology	EASC 402-3 Sedimentology
EASC 317-4 Global Geophysics	EASC 404-3 Structural Geology II
EASC 400-3 Selected Topics in Earth Sciences	EASC 405-3 Water Cycles and Resources: Environmental and
EASC 401-3 Mineral Deposits	Climate Change Impacts
EASC 402-3 Sedimentology	EASC 408-3 Regional Geology of Western Canada
EASC 404-3 Structural Geology II	EASC 410-3 Groundwater Contaminant and Transport

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EASC 405-3 Water Cycles and Resources: Environmental and	EASC 411-3 Terrain Analysis
Climate Change Impacts	EASC 413-3 Resource Geotechnics
EASC 406-3 Field Geology III	EASC 416-3 Field Techniques in Hydrogeology
EASC 408-3 Regional Geology of Western Canada	EASC 420-3 Petroleum Geology
EASC 410-3 Groundwater Contaminant and Transport	EASC 421-3 Volcanology
EASC 411-3 Terrain Analysis	EASC 491-1 Directed Readings*
EASC 412-3 Groundwater Geochemistry (Inactive)	EASC 492-2 Directed Readings*
EASC 413-3 Resource Geotechnics	EASC 493-3 Directed Readings*
EASC 416-3 Field Techniques in Hydrogeology	GEOG 311-4 Hydrology
EASC 420-3 Petroleum Geology	GEOG 313-4 River Geomorphology
EASC 421-3 Volcanology	GEOG 317-4 Soil Science
EASC 491-1 Directed Readings*	GEOG 412W-4 Glacial Processes and Environments
EASC 492-2 Directed Readings*	
EASC 493-3 Directed Readings*	*students may only complete a maximum of <u>3 units</u> from a
GEOG 311-4 Hydrology	combination of EASC 491, 492, or 493
GEOG 313-4 River Geomorphology	
GEOG 317-4 Soil Science	
GEOG 412-4 Glacial Processes and Environments	
SECC 412-4 Glacial I Toccases and Environments	
*students may only complete a maximum of three units from a	
combination of EASC 491, 492, or 493	
Combination of EASC 491, 492, 01 495	
General Earth Sciences Stream	Canada Rauth Salaman Star
	General Earth Sciences Stream
Students who choose this stream will complete	Students who choose this stream will complete a minimum of 45
	units, including all of
EASC 306-3 Field Geology II	
	EASC 306-3 Field Geology II
and at least one of	EASC 308-3 Field Geology III
EASC 406-3 Field Geology III	
EASC 416-3 Field Techniques in Hydrogeology	and one of
	EASC 310W-3 Paleontology
and at least 30 other upper division EASC units.*	EASC 315W-3 Geochemistry of Natural Waters
*students may only complete a maximum of three units from a	and at least <u>36 units of upper division EASC or related courses</u>
combination of EASC 491, 492, or 493	that are approved by the department.*
and at least eight additional units in the Faculty of Science or	*students may only complete a maximum of <u>3 units</u> from a
physical geography. These courses may be used toward the minor	combination of EASC 491, 492, or 493.
requirements in another department.	
Faculty of Science Requirements	Faculty of Science Requirements
In addition to the above requirements, students must also satisfy	In addition to the above requirements, students must also satisfy
Faculty of Science major program requirements to complete a	Faculty of Science major program requirements to complete a
total of 120 units including	total of 120 units including
-	
additional upper division units to total a minimum of 44 upper	additional upper division units to total a minimum of 44 upper
division units (excluding EDUC 401, 406)	division units (excluding EDUC 401, 406)
students who were enrolled at Simon Fraser University between	students who were enrolled at Simon Fraser University between
fall 1991 and summer 2006 are required to complete a minimum	fall 1991 and summer 2006 are required to complete a minimum
of 12 units in subjects outside the Faculty of Science (excluding	of 12 units in subjects outside the Faculty of Science (excluding
EDUC 401 to 406) including six units minimum to be completed	EDUC 401 to 406) including six units minimum to be completed
in the Faculty of Arts and Social Sciences	in the Faculty of Arts and Social Sciences
	I A MA FRANKY OF THIS AND SUCIAL SUCIOES
Writing, Quantitative, and Breadth Requirements	Writing Augustitative and Busselth Development
Students admitted to Simon Fraser University beginning in the	Writing, Quantitative, and Breadth Requirements
fall 2006 term must meet writing, quantitative and breadth	Students admitted to Simon Fraser University beginning in the
	fall 2006 term must meet writing, quantitative and breadth
requirements as part of any degree program they may undertake.	requirements as part of any degree program they may undertake.
See Writing, Quantitative, and Breadth Requirements for	See Writing, Quantitative, and Breadth Requirements for
university-wide information.	university-wide information.
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Residency Requirements and Transfer Credit	Residency Requirements and Transfer Credit
The University's residency requirement stipulates that, in most	The University's residency requirement stipulates that, in most
cases, total transfer and course challenge credit may not exceed	cases, total transfer and course challenge credit may not exceed
60 units, and may not include more than 15 units as upper	60 units, and may not include more than 15 units as upper
division work.	division work.
Elective Courses In addition to the courses listed above, students should consult an academic advisor to plan the remaining required elective courses.	····

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SCUS 12-47b(vi)

Present Calendar Description	Proposed Calendar Description changes <u>Underlined</u>
Earth Sciences Honours Program This bachelor of science (BSc) with honours program offers a wide cross-section of discipline-related courses while providing an opportunity for independent research. The program has three course stream options leading to course concentrations: geology stream, environmental geoscience stream, and general earth sciences stream.	Earth Sciences Honours Program This bachelor of science (BSc) with honours program offers a wide cross-section of discipline-related courses while providing an opportunity for independent research. The program has three course stream options leading to course concentrations: geology stream, environmental gcoscience stream, and general earth sciences stream.
	The geology and environmental geoscience streams are designed to permit a student to enrol as a geologist or environmental geoscientist respectively, in the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC), the governing body that regulates geoscience practice in BC. All students intending to practice as a geoscientist in BC must be licensed by APEGBC, and are strongly advised to pursue one of these two streams. Many other Canadian provinces also require professional licensing.
	Students who are not intending to practice as professional geoscientists, may choose to pursue the general Earth Sciences stream. This stream may best accommodate students in some joint major programs.
	Students should seek the advice of a departmental program advisor.
Admission Requirements Entry to the program requires a 3.00 or higher (B standing) cumulative grade point average (CGPA), and departmental permission.	Admission Requirements Entry to the program requires a 3.00 or higher (B standing) cumulative grade point average (CGPA), and departmental permission.
	Minimum Grade Requirement Students wishing to enroll in Earth Sciences courses must obtain a C- grade or better in prerequisite courses.
Program Requirements Students complete 132 units, as specified below including a minimum 3.00 cumulative grade point average.	Program Requirements Students complete <u>a minimum of</u> 132 units, as specified below including a minimum 3.00 cumulative grade point average to be <u>awarded an honours degree.</u>
Lower Division Requirements All students, no matter which streams they will choose, will complete a minimum of 54 units including all of	Lower Division Requirements All students, no matter which streams they will choose, will complete a minimum of 54 units including
CHEM 121-4 General Chemistry and Laboratory I CHEM 122-2 General Chemistry II CHEM 126-2 General Chemistry Laboratory II EASC 101-3 Physical Geology EASC 201-3 Stratigraphy and Sedimentation EASC 202-3 Introduction to Mineralogy EASC 204-3 Structural Geology I	all of CHEM 121-4 General Chemistry and Laboratory I CHEM 122-2 General Chemistry II CHEM 126-2 General Chemistry Laboratory II EASC 101-3 Dynamic Earth EASC 201-3 Stratigraphy and Sedimentation EASC 202-3 Introduction to Mineralogy
EASC 205-3 Introduction to Petrology EASC 206-2 Field Geology 1 EASC 207-3 Introduction to Applied Geophysics EASC 208-3 Introduction to Geochemistry EASC 210-3 Historical Geology GEOG 213-3 Introduction to Geomorphology	EASC 204-3 Structural Geology I EASC 205-3 Introduction to Petrology EASC 206-2 Field Geology I EASC 207-3 Introduction to Applied Geophysics EASC 208-3 Introduction to Geochemistry EASC 209W-3 Environmental Geoscience
MATH 152-3 Calculus II and one of	EASC 210-3 Historical Geology MATH 151-3 Calculus I or MATH 150-4 Calculus I with Review
MATH 150-4 Calculus I with Review MATH 151-3 Calculus I and one of	MATH 152-3 Calculus II and one of STAT 201-3 Statistics for the Life Sciences
STAT 201-3 Statistics for the Life Sciences STAT 270-3 Introduction to Probability and Statistics	STAT 270-3 Introduction to Probability and Statistics and one of
and one of	PHYS 101-3 Physics for the Life Sciences I*

PHYS 101-3 Physics for the Life Sciences I*	PHYS 120-3 Mechanics and Modern Physics
PHYS 120-3 Mechanics and Modern Physics	PHYS 125-3 Mechanics and Special Relativity
PHYS 125-3 Mechanics and Special Relativity	PHYS 140-4 Studio Physics - Mechanics and Modern Physics
PHYS 140-4 Studio Physics - Mechanics and Modern Physics	
······	and one of
and one of	PHYS 102-3 Physics for the Life Sciences II*
PHYS 102-3 Physics for the Life Sciences II*	PHYS 121-3 Optics, Electricity and Magnetism
PHYS 121-3 Optics, Electricity and Magnetism	PHYS 126-3 Electricity, Magnetism and Light
PHYS 121-3 Optics, Electricity and Magnetism	
PHYS 126-3 Electricity, Magnetism and Light	PHYS 141-4 Studio Physics - Optics, Electricity and Magnetism
PHYS 141-4 Studio Physics - Optics, Electricity and Magnetism	
	and if not completing PHYS 140/141, one of
and if not completing PHYS 140/141, one of	PHYS 130-2 Physics for the Life Sciences Laboratory*
PHYS 130-2 Physics for the Life Sciences Laboratory*	PHYS 131-2 Physics Laboratory I
PHYS 131-2 Physics Laboratory I	
	*Students are encouraged to complete the standard stream (PHYS
*Students are encouraged to complete the standard stream (PHYS	120, 121, 131) or the advanced stream (PHYS 125, 126, 131).
120, 121, 131) or the advanced stream (PHYS 125, 126, 131).	Students may also choose to complete the studio physics stream
Students may also choose to complete the studio physics stream	(PHYS 140, 141). Students who complete the life sciences stream
(PHYS 140, 141). Students who complete the life sciences stream	(PHYS 101, 102, 130) (which has a corequisite of BISC 100 or
(PHYS 101, 102, 130) (which has a corequisite of BISC 100 or	101 or 102) with a minimum B grade should have sufficient
101 or 102) with a minimum B grade should have sufficient	preparation for the major program.
preparation for the major program.	
Upper Division Requirements	Upper Division Requirements
Students will complete 60 units minimum of 300 and 400	Students will complete 60 units minimum of 300 and 400
division EASC or physical geography courses, or related courses	division EASC or related courses that are approved by the
that are approved by the department. Students are encouraged to	······································
select upper division elective courses in consultation with an	department. Students are encouraged to select upper division
	elective courses in consultation with an academic advisor, as
academic advisor, as APEGBC has specific groupings of elective	APEGBC has specific groupings of elective courses for each
courses for each stream, respectively.	stream, respectively.
	sucam, respectively.
Geology Stream	Geology Stream
Students who choose this stream will complete a minimum of 50	
	Students who choose this stream will complete a minimum of 51
units, including all of	<u>units</u> , including all of
EASC 301-3 Igneous and Metamorphic Petrology	EASC 301-3 Igneous Petrology
EASC 302-3 Sedimentary Petrology	EASC 302-3 Sedimentary Petrology
EASC 306-3 Field Geology II	EASC 306-3 Field Geology II
EASC 309-3 Global Tectonics	EASC 308-3 Field Geology III
EASC 310W-3 Paleontology	EASC 309-3 Global Tectonics
EASC 499-9 honours Thesis	EASC 310W-3 Paleontology
and at least one of	
EASC 303W-3 Environmental Geoscience	EASC 311-3 Metamorphic Petrology
EASC 304-3 Hydrogeology	EASC 311-3 Metamorphic Petrology EASC 499-9 <u>Honours</u> Thesis
EASC 304-3 Hydrogeology	EASC 311-3 Metamorphic Petrology EASC 499-9 <u>Honours</u> Thesis and at least one of
EASC 313-3 Introduction to Soil and Rock Engineering	EASC 311-3 Metamorphic Petrology EASC 499-9 <u>Honours</u> Thesis and at least one of EASC 304-3 Hydrogeology
	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology	EASC 311-3 Metamorphic Petrology EASC 499-9 <u>Honours</u> Thesis and at least one of EASC 304-3 Hydrogeology
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology and at least 18 units chosen from	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology and at least 18 units chosen from	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 303W-3 Environmental Geoscience	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics EASC 312-3 Stratigraphy
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 303W-3 Environmental Geoscience EASC 304-3 Hydrogeology	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics EASC 312-3 Stratigraphy EASC 313-3 Introduction to Soil and Rock Engineering
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 303W-3 Environmental Geoscience EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics EASC 312-3 Stratigraphy EASC 313-3 Introduction to Soil and Rock Engineering EASC 314-3 Principles of Glaciology
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 303W-3 Environmental Geoscience EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics EASC 312-3 Stratigraphy EASC 313-3 Introduction to Soil and Rock Engineering EASC 314-3 Principles of Glaciology EASC 315W-3 Geochemistry of Natural Waters
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 303W-3 Environmental Geoscience EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics EASC 312-3 Stratigraphy	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics EASC 312-3 Stratigraphy EASC 313-3 Introduction to Soil and Rock Engineering EASC 314-3 Principles of Glaciology EASC 315W-3 Geochemistry of Natural Waters EASC 317-3 Global Geophysics
EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least one of EASC 406-3 Field Geology III EASC 416-3 Field Methods in Hydrogeology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 303W-3 Environmental Geoscience EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics	EASC 311-3 Metamorphic Petrology EASC 499-9 Honours Thesis and at least one of EASC 304-3 Hydrogeology EASC 313-3 Introduction to Soil and Rock Engineering EASC 403-3 Quaternary Geology and at least 18 units chosen from EASC 300-3 Selected Topics in Earth Sciences EASC 304-3 Hydrogeology EASC 305-3 Quantitative Methods for the Earth Sciences EASC 307-3 Applied Geophysics EASC 312-3 Stratigraphy EASC 313-3 Introduction to Soil and Rock Engineering EASC 314-3 Principles of Glaciology EASC 315W-3 Geochemistry of Natural Waters

EASC 315-3 Geochemistry of Natural Waters	EASC 402-3 Sedimentology
EASC 317-3 Global Geophysics	EASC 403-3 Quaternary Geology
EASC 400-3 Selected Topics in Earth Sciences	EASC 404-3 Structural Geology II
EASC 401-3 Mineral Deposits	EASC 405-3 Water Cycles and Resources: Environmental and
EASC 402-3 Sedimentology	Climate Change Impacts
EASC 403-3 Quaternary Geology	EASC 408-3 Regional Geology of Western Canada
EASC 404-3 Structural Geology II	EASC 410-3 Groundwater Contaminant and Transport
EASC 405-3 Water Cycles and Resources: Environmental and	EASC 411-3 Terrain Analysis
Climate Change Impacts	EASC 413-3 Resource Geotechnics
EASC 406-3 Field Geology III	EASC 416-3 Field Techniques in Hydrogeology
EASC 408-3 Regional Geology of Western Canada	EASC 420-3 Petroleum Geology
EASC 410-3 Groundwater Contaminant and Transport	EASC 421-3 Volcanology
EASC 411-3 Terrain Analysis	EASC 491-1 Directed Reading*
EASC 413-3 Resource Geotechnics	EASC 492-2 Directed Reading*
EASC 416-3 Field Techniques in Hydrogeology	EASC 493-3 Directed Reading*
EASC 420-3 Petroleum Geology	
EASC 421-3 Volcanology	
EASC 491-1 Directed Reading*	
EASC 492-2 Directed Reading*	
EASC 493-3 Directed Reading*	
and as losses and distanced units in the Description of Oniones and	
and at least two additional units in the Faculty of Science or	
physical geography. These courses may be used toward the minor requirements in another department. Some of these courses may	
also satisfy APEGBC requirements.	
also satisfy AFEOBC requirements.	
Environmental Geoscience Stream	Environmental Geoscience Stream
Students who choose this stream will complete all of	Students who choose this stream will complete a minimum of 51
	units, including all of
EASC 303W-3 Environmental Geoscience	
EASC 304-3 Hydrogeology	EASC 304-3 Hydrogeology
EASC 306-3 Field Geology II	EASC 306-3 Field Geology II
EASC 313-3 Introduction to Soil and Rock Engineering	EASC 308-3 Field Geology III
EASC 403-3 Quaternary Geology	EASC 313-3 Introduction to Soil and Rock Engineering
EASC 499-9 honours Thesis	EASC 315W-3 Geochemistry of Natural Waters
	EASC 403-3 Quaternary Geology
and one of	EASC 499-9 Honours Thesis
GEOG 311-4 Hydrology	
GEOG 317-4 Soil Science	and at least one of
	EASC 301-3 Igneous Petrology
and at least one of	EASC 302-3 Sedimentary Petrology
EASC 301-3 Igneous and Metamorphic Petrology	EASC 309-3 Global Tectonics
EASC 302-3 Sedimentary Petrology	EASC 310W-3 Paleontology
EASC 309-3 Global Tectonics	
EASC 310W-3 Paleontology	and a minimum of 21 units chosen from
	EASC 300-3 Selected Topics in Earth Sciences
and at least one of	EASC 301-3 Igneous Petrology
EASC 406-3 Field Geology III	EASC 302-3 Sedimentary Petrology
EASC 416-3 Field Techniques in Hydrogeology	EASC 305-3 Quantitative Methods for the Earth Sciences
	EASC 307-3 Applied Geophysics
and a minimum of 19 units chosen from	EASC 309-3 Global Tectonics
EASC 300-3 Selected Topics in Earth Sciences	EASC 310W-3 Paleontology
EASC 301-3 Igneous and Metamorphic Petrology	EASC 311-3 Metamorphic Petrology
EASC 302-3 Sedimentary Petrology	EASC 312-3 Stratigraphy
EASC 305-3 Quantitative Methods for the Earth Sciences	EASC 314-3 Principles of Glaciology
EASC 307-3 Applied Geophysics	EASC 317-3 Global Geophysics
EASC 309-3 Global Tectonics	EASC 400-3 Selected Topics in Earth Sciences
EASC 310W-3 Palcontology	EASC 401-3 Mineral Deposits
EASC 312-3 Stratigraphy	EASC 402-3 Sedimentology
EASC 314-3 Principles of Glaciology EASC 315W-3 Geochemistry of Natural Waters	EASC 404-3 Structural Geology II EASC 405-3 Water Cycles and Resources: Environmental and

EASC 317-4 Global Geophysics	Climate Change Impacts
EASC 400-3 Selected Topics in Earth Sciences	EASC 408-3 Regional Geology of Western Canada
EASC 401-3 Mineral Deposits	EASC 410-3 Groundwater Contaminant and Transport
EASC 402-3 Sedimentology	EASC 411-3 Terrain Analysis
EASC 404-3 Structural Geology II	EASC 413-3 Resource Geotechnics
EASC 405-3 Water Cycles and Resources: Environmental and	EASC 416-3 Field Techniques in Hydrogeology
Climate Change Impacts	EASC 420-3 Petroleum Geology
EASC 406-3 Field Geology III	EASC 421-3 Volcanology
EASC 408-3 Regional Geology of Western Canada	EASC 491-1 Directed Readings*
EASC 410-3 Groundwater Contaminant and Transport	EASC 492-2 Directed Readings*
EASC 411-3 Terrain Analysis	EASC 493-3 Directed Readings*
EASC 413-3 Resource Geotechnics	GEOG 311-4 Hydrology
EASC 416-3 Field Techniques in Hydrogeology	GEOG 313-4 River Geomorphology
EASC 420-3 Petroleum Geology	GEOG 317-4 Soil Science
EASC 421-3 Volcanology	GEOG 412W-4 Glacial Processes and Environments
EASC 491-1 Directed Readings*	
EASC 492-2 Directed Readings*	*students may only complete a maximum of <u>3 units</u> from a
EASC 493-3 Directed Readings*	combination of EASC 491, 492, or 493
GEOG 311-4 Hydrology	
GEOG 313-4 River Geomorphology	
GEOG 317-4 Soil Science	
GEOG 412-4 Glacial Processes and Environments	
*students may only complete a maximum of three units from a	
combination of EASC 491, 492, or 493	
General Earth Sciences Stream	General Earth Sciences Stream
Students who choose this stream will complete	Students who choose this stream will complete <u>a minimum of 51</u>
	units, including all of
EASC 306-3 Field Geology II	
	EASC 306-3 Field Geology II
and at least one of	EASC 308-3 Field Geology III
EASC 406-3 Field Geology III	EASC 499-9 Honours Thesis
EASC 416-3 Field Techniques in Hydrogeology	
EASC 499-9 honours Thesis	and one of
	EASC 310W-3 Paleontology
and at least 30 other upper division EASC units.*	EASC 315W-3 Geochemistry of Natural Waters
students may only complete a maximum of three units from a	and at least 33 other upper division EASC units
combination of EASC 491, 492, or 493	
and at least eight additional units in the Faculty of Science or	*students may only complete a maximum of <u>3 units</u> from a
physical geography. These courses may be used toward the minor	combination of EASC 491, 492, or 493.
requirements in another department.	
Elective Courses	
To achieve a final total of at least 132 units, students will	
complete at least 12 additional units from outside the Faculty of	
Science.	Dente Colore Denter
Faculty of Science Requirements	Faculty of Science Requirements
In addition to the above requirements, students must also satisfy	In addition to the above requirements, students must also satisfy
Faculty of Science honours program requirements as follows.	Faculty of Science honours program requirements as follows.
	here and an an an an and the second state of distances with the second state of the se
students are required to complete additional upper division units	students are required to complete additional upper division units
to total a minimum of 60 upper division units (excluding EDUC	to total a minimum of 60 upper division units (excluding EDUC
401 to 406)	401 to 406)
atudanta suba sugar ang liad at Cincar Paran Listanda, katura	atudante suba sugar annollad et Olman Funces I taluanite, hature
students who were enrolled at Simon Fraser University between	students who were enrolled at Simon Fraser University between
fall 1991 and summer 2006 are required to complete a minimum	fail 1991 and summer 2006 are required to complete a minimum
of 12 units in subjects outside the Faculty of Science (excluding	of 12 units in subjects outside the Faculty of Science (excluding EDUC 401 to 400) including six units minimum to be completed
EDUC 401 to 406) including six units minimum to be completed	EDUC 401 to 406) including six units minimum to be completed

in the Faculty of Arts and Social Sciences	in the Faculty of Arts and Social Sciences
Writing, Quantitative, and Breadth Requirements	Writing, Quantitative, and Breadth Requirements
Students admitted to Simon Fraser University beginning in the	Students admitted to Simon Fraser University beginning in the
fall 2006 term must meet writing, quantitative and breadth	fall 2006 term must meet writing, quantitative and breadth
requirements as part of any degree program they may undertake.	requirements as part of any degree program they may undertake.
See Writing, Quantitative, and Breadth Requirements for	See Writing, Quantitative, and Breadth Requirements for
university-wide information.	university-wide information.
Residency Requirements and Transfer Credit	Residency Requirements and Transfer Credit
The University's residency requirement stipulates that, in most	The University's residency requirement stipulates that, in most
cases, total transfer and course challenge credit may not exceed	cases, total transfer and course challenge credit may not exceed
60 units, and may not include more than 15 units as upper	60 units, and may not include more than 15 units as upper
division work.	division work.

SCUS 12-47b(vii)

Present Calendar Description	Proposed Calendar Description changes <u>Underlined</u>
Chemistry and Earth Sciences Joint Major Program	Chemistry and Earth Sciences Joint Major Program
This Bachelor of Science (BSc) program is offered jointly by the	This Bachelor of Science (BSc) program is offered jointly by the
Departments of Chemistry and Earth Sciences. Entry requires	Departments of Chemistry and Earth Sciences. Entry requires
permission of both.	permission of both departments.
Minimum Grade Requirement Students wishing to enroll in Chemistry, Physics, and Earth Sciences courses must obtain a C- grade or better in prerequisite courses.	Minimum Grade Requirement Students wishing to enroll in Chemistry and Earth Sciences courses must obtain a C- grade or better in prerequisite courses.
Program Requirements	Program Requirements
Students complete at least 122 units, as specified below.	Students complete <u>a minimum of</u> 122 units, as specified below.
Lower Division Requirements	Lower Division Requirements
Students will complete a minimum of 68 units including all of	Students will complete a minimum of 68 units including
CHEM 121-4 General Chemistry and Laboratory I	all of
CHEM 122-2 General Chemistry II	CHEM 121-4 General Chemistry and Laboratory I
CHEM 126-2 General Chemistry Laboratory II	CHEM 122-2 General Chemistry II
CHEM 215-4 Introduction to Analytical Chemistry	CHEM 126-2 General Chemistry Laboratory II
CHEM 230-3 Inorganic Chemistry	CHEM 215-4 Introduction to Analytical Chemistry
CHEM 236W-3 Inorganic Chemistry Laboratory	CHEM 230-3 Inorganic Chemistry Laboratory
CHEM 281-4 Organic Chemistry I	CHEM 236W-3 Inorganic Chemistry Laboratory
EASC 101-3 Physical Geology	CHEM 281-4 Organic Chemistry I
EASC 201-3 Stratigraphy and Sedimentation	<u>EASC 101-3 Dynamic Earth</u>
EASC 202-3 Introduction to Mineralogy	EASC 201-3 Stratigraphy and Sedimentation
EASC 204-3 Structural Geology I	EASC 202-3 Introduction to Mineralogy
EASC 205-3 Introduction to Petrology	EASC 204-3 Structural Geology I
EASC 206-2 Field Geology I	EASC 206-2 Field Geology I
EASC 207-3 Introduction to Applied Geophysics	EASC 206-2 Field Geology I
EASC 208-3 Introduction to Geochemistry	EASC 207-3 Introduction to Applied Geophysics
EASC 210-3 Historical Geology	EASC 208-3 Introduction to Geochemistry
GEOG 213-3 Introduction to Geomorphology	<u>EASC 209W-3 Environmental Geoscience</u>
MATH 151-3 Calculus I	EASC 210-3 Historical Geology
MATH 152-3 Calculus II	MATH 151-3 Calculus I <u>or MATH 150-4 Calculus I with Review</u>
STAT 270-3 Introduction to Probability and Statistics	MATH 152-3 Calculus II
and all of PHYS 120-3 Mechanics and Modern Physics PHYS 121-3 Optics, Electricity and Magnetism PHYS 131-2 Physics Laboratory I or all of PHYS 125-3 Mechanics and Special Relativity PHYS 126-3 Electricity, Magnetism and Light PHYS 131-2 Physics Laboratory I or both of PHYS 140-4 Studio Physics-Mechanics and Modern Physics PHYS 141-4 Studio Physics-Optics, Electricity and Magnetism	and one of STAT 201-3 Statistics for the Life Sciences STAT 270-3 Introduction to Probability and Statistics and all of PHYS 120-3 Mechanics and Modern Physics PHYS 121-3 Optics, Electricity and Magnetism PHYS 131-2 Physics Laboratory I or all of PHYS 125-3 Mechanics and Special Relativity PHYS 126-3 Electricity, Magnetism and Light PHYS 131-2 Physics Laboratory I or both of PHYS 140-4 Studio Physics-Mechanics and Modern Physics PHYS 141-4 Studio Physics-Optics, Electricity and Magnetism
Upper Division Requirements	Upper Division Requirements
Students will complete a minimum of 42 units including all of	Students will complete a minimum of 42 units including all of
CHEM 316-4 Introductory Instrumental Analysis	CHEM 316-4 Introductory Instrumental Analysis
CHEM 317-2 Analytical Environmental Chemistry	CHEM 317-2 Analytical Environmental Chemistry

CHEM 332-3 The Chemistry of Transition Metals	CHEM 332-3 The Chemistry of Transition Metals
CHEM 360-3 Thermodynamics and Chemical Kinetics	CHEM 360-3 Thermodynamics and Chemical Kinetics
CHEM 371-3 Chemistry of the Aqueous Environment	CHEM 371-3 Chemistry of the Aqueous Environment
CHEM 372-3 Chemistry of the Atmospheric Environment	CHEM 372-3 Chemistry of the Atmospheric Environment
and 3 units of 400-level CHEM not including CHEM 481-5 or CHEM 483-5	and 3 units of 400-level CHEM not including CHEM 481-5 or CHEM 483-5
EASC 303W-3 Environmental Geosciences EASC 306-3 Field Geology II	EASC 306-3 Field Geology II EASC 308-3 Field Geology III
Environmental Stream Students who choose this stream will complete all of EASC 304-3 Hydrogeology EASC 403-3 Quatemary Geology	Environmental Stream Students who choose this stream will complete all of EASC 304-3 Hydrogeology EASC 403-3 Quaternary Geology
Geology Stream Students who choose this stream will complete all of EASC 301-3 Igneous and Metamorphic Petrology EASC 302-3 Sedimentary Petrology	Geology Stream Students who choose this stream will complete all of <u>EASC 301-3 Igneous Petrology</u> EASC 302-3 Sedimentary Petrology
and 6 additional units of upper division EASC courses	and one of EASC 315W-3 Geochemistry of Natural Waters
and one of NUSC 341-3 Introduction to Radiochemistry	EASC 310W-3 Paleontology
NUSC 344-3 Nucleosynthesis and Distribution of the Elements	and 3 additional units of 400-level EASC courses
PHYS 346-3 Energy and the Environment	
Note: at least 3 units of upper division EASC courses must be 400-level	and one of NUSC 341-3 Introduction to Radiochemistry NUSC 344-3 Nucleosynthesis and Distribution of the Elements PHYS 346-3 Energy and the Environment
Upper Division Electives	Hanna Division Florition
Upper division units must total a minimum of 44 upper division units (excluding EDUC 401-406)	Upper Division Electives Upper division units must total a minimum of 44 upper division units (excluding EDUC 401-406)
Faculty of Science Requirements	Faculty of Science Requirements
To satisfy Faculty of Science requirements, students complete additional upper division credit to total 44 units. Job practicum courses, STAT 302 and 403 may not be used to fulfill this requirement.	To satisfy Faculty of Science requirements To satisfy Faculty of Science requirements, students complete additional upper division credit to total 44 units. Job practicum courses, STAT 302 and 403 may not be used to fulfill this requirement.
Writing, Quantitative, and Breadth Requirements Students admitted to Simon Fraser University beginning in the fall 2006 term must meet writing, quantitative and breadth requirements as part of any degree program they may undertake. See Writing, Quantitative, and Breadth Requirements for university-wide information.	Writing, Quantitative, and Breadth Requirements Students admitted to Simon Fraser University beginning in the fall 2006 term must meet writing, quantitative and breadth requirements as part of any degree program they may undertake. See Writing, Quantitative, and Breadth Requirements for university-wide information.
Residency Requirements and Transfer Credit The University's residency requirement stipulates that, in most cases, total transfer and course challenge credit may not exceed 60 units, and may not include more than 15 units as upper division work.	Residency Requirements and Transfer Credit The University's residency requirement stipulates that, in most cases, total transfer and course challenge credit may not exceed 60 units, and may not include more than 15 units as upper division work.
Elective Courses In addition to the courses listed above, students should consult an academic advisor to plan the remaining required elective courses.	Elective Courses In addition to the courses listed above, students should consult an academic advisor to plan the remaining required elective courses.

SCUS 12-47b(viii)

Present Calendar Description	Proposed Calendar Description changes Underlined
Chemistry and Earth Sciences Joint Honours Program This Bachelor of Science (BSc) program is offered jointly by the Departments of Chemistry and Earth Sciences. Entry requires permission of both.	Chemistry and Earth Sciences Joint Honours Program This Bachelor of Science (BSc) program is offered jointly by the Departments of Chemistry and Earth Sciences. Entry requires permission of both <u>departments</u> .
Minimum Grade Requirement Students wishing to enroll in Chemistry, Physics, and Earth Sciences courses must obtain a C- grade or better in prerequisite courses.	Minimum Grade Requirement Students wishing to enroll in <u>Chemistry and Earth Sciences</u> courses must obtain a C- grade or better in prerequisite courses.
Program Requirements Students complete at least 132 units, as specified below including a minimum 3.00 cumulative grade point average to be awarded an honours degree.	Program Requirements Students complete <u>a minimum of 132</u> units, as specified below including a minimum 3.00 cumulative grade point average to be awarded an honours degree.
Lower Division Requirements	Lower Division Requirements
Students will complete a minimum of 68 units including all of	Students will complete a minimum of 68 units including
CHEM 121-4 General Chemistry and Laboratory 1 CHEM 122-2 General Chemistry II CHEM 126-2 General Chemistry Laboratory II CHEM 215-4 Introduction to Analytical Chemistry CHEM 230-3 Inorganic Chemistry CHEM 236W-3 Inorganic Chemistry Laboratory CHEM 281-4 Organic Chemistry I EASC 101-3 Physical Geology EASC 201-3 Stratigraphy and Sedimentation EASC 202-3 Introduction to Mineralogy EASC 202-3 Introduction to Mineralogy EASC 205-3 Introduction to Petrology EASC 206-2 Field Geology I EASC 207-3 Introduction to Applied Geophysics EASC 208-3 Introduction to Geochemistry EASC 208-3 Introduction to Geochemistry EASC 210-3 Historical Geology GEOG 213-3 Introduction to Geomorphology MATH 151-3 Calculus I MATH 152-3 Calculus II	all of CHEM 121-4 General Chemistry and Laboratory I CHEM 122-2 General Chemistry II CHEM 126-2 General Chemistry Laboratory II CHEM 215-4 Introduction to Analytical Chemistry CHEM 230-3 Inorganic Chemistry CHEM 236W-3 Inorganic Chemistry Laboratory CHEM 281-4 Organic Chemistry I <u>EASC 101-3 Dynamic Earth</u> EASC 201-3 Stratigraphy and Sedimentation EASC 202-3 Introduction to Mineralogy EASC 202-3 Introduction to Mineralogy EASC 205-3 Introduction to Petrology EASC 206-2 Field Geology I EASC 207-3 Introduction to Applied Geophysics EASC 208-3 Introduction to Geochemistry <u>EASC 209W-3 Environmental Geoscience</u> EASC 210-3 Historical Geology MATH 151-3 Calculus I <u>or MATH 150-4 Calculus I with Review</u> MATH 152-3 Calculus II
STAT 270-3 Introduction to Probability and Statistics and all of PHYS 120-3 Mechanics and Modern Physics PHYS 121-3 Optics, Electricity and Magnetism PHYS 131-2 Physics Laboratory I or all of PHYS 125-3 Mechanics and Special Relativity PHYS 126-3 Electricity, Magnetism and Light PHYS 131-2 Physics Laboratory I or both of PHYS 140-4 Studio Physics-Mechanics and Modern Physics	and one of <u>STAT 201-3 Statistics for the Life Sciences</u> <u>STAT 270-3 Introduction to Probability and Statistics</u> and all of PHYS 120-3 Mechanics and Modern Physics PHYS 121-3 Optics, Electricity and Magnetism PHYS 131-2 Physics Laboratory 1 or all of PHYS 125-3 Mechanics and Special Relativity PHYS 126-3 Electricity, Magnetism and Light
PHYS 141-4 Studio Physics-Optics, Electricity and Magnetism	PHYS 131-2 Physics Laboratory I or both of PHYS 140-4 Studio Physics-Mechanics and Modern Physics PHYS 141-4 Studio Physics-Optics, Electricity and Magnetism

Upper Division Requirements Upper division units must total a minimum of 50 units in CHEM	Upper Division Requirements Upper division units must total a minimum of 50 units in CHEM and EASC, including at least 26 units in upper division CHEM, and
and EASC, including at least 26 units in upper division CHEM, and all of	and EASC, including at least 20 units in upper division Cricky, a all of
CHEM 316-4 Introductory Instrumental Analysis	CHEM 316-4 Introductory Instrumental Analysis
CHEM 317-2 Analytical Environmental Chemistry	CHEM 317-2 Analytical Environmental Chemistry
CHEM 332-3 The Chemistry of Transition Metals	CHEM 332-3 The Chemistry of Transition Metals
CHEM 360-3 Thermodynamics and Chemical Kinetics	CHEM 360-3 Thermodynamics and Chemical Kinetics
CHEM 371-3 Chemistry of the Aqueous Environment	CHEM 371-3 Chemistry of the Aqueous Environment
CHEM 372-3 Chemistry of the Atmospheric Environment	CHEM 372-3 Chemistry of the Atmospheric Environment
and 6 units of 400-level CHEM (which can include CHEM 481-5)	and 6 units of 400-level CHEM (which can include CHEM 481-5
EASC 303W-3 Environmental Geosciences	EASC 306-3 Field Geology II
EASC 306-3 Field Geology II	EASC 308-3 Field Geology III
Environmental Stream	Environmental Stream
Students who choose this stream will complete all of	Students who choose this stream will complete all of
EASC 304-3 Hydrogeology	EASC 304-3 Hydrogeology
EASC 403-3 Quaternary Geology	EASC 403-3 Quaternary Geology
Geology Stream	Geology Stream
Students who choose this stream will complete all of	Students who choose this stream will complete all of
EASC 301-3 Igneous and Metamorphic Petrology	EASC 301-3 Igneous Petrology
EASC 302-3 Sedimentary Petrology	EASC 302-3 Sedimentary Petrology
and 3 additional units of upper division EASC courses	and one of
and one of	EASC 315W-3 Geochemistry of Natural Waters EASC 310W-3 Paleontology
EASC 499-9 Honours Thesis	EASC STOW-S Falcontology
CHEM 481-5 Undergraduate Research	and one of
CHEM 401-5 Undergraduate Research	EASC 499-9 Honours Thesis
and one of	CHEM 481-5 Undergraduate Research
NUSC 341-3 Introduction to Radiochemistry	CITEM 481-5 Ondergraduate Research
NUSC 344-3 Nucleosynthesis and Distribution of the Elements	and one of
PHYS 346-3 Energy and the Environment	NUSC 341-3 Introduction to Radiochemistry
11115 540-5 Energy and the Enternominent	NUSC 344-3 Nucleosynthesis and Distribution of the Elements
	PHYS 346-3 Energy and the Environment
Upper Division Electives	Upper Division Electives
Upper division units must total a minimum of 60 units overall (not	
including EDUC 401-406)	including EDUC 401-406)
Faculty of Science Requirements	Faculty of Science Requirements
To satisfy Faculty of Science requirements, students complete	To satisfy Faculty of Science requirements, students complete
additional upper division credit to total 44 units. Job practicum	additional upper division credit to total 44 units. Job practicum
courses, STAT 302 and 403 may not be used to fulfill this requirement.	courses, STAT 302 and 403 may not be used to fulfill this requirement.
Writing, Quantitative, and Breadth Requirements	Writing, Quantitative, and Breadth Requirements
Students admitted to Simon Fraser University beginning in the fall	Students admitted to Simon Fraser University beginning in the f
2006 term must meet writing, quantitative and breadth	2006 term must meet writing, quantitative and breadth requirem
TADA faill illingt illingt withing and the market	as part of any degree program they may undertake. See Writing,
requirements as part of any degree program they may undertake.	as part of any degree program mey may undertake. See writing,
requirements as part of any degree program they may undertake. See Writing, Quantitative, and Breadth Requirements for	Quantitative, and Breadth Requirements for university-wide
requirements as part of any degree program they may undertake.	
requirements as part of any degree program they may undertake. See Writing, Quantitative, and Breadth Requirements for university-wide information. Residency Requirements and Transfer Credit	Quantitative, and Breadth Requirements for university-wide information. Residency Requirements and Transfer Credit
requirements as part of any degree program they may undertake. See Writing, Quantitative, and Breadth Requirements for university-wide information. Residency Requirements and Transfer Credit The University's residency requirement stipulates that, in most	Quantitative, and Breadth Requirements for university-wide information. Residency Requirements and Transfer Credit The University's residency requirement stipulates that, in most
requirements as part of any degree program they may undertake. See Writing, Quantitative, and Breadth Requirements for university-wide information. Residency Requirements and Transfer Credit	Quantitative, and Breadth Requirements for university-wide information. Residency Requirements and Transfer Credit

work.	work.
Elective Courses	Elective Courses
In addition to the courses listed above, students should consult an	In addition to the courses listed above, students should consult an
academic advisor to plan the remaining required elective courses.	academic advisor to plan the remaining required elective courses.

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SCUS 12-47b(ix)

Present Calendar Description	Proposed Calendar Description changes <u>Underlined</u>
Earth Sciences Certificate Program	Earth Sciences Certificate Program
This program provides both part-time and full-time students with the opportunity to understand the fundamentals of earth sciences without necessarily specializing in earth sciences.	This program provides both part-time and full-time students with the opportunity to understand the fundamentals of Earth Sciences without necessarily specializing in Earth Sciences.
	Minimum Grade Requirement Students wishing to enroll in Earth Sciences courses must obtain a C- grade or better in prerequisite courses.
Program Requirements	Program Requirements
This certificate requires completion of at least 23 units of required course work and electives as follows, including one of	This certificate requires completion of at least <u>24</u> units of required course work and electives as follows
EASC 101-3 Physical Geology GEOG 111-3 Earth Systems	EASC 101-3 Dynamic Earth
and one of EASC 106-3 Earth Through Time EASC 210-3 Historical Geology and EASC 206-2 Field Geology I and at least 15 units selected from EASC 103-3 The Rise and Fall of the Dinosaurs EASC 104-3 Geohazards — Earth in Turmoil EASC 107-3 Economic Geological Resources GEOG 213-3 Introduction to Geomorphology REM 100-3 Global Change and any other 200, 300 or 400 division EASC course. This certificate allows students to pursue their 15 elective units in specific course concentrations. Some suggested electives grouping are as follows. Environmental Focus EASC 104-3 Geohazards — Earth in Turmoil EASC 107-3 Economic Geological Resources EASC 208-3 Introduction to Geochemistry EASC 303W-3 Environmental Geoscience EASC 304-3 Hydrogeology REM 100-3 Global Change General Earth Sciences Breadth Courses EASC 107-3 Economic Geological Resources REX 107-3 Economic Geological Resources EASC 107-3 Global Change General Earth Sciences Breadth Courses EASC 107-3 Global Change Geology Focus EASC 201-3 Stratigraphy and Scdimentation EASC 201-3 Stratigraphy and Scdimentation EASC 202-3 Introduction to Mineralogy EASC 204-3 Introduction to Geochemistry EASC 204-3 Introduction to Geochemistry	and one of EASC 106-3 Earth Through Time EASC 210-3 Historical Geology and at least 18 units selected from EASC 103-3 The Rise and Fall of the Dinosaurs EASC 104-3 Geohazards — Earth in Turmoil EASC 107-3 Economic Geological Resources EASC 108-3 Exploring the Solar System EASC 206-2 Field Geology 1* EASC 209W Environmental Geoscience REM 100-3 Global Change and any other 200, 300 or 400 division EASC course. *Students considering taking EASC 206 Field Geology 1 must take EASC 210 Historical Geology.
Hazards Focus EASC 104-3 Gcohazards — Earth in Turmoil EASC 303W-3 Environmental Geoscience	

EASC 207-3 Introduction to Geophysics	
GEOG 213-3 Introduction to Geomorphology	
Paleontology Focus	
EASC 103-3 The Rise and Fall of the Dinosaurs	
EASC 201-3 Stratigraphy and Sedimentation	
EASC 210-3 Historical Geology	
EASC 310W-3 Paleontology	
EASC STOW -S FRICOILCIUBY	

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SCUS 12-47c(i)

SFU	SENATE COMMITTEE ON Undergraduate studies		COURSE	CHANGE/DELETION	
EXISTING COURSE, CHANGES	RECOMMENDED				
Please check appropriate revision(s):				
Course number Credit	Title Description	Prerequisite	Course deletion	Learning Outcomes	
Indicate number of hours for: Lec	ture Seminar		Tutorial	Lab	
FROM BISC 41 Course Subject/Number	8	TO Course Subj	BISC 318 ect.'Number		
Credits		Credits			
TITLE	chedule, no more than 100 characters in				
(2) SHORT title for enrollment ar FROM:	nd transcript, no more than 30 character	s including spa TO:	ices and punctuation.		
DESCRIPTION FROM:		DESCRIPTI TO:	ON		
If so, this should be noted in the	204 or HSCI 212 and completion	BISC 10 TO: Lunits have ta	that students should not 01 and 102, and 204 (5. Recommended: BIS		

RATIONALE This is a large course taught at the third year level and that re- numbering will bring it in line with the other organismal lab courses that have second-year course prerequisites (202 or 204) but no third-year course prerequisites.



SCUS 12-47d(i)

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

MEMO

ADDRESS 8888 UNIVERSITY DRIVE BURNABY BC V5A 186 CANADA

ROM S	SUSAN RHODES	Assistant Direct Institutional L		rsity Curric	lum and	
E W	designation a	pproval for	KIN 451	(Co-op)		

TIME 2:12 PM

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The University Curriculum Office has approved a W designation for:

KIN 451-3 Practicum III - effective 1134

Please forward this memo to the Faculty of Science Undergraduate Curriculum Committee and then SCUS for additional approval.

Proposal for W designation for Kin 451

Richard Ward & Anne-Kristina Arnold

May 2012

The objective of this proposal for a **KIN 451W Course** is to allow students to fulfill their upper division W credit through the writing components from their Co-op practicum. Students complete substantial writing components within each Co-op practicum including reflective, career, technical, professional, and academic writing. This proposal intends that the W designation be an option for students in their third work semester (KIN 451) for the writing completed related to the discipline and profession. This would be assessed by a qualified W instructor and meet all current W guidelines and learning outcomes. Prior to KIN 451, BPK Co-op students will have already completed:

- two Co-op preparatory courses; Bridging Online courses
- two written Co-op Practicum Projects

The addition of a W designation for KIN 451 requires that students' written work meet explicit criteria; receive appropriate feedback and response that is directed at improving the quality of writing for the forms and purposes of the discipline and the profession; and that student integrate the feedback in to the revision of their written work. The writing will be graded and iterative; the graded components will comprise more than 50% of the course grade and students are required to implement feedback on their writing and resubmit for further grading. KIN 451W will be a graded course which will be different from the other practicum courses which are presently graded as PASS/FAIL.

The graded components for KIN 451W with mark breakdown are as follows:

Reflective writing piece	
1 st Submission	10%
Resubmission	5%
Project	
1 st Submission	40%
Resubmission	20%
Symposium Presentation	25%

REFLECTIVE WRITING PIECE

For the KIN 451W Reflective Writing Piece, students will set learning objectives (learning explorations) for their Co-op practicum, inclusive of both discipline and professional objectives, at the beginning of their Co-op practicum. During the third week of the Co-op practicum, students will use writing to reflect on the plausibility and attainability of their learning explorations based on the actual experiences; discussions with their Workplace Supervisor; and dialogue with Co-op Staff or Coordinator. By referring to the examples of writing within the profession and standards accepted for this course, students will incorporate their reflection into a written proposal that outlines how the student will realize their learning objectives in the KIN 451W Project. Student will receive feedback on their proposal and re-submit the KIN 451W Reflective Writing Piece. Discussions with respect to learning objectives and the proposal will continue in person between the student, Co-op Coordinator and the employer/supervisor at the work place site visit.

PROJECT

For the KIN 451W Project, students will use writing to demonstrate their discipline specific learning by using forms and purposes that are typical of the professions. Examples of writing within the profession and standards accepted for this course include:

- Case study Article (e.g. read and critique article, write an abstract in your own words)
- Documentation and problem solving (e.g.: medical notes on the patient's injury history, safe return to work plan, patient care activities, exercise progressions, charting notes, job demand analysis, patient work place evaluation)
- Research Projects
- Lab Reports
- Advocacy Papers
- Short essays of physical exams
- Client Summary Papers
- Writing to a physician and/or lawyer or ICBC/ Work Safe Agent regarding patient's progress with treatment and recommended return to work plan
- Scientific abstract or Journal submission
- Scientific poster submissions

Each accepted standard will have detailed requirements, purposes and guidelines that facilitate the understanding of typical structures, models of reasoning, styles of address, and the use of language as well as examples to support the instruction.

Student will submit a final draft of the KIN451W Project for feedback from an employer (the professional lens, no academic weight) and marker (for academic lens) and the resubmit the KIN 451W Project for final grading.

Symposium Presentation

A symposium for all Kin 451W students will be held during the examination period at the end of the semester. Students are required to give a 15-minute Visual & Oral Presentation about their KIN 451W Project and provide the audience with handouts. For grading, students will submit the visual presentation, and outline of their oral speaking/ preparation notes, and the audience handouts.

The Symposium will be graded by the designated BPK faculty member, Co-op Co-ordinator and Workplace Supervisor (if available) on components of appropriate visuals, oral presentation, balance, and written notes and handouts.

Grading Procedure

The BPK Undergraduate Program Committee (UPC) remains committed to the integrity of grading in courses. Since this grading will occur outside of the usual classroom grading situation the UPC has implemented a double grading supervisory format. The marking of the written components of the course will be under double supervision. The reflective piece and the project will be marked by a trained W marker paid by the \$75 per student allocation for Writing T.A.s. This will be supervised by

BPK Co-op Coordinator Darleen Bemister who has undergone the Faculty of Science Writing training workshops and a BPK Faculty member. In addition a BPK faculty member will also supervise the process for the project. The symposium presentation will be marked by the BPK faculty member and the employer (if appropriate). BPK faculty member Richard Ward (KIN 304W) and Anne-Kristina Arnold (KIN 180W) have committed to fulfill this role.

Currently the BPK Co-op Requirements are:

- Completion of 45 credit hours prior to the start of the first work term.
- Registered as a full-time student (minimum of 9 credit hours)
- KIN 142, plus two other Kinesiology courses
- Good written, verbal, and interpersonal communication skills
- GPA: good academic standing (recommended 2.50)
- Undergraduate work and study semesters normally alternate.
- Successful completion of at least four work terms is required for a Co-operative Education degree designation; however, undergraduate students are eligible for a Co-op certificate upon successful completion of three work terms.
- Students register for work terms as KIN 351, 352, 451, 452 & 453.

KIN 351-3 Practicum I

The first term of work experience in the Kinesiology Co-operative Education Program. Units from this course do not count towards the units required for an SFU degree. Prerequisite: students must complete Bridging Online (visit www.sfu.ca/coop/bol for further details) at least two terms before their anticipated co-op placement. Students must then apply to the Kinesiology Co-op Program by the first week of the term preceding the work term. Normally, students will have completed a minimum of 45 units by the end of the term of application, KIN 142, plus at least two other kinesiology courses and have a minimum GPA of 2.50. Work terms are graded as pass/fail (P/F).

KIN 352-3 Practicum II

The second term of work experience in the Kinesiology Co-operative Education Program. Units from this course do not count towards the units required for an SFU degree. Prerequisite: KIN 351. Work terms are graded as pass/fail (P/F).

KIN 451-3 Practicum III

The third term of work experience for students in the Kinesiology Co-operative Education Program. Units from this course do not count towards the units required for an SFU degree. Prerequisite: KIN 352. Work terms are graded as pass/fail (P/F).

KIN 452-3 Practicum IV

The fourth term of work experience for students in the Kinesiology Co-operative Education Program. Units from this course do not count towards the units required for an SFU degree. Prerequisite: KIN 451. Work terms are graded as pass/fail (P/F).

It is proposed that the third in the sequence of Coop Practicum courses KIN 451 be designated with a Writing Intensive option. After completion of this third semester the student is eligible for a Co-op Certificate. Should the student complete a fourth or fifth co-op work term, the student is eligible for a Co-op Degree Designation. KIN 451W will be graded based upon completion of required components comprised of at least 50% of the grade being achieved from written components that are submitted, marked, edited, returned and then resubmitted for further marks.

KIN 451W-3 Practicum III

The third term of work experience for students in the Kinesiology Co-operative Education Program. Units from this course do not count towards the units required for an SFU degree. **This course may be used as upper division W credit, and will be graded as such.** Prerequisite: KIN 352.



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Department of Mathematics

LADISLAV STACHO Chair, Undergraduate Studies Committee

MAILING ADDRESS Simon Fraser University 8888 University Drive Burnaby BC V5A 1S6 Canada

CONTACT INFO Voice: 778.782.4816 Fax: 778.782.4947 Email: lstacho@math.sfu.ca

ATTENTION Dr. George Agnes Faculty of Science Undergraduate Curriculum Committee

FROM Ladislav Stacho, Chair, Undergraduate Studies Committee

RE Calendar Changes

DATE 2 October 2012

Please find enclosed the following documents relating to undergraduate curriculum changes approved by Mathematics to be considered at the next Faculty of Science Undergraduate Curriculum Committee meeting.

Program Changes

I Mathematics Major and Honours Programs Update Elective Courses section

Il Operations Research Major and Honours Programs

- Delete IAT 103W Design Communication and Collaboration from Lower Division Core Requirements
- Minor Revision to Upper Division Requirements

III Course Changes Deletion Math 402-4 Industrial Mathematics Project Prerequisite Change Math 348-3 Probabilistic Models in Operations Research

Contact: Ms. Dale Yamaura, Manager, Academic and Administrative Services Voice: 2-3799; Email: math_manager@sfu.ca

Mathematics Curriculum Changes

I Update Elective Courses section in our Mathematics Major and Honours Programs

Justification: We do not want students taking the excluded courses to satisfy the requirement.

From (current description):

In addition to the courses listed above, students should consult an academic advisor to plan the remaining required elective courses.

Students obtain at least six units in courses offered by the Faculty of Science outside the Department of Mathematics, and the Department of Statistics and Actuarial Science. Students will also obtain at least six units in Faculty of Arts and Social Sciences courses. (The two required CMPT courses and the Faculty of Arts and Social Sciences six-unit requirement fulfill the Faculty of Science requirement that students complete 12 units from outside the Faculty of Science.)

To (new description):

In addition to the courses listed above, students should consult an academic advisor to plan the remaining required elective courses.

Students obtain at least six units in courses offered by the Faculty of Science outside the Department of Mathematics, and the Department of Statistics and Actuarial Science. <u>Courses</u> <u>PHYS 100, BISC 100 and CHEM 110/111 cannot be used to satisfy this requirement.</u> Students will also obtain at least six units in Faculty of Arts and Social Sciences courses. (The two required CMPT courses and the Faculty of Arts and Social Sciences six-unit requirement fulfill the Faculty of Science requirement that students complete 12 units from outside the Faculty of Science.)

II Operations Research Major and Honours Programs

A Delete IAT103W Design Communication and Collaboration from the OR Major and Honors Lower Division Core Requirements

Justification: IAT 103W was initially included in the OR program, years before development of MATH 208W Introduction to Operations Research. Both courses are currently required for the major and honours programs. MATH 208W fulfills the required lower division writing component and supersedes IAT 103W. Students do not find the course IAT 103W useful for the OR programs.

From (current description - Major and Honours Programs are the same):

Lower Division Core Requirements

Students complete a minimum total of 36 units, including either one of

- CMPT 126-3 Introduction to Computer Science and Programming
- CMPT 128-3 Introduction to Computing Science and Programming for Engineers
 or both of
 - CMPT 120-3 Introduction to Computing Science and Programming I
 - CMPT 125-3 Introduction to Computing Science and Programming II

and all of

- CMPT 225-3 Data Structures and Programming
- IAT 103W-3 Design Communication and Collaboration
- MACM 101-3 Discrete Mathematics I
- MACM 201-3 Discrete Mathematics II
- MATH 208W-3 Introduction to Operations Research
- MATH 251-3 Calculus III
- STAT 270-3 Introduction to Probability and Statistics
- STAT 285-3 Intermediate Probability and Statistics

and one of

- MATH 150-4 Calculus I with Review
- MATH 151-3 Calculus I
- MATH 154-3 Calculus I for the Biological Sciences*

 MATH 157-3 Calculus I for the Social Sciences * and one of

- and one of
 - MATH 152-3 Calculus II
 - MATH 155-3 Calculus II for the Biological Sciences*

MATH 158-3 Calculus II for the Social Sciences *

and one of

- MATH 240-3 Algebra I: Linear Algebra
- MATH 232-3 Applied Linear Algebra*

*with a B grade or better

To (new description - Major and Honours Programs are the same):

Lower Division Core Requirements

Students complete a minimum total of 33 units, including either one of

- CMPT 126-3 Introduction to Computer Science and Programming
- CMPT 128-3 Introduction to Computing Science and Programming for Engineers
 or both of
 - CMPT 120-3 Introduction to Computing Science and Programming I

CMPT 125-3 Introduction to Computing Science and Programming II

and all of

- CMPT 225-3 Data Structures and Programming
- MACM 101-3 Discrete Mathematics I
- MACM 201-3 Discrete Mathematics II
- MATH 208W-3 Introduction to Operations Research
- MATH 251-3 Calculus III
- STAT 270-3 Introduction to Probability and Statistics
- STAT 285-3 Intermediate Probability and Statistics

and one of

- MATH 150-4 Calculus I with Review
- MATH 151-3 Calculus I
- MATH 154-3 Calculus I for the Biological Sciences*
- MATH 157-3 Calculus I for the Social Sciences *

and one of

- MATH 152-3 Calculus II
- MATH 155-3 Calculus II for the Biological Sciences*
- MATH 158-3 Calculus II for the Social Sciences *
- and one of
 - MATH 240-3 Algebra I: Linear Algebra
 - MATH 232-3 Applied Linear Algebra*

*with a B grade or better

B Revision to Upper Division requirements for Operations Research Major and Honours programs

Justification:

Change 1: Students have scheduling problems to take all courses required from the first 8 courses in the original requirement for the OR major program, and from the first 9 courses in the original requirement for the honours program. We slightly weakened the requirement, which should accommodate most students.

Change 2: Statistics is no longer offering STAT 400, as per SCUS Document #12-21. As suitable replacements, they offer either STAT 340 or STAT 475, thus implementing them in the revisions below.

Change 3: Clarification on selection of 400 level courses from Table III.

From (current description for Major Program):

Upper Division Requirements

Students will complete a minimum of 34 units, including all of

• MATH 308-3 Linear Optimization

- MATH 309-3 Continuous Optimization
- MATH 348-3 Probabilistic Models in Operations Research
- MATH 402W-4 Operations Research Clinic
- MATH 408-3 Discrete Optimization
- MATH 448-3 Network Flows
- STAT 350-3 Linear Models in Applied Statistics
- STAT 380-3 Introduction to Stochastic Processes

and at least two additional courses from Table I below

- ACMA 445-3 Loss Models: Estimation and Selection*
- BUEC 433-5 Forecasting in Business and Economics†
- STAT 390-3 Selected Topics in Probability and Statistics
- STAT 400-3 Data Analysis
- STAT 402-3 Generalized Linear and Nonlinear Modeling
- STAT 410-3 Statistical Analysis of Sample Surveys
- STAT 430-3 Statistical Design and Analysis of Experiments
- STAT 460-3 Bayesian Statistics
- STAT 490-3 Selected Topics in Probability and Statistics

*students must meet the entry requirements for the actuarial science program to enroll in this course

†see BUEC courses for prerequisites

and at least one from Table II below

- CMPT 305 Computer Simulation and Modeling (3)
- CMPT 307 Data Structures and Algorithms (3)
- MACM 316 Numerical Analysis I (3)
- MATH 343 Applied Discrete Mathematics (3)
- MATH 345 Introduction to Graph Theory (3)
- MATH 445 Graph Theory (3)

To (new description for Major Program):

Upper Division Requirements

Students will complete a minimum of 34 units, including all of

- MATH 308-3 Linear Optimization
- MATH 348-3 Probabilistic Models in Operations Research
- MATH 402W-4 Operations Research Clinic

and four of

- MATH 309-3 Continuous Optimization
- MATH 408-3 Discrete Optimization
- MATH 448-3 Network Flows
- STAT 350-3 Linear Models in Applied Statistics
- STAT 380-3 Introduction to Stochastic Processes

and at least two additional courses from Table I below

- ACMA 445-3 Loss Models: Estimation and Selection*
- BUEC 433-5 Forecasting in Business and Economics†
- STAT 340-3 Statistical Computing and Exploratory Data Analysis
- STAT 390-3 Selected Topics in Probability and Statistics
- STAT 402-3 Generalized Linear and Nonlinear Modeling
- STAT 410-3 Statistical Analysis of Sample Surveys
- STAT 430-3 Statistical Design and Analysis of Experiments
- STAT 460-3 Bayesian Statistics
- STAT 475-3 Applied Discrete Data Analysis
- STAT 490-3 Selected Topics in Probability and Statistics

*students must meet the entry requirements for the actuarial science program to enroll in this course

†see BUEC courses for prerequisites

and at least one from Table II below

- CMPT 305 Computer Simulation and Modeling (3)
- CMPT 307 Data Structures and Algorithms (3)
- MACM 316 Numerical Analysis I (3)
- MATH 343 Applied Discrete Mathematics (3)
- MATH 345 Introduction to Graph Theory (3)
- MATH 445 Graph Theory (3)

From (current description for Honours Program):

Students complete a total of 48 units, including all of

- MATH 308-3 Linear Optimization
- MATH 309-3 Continuous Optimization
- MATH 320-3 Introduction to Analysis II
- MATH 348-3 Probabilistic Models in Operations Research
- MATH 402W-4 Operations Research Clinic
- MATH 408-3 Discrete Optimization
- MATH 448-3 Network Flows
- STAT 350-3 Linear Models in Applied Statistics
- STAT 380-3 Introduction to Stochastic Processes

and at least two additional courses from Table I below

- ACMA 445-3 Loss Models: Estimation and Selection*
- BUEC 433-5 Forecasting in Business and Economics†
- STAT 390-3 Selected Topics in Probability and Statistics
- STAT 400-3 Data Analysis
- STAT 402-3 Generalized Linear and Nonlinear Modelling
- STAT 410-3 Statistical Analysis of Sample Surveys
- STAT 430-3 Statistical Design and Analysis of Experiments
- STAT 460-3 Bayesian Statistics
- STAT 490-3 Selected Topics in Probability and Statistics

*students must meet the entry requirements for the actuarial science program to enrol in this course

†see BUEC courses for prerequisites

and at least one from Table II below

- CMPT 305-3 Computer Simulation and Modelling
- CMPT 307-3 Data Structures and Algorithms
- MACM 316-3 Numerical Analysis I
- MATH 343-3 Applied Discrete Mathematics
- MATH 345-3 Introduction to Graph Theory
- MATH 445-3 Graph Theory

To complete the required 48 upper division units, students complete additional Table III courses (see list below), of which at least four courses must be at the 400 division. One upper division MATH course that is not shown in Table III may be substituted.

- CMPT 305-3 Computer Simulation and Modelling
- CMPT 307-3 Data Structures and Algorithms
- CMPT 361-3 Introduction to Computer Graphics

- CMPT 405-3 Design and Analysis of Computing Algorithms
- CMPT 461-3 Advanced Computer Graphics
- MACM 316-3 Numerical Analysis I
- MACM 401-3 Introduction to Computational Algebra
- MACM 409-3 Numerical Linear Algebra
- MACM 416-3 Numerical Analysis II
- MACM 442-3 Cryptography
- MATH 310-3 Introduction to Ordinary Differential Equations
- MATH 314-3 Boundary Value Problems
- MATH 322-3 Complex Variables
- MATH 338-3 Advanced Linear Algebra
- MATH 342-3 Elementary Number Theory
- MATH 343-3 Applied Discrete Mathematics
- MATH 345-3 Introduction to Graph Theory
- MATH 348-3 Probability Models in Operations Research
- MATH 418-3 Partial Differential Equations
- MATH 438-3 Linear Algebra
- MATH 443-3 Combinatorial Theory
- MATH 445-3 Graph Theory
- MATH 447-4 Coding Theory
- MATH 461-3 Continuous Mathematical Models
- MATH 462-3 Fluid Dynamics
- MATH 467-3 Dynamical Systems
- MATH 470-3 Variational Calculus
- PHYS 395-3 Computational Physics

To (new description for Honours Program):

Students will complete a minimum of 48 units, including all of

- MATH 308-3 Linear Optimization
- MATH 348-3 Probabilistic Models in Operations Research
- MATH 402W-4 Operations Research Clinic

and five of

- MATH 309-3 Continuous Optimization
- MATH 320-3 Introduction to Analysis II
- MATH 408-3 Discrete Optimization
- MATH 448-3 Network Flows
- STAT 350-3 Linear Models in Applied Statistics
- STAT 380-3 Introduction to Stochastic Processes

and at least two additional courses from Table I below

- ACMA 445-3 Loss Models: Estimation and Selection*
- BUEC 433-5 Forecasting in Business and Economics†
- STAT 340-3 Statistical Computing and Exploratory Data Analysis
- STAT 390-3 Selected Topics in Probability and Statistics
- STAT 402-3 Generalized Linear and Nonlinear Modelling
- STAT 410-3 Statistical Analysis of Sample Surveys
- STAT 430-3 Statistical Design and Analysis of Experiments
- STAT 460-3 Bayesian Statistics
- STAT 475-3 Applied Discrete Data Analysis
- STAT 490-3 Selected Topics in Probability and Statistics

*students must meet the entry requirements for the actuarial science program to enrol in this course

†see BUEC courses for prerequisites

and at least one from Table II below

- CMPT 305-3 Computer Simulation and Modelling
- CMPT 307-3 Data Structures and Algorithms
- MACM 316-3 Numerical Analysis I
- MATH 343-3 Applied Discrete Mathematics
- MATH 345-3 Introduction to Graph Theory
- MATH 445-3 Graph Theory

To complete the required 48 upper division units, students complete additional Table III courses (see list below). <u>At least four courses from Table III must be at the 400 division</u>. One upper division MATH course that is not shown in Table III may be substituted.

- CMPT 305-3 Computer Simulation and Modelling
- CMPT 307-3 Data Structures and Algorithms
- CMPT 361-3 Introduction to Computer Graphics
- CMPT 405-3 Design and Analysis of Computing Algorithms
- CMPT 461-3 Advanced Computer Graphics
- MACM 316-3 Numerical Analysis I
- MACM 401-3 Introduction to Computational Algebra
- MACM 409-3 Numerical Linear Algebra
- MACM 416-3 Numerical Analysis II
- MACM 442-3 Cryptography
- MATH 310-3 Introduction to Ordinary Differential Equations
- MATH 314-3 Boundary Value Problems
- MATH 322-3 Complex Variables
- MATH 338-3 Advanced Linear Algebra
- MATH 342-3 Elementary Number Theory
- MATH 343-3 Applied Discrete Mathematics
- MATH 345-3 Introduction to Graph Theory
- MATH 348-3 Probability Models in Operations Research
- MATH 418-3 Partial Differential Equations
- MATH 438-3 Linear Algebra
- MATH 443-3 Combinatorial Theory
- MATH 445-3 Graph Theory
- MATH 447-4 Coding Theory
- MATH 461-3 Continuous Mathematical Models
- MATH 462-3 Fluid Dynamics
- MATH 467-3 Dynamical Systems
- MATH 470-3 Variational Calculus
- PHYS 395-3 Computational Physics

SCUS 12-47e(iii)

SE CHANGE/DELETION

SFU	SENATE COMMITTEE UNDERGRADUATE ST				SEPTEMBER 2012
	, CHANGES RECON	VIMENDED			
Please check appropria	te revision(s)				
Course numbe	r 🗌 Credit 🔲	Title Des	cription 📕 Prer	equisite	Deletion
Indicate number of hou	rs for: Lecture	Seminar	Tutorial	Lab	
FROM:			TO:		
Course Number MAT	H 348		Course Number		
Credit Hour 3.0			Credit Hour		

TITLE: Probabilistic Models in Operations Research

(1) Long title for calendar and schedule, no more than 100 characters including spaces and punctuation.

(2) Short title for enrollment and transcript, no more than 30 characters including spaces and punctuation.

DESCRIPTION

PREREQUISITE

STAT 270, MATH 308.

STAT 270. Pre- or Co-requisite: MATH 308.

RATIONALE

This is primarily a scheduling problem. MATH 308 was prerequisite to ensure students did not take MATH 348 too early. There is some discussion of optimization in MATH 348, so MATH 308 as a co-requisite will be appropriate. The simplex method, main topic of MATH 308, is not a required topic in 348.

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 proroquisite.

Effective term and year <u>1134 – Summer 2013</u>

SCUS 12-47e(iv)

	ACTIVE CONDUCTED ON	COL	URSE CHANGE/DELETION
SFU	SENATE COMMITTEE ON UNDERGRADUATE STUDIES		SEPTEMBER 2012
EXISTING COURSE	, CHANGES RECOMMENDED		
Please check appropria	te revision(s)		
Course number	r 🔲 Credit 🔲 Title 🔲 Des	scription Prerequisite	Deletion
Indicate number of hou	rs for: Lecture Seminar	Tutorial Lab	
FROM:		TO:	
Course Number MAT	H 402	Course Number	
Credit Hour4.0		Credit Hour	
TITLE: Industrial Mathe	matics Project		
(1) Long title for calenda	ar and schedule, no more than 100 chara	cters including spaces and punctuation.	
(2) Short title for enrolli	ment and transcript, no more than 30 ch	aracters including spaces and punctuation.	
DESCRIPTION			
1			
PREREQUISITE	and the second		
			-
RATIONALE	an fan gener fan en an fan fan fan fan fan fan fan fan fan		

MATH 402-4 is not required in the Operations Research or other programs and we do not plan to offer it in future. This is mainly a "clean up" step. We will keep MATH 402W-4 Operations Research Clinic.

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 prorequisite.

Effective term and year <u>1134 – Summer 2013</u>

SCUS 12-47f

Students cannot obtain credit for STAT 302 if they already have T0: credit for STAT 305 and/or STAT 350, or if they are cimultaneously enrolled in STAT 302 and STAT 350.

SFU	SFNATE COMMITTEE ON UNDERGRADUATE SUDIES		COURSE	CHANGE/DELETION
EXISTING COURSE, CHANGES	RECOMMENDED			
Please check appropriate revision(s	s):			
Course number Credit	Title Description	Prerequisite Cours	e deletion	Learning Outcomes
Indicate number of hours for: Lec	cture Seminar	Tutorial		Lab
2	T 302	TO Course Subject/Numbe Credits		Т 302
TITLE (1) LONG title for calendar and so FROM:	chedule, no more than 100 characters	including spaces and punctu TO:	ation.	
(2) SHORT title for enrollment ar FROM:	nd transcript, no more than 30 charact	ers including spaces and pur TO:	ictuation.	
DESCRIPTION FROM:		DESCRIPTION TO:		
PREREQUISITE Does this course replicate the cont If so, this should be noted in the	tent of a previously approved course to prerequisite .	PREREQUISITE such an extent that student	s should not	receive credit for both courses?

FROM: Students cannot obtain credit for STAT 302 if they already have credit for STAT 350, or if they are simultaneously enrolled in STAT 302 and STAT 350.

LEARNING OUTCOMES

RATIONALE

STAT 302 and STAT 305 are similar courses but for different audiences and students should not be allowed to get credit for both.

Effective term and year

SFU	SENATE COMMITTEE ON UNDERGRADUATE STUDIES	COURSE CHANG	E/DELETION
EXISTING COURSE, CHANGES	RECOMMENDED		
Please check appropriate revision(s):		
Course number Credit	Title Description	Prorequisite Course deletion Learn	ning Outcomes
Indicate number of hours for: Leo	ture Seminar	Tutorial L	ab
FROM Course Subject/Number, STA	T 403	TO Course Subject/Number STAT 403	
Credits <u>3</u>		Credits_	
FROM:	chedule, no more than 100 characters in nd transcript, no more than 30 character	TO:	
DESCRIPTION FROM:		DESCRIPTION TO:	
PREREQUISITE Does this course replicate the cont If so, this should be noted in the STAT 302 or 350 FROM:	ent of a previously approved course to si prerequisite.	PREREQUISITE uch an extent that students should not receive crea STAT 302, 305 or 350 T0:	dit for both courses?
LEARNING OUTCOMES			

RATIONALE

STAT 305 is a course similar to STAT 302 that was introduced for the Health Sciences student. This course is also a good and necessary prerequisite for STAT 403.

Effective term and year Spring 2013

C	F	11
2	F	

COURSE CHANGE/DELETION

EXISTING COURSE, CHANGES RECOMMENDED						
Please check appropriate revision(s):						
Course number Credit Title Description	Prerequisite Course deletion Learning Outcomes					
Indicate number of hours for: Lecture Seminar	Tutorial Lab					
FROM ACMA 320	TO Course Subject/Number					
3	Credits					
TITLE (1) LONG title for calendar and schedule, no more than 100 characters inc FROM:	luding spaces and punctuation. TO:					
(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation. FROM: TO:						
DESCRIPTION FROM:	DESCRIPTION TO:					
PREREQUISITE Does this course replicate the content of a previously approved course to su If so, this should be noted in the prerequisite . MATH 232, STAT285, and ACMA210 (with a grade of C+ or higher) FROM:	STAT285 and ACMA210 (with a grade of C+ or higher)					
LEARNING OUTCOMES	то:					

RATIONALE

MATH 232 is a prerequisite for STAT 285.

Effective term and year Spring 2013

SCUS 12-47g

SFU	SENATE COMMITTEE ON UNDERGRADUATE STUDIES	COURSE CHANGE/DELETION	
EXISTING COURSE, CHANGES	RECOMMENDED		
Please check appropriate revision(5):		
Course number Credit		Prerequisite Course deletion Learning Outcomes	
FROM Course Subject/Number_PHY	′S 100-3	TO Course Subject/Number	-
Credits		Credits	-
TITLE (1) LONG title for calendar and so FROM:	chedule, no more than 100 characters ind	cluding spaces and punctuation. TO:	
(2) SHORT title for enrollment at FROM:	nd transcript, no more than 30 character	s including spaces and punctuation. TO:	
DESCRIPTION FROM:		DESCRIPTION TO:	
If so, this should be noted in the	prerequisite.	PREREQUISITE ach an extent that students should not receive credit for both courses?	
BC Principles of N FROM: equivalent)	Mathematics 12 (or	BC Pre-Calculus 12 (or equivalent)	
LEARNING OUTCOMES			

RATIONALE

The provincial government changed the name of highschool math and our physics calendar entries need updating.

Effective term and year Spring 2013

2012 april



EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number	Credit	Title	Description	Prerequisite	Course deletion	Learning Outcomes	
Indicate number of h	ours for: Lectu	re <u>3</u>	Seminar		Tutorial 1	Lab	
FROM Course Subject/Nun	ber_PHYS	6 125-3	3	TO Course Sub	ject/Number		
Credits 3				Credits			

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation. FROM: TO:

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation. FROM: TO:

DESCRIPTION FROM:

PREREQUISITE

PREREQUISITE

DESCRIPTION

TO:

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 prerequisite. greater than 85% in both BC Pre-Calculus T0: 12... greater than 85% in both BC Principles of

FROM: Mathematics 12... LEARNING OUTCOMES

RATIONALE

The provincial government changed the name of highschool math and our physics calendar entries need updating.

Effective term and year Spring 2013

2012 april