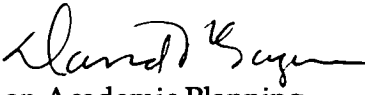


## SIMON FRASER UNIVERSITY

## OFFICE OF THE VICE-PRESIDENT, ACADEMIC

## MEMORANDUM

To: Senate

From: D. Gagan, Chair   
Senate Committee on Academic Planning

Subject: Faculty of Science -  
Curriculum revisions

Date: December 11, 1998

Action undertaken by the Senate Committee on Undergraduate Studies and the Senate Committee on Academic Planning gives rise to the following motions:

**Motions:**

"that Senate approve and recommend to the Board of Governors as set forth in S.99 - 7 , the following curriculum revisions in the Faculty of Science:

- i) Proposed Joint UBC-SFU-UVic-UNBC Calculus Challenge Examination Certificate
- ii) Proposed Major and Honors Programs in Actuarial Science."

**For Information:**

Acting under delegated authority, SCUS approved curriculum revisions in the following departments/programs:

- |   |                            |
|---|----------------------------|
| a) Department of Mathematics and Statistics | i) General Science Program |
| b) Earth Sciences Program                   |                            |
| c) Environmental Science Program            |                            |
| d) Biochemistry Program                     | j) Faculty of Science      |
| e) B.Sc. in Geography Program               |                            |
| f) Marine Science Program                   |                            |
| g) Department of Chemistry                  |                            |
| h) Department of Biological Sciences        |                            |

Any Senator wishing to consult the full report of curriculum revisions within the Faculty of Science should contact Bobbie Grant, Senate Assistant at 291-3168 or e-mail [bgrant@sfu.ca](mailto:bgrant@sfu.ca)

# SFU SIMON FRASER UNIVERSITY

## MEMORANDUM

<b>To:</b> Len Berggren, Chair Mathematics and Statistics	<b>Date:</b> July 23, 1998 <b>From:</b> Charmaine Dean, Chair UGSC Mathematics and Statistics
--	---

**Re: Proposal for Joint UBC-SFU-UVic-UNBC Calculus  
Challenge Examination Certificate**

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The attached proposal is a joint proposal by the four B.C. universities for a Calculus Challenge Examination Certificate. The Ministry of Education is keen to see university cooperation on examinations related to first-year Calculus courses which may be taken by students through a variety of programs in high-schools. The proposal has been created through joint discussions with Ministry representatives and representatives from the four universities involved. It was approved by the Department's UGSC on May 20, 1998. Please forward it to the department for discussion and for consideration of approval.

*Charmaine Dean*

## Proposal for the Creation of a UBC - SFU - UVic - UNBC Calculus Examination Certificate

### 1. Description and Background

The Ministry of Education is strongly encouraging that SFU, UBC, UVic and UNBC (the Four) have a common Calculus Challenge examination policy. At present, UBC, SFU and UVic administer Calculus Challenge examinations to students who request them from the Mathematics Departments of those universities. The student pays a fee for writing the examination, and if successful, receives transfer credit for Calculus I: UBC's MATH 100 or SFU's MATH 151 or UVic's MATH 100 or UNBC's Math 100. At UBC, the student's transcript will also show the grade obtained on the examination if a student requests credit.

The Ministry currently recognizes AP (Advanced Placement) examinations in all subjects and all such courses are recognized now on student transcripts in the same way as Principles of Math 12 or Physics 12. The AP Calculus AB exam is currently written by about 1500 B.C. students annually. It costs about \$70 U.S. and this money flows out of the province. On the other hand many B.C. students take other kinds of calculus usually under the rubrics LD (locally developed) Calculus which is not recognized by the Ministry or the universities, or IB Calculus. The Four grant transfer credit for some higher level IB Math courses. Currently a large proportion of the clientele for Calculus I at the Four have at least one semester of calculus in high school.

At SFU, high enrolment in MATH 151, particularly in the fall has been causing some problems. SFU's largest mathematics class at the 100 level has consistently been MATH 151, with enrolments of over 600 students in the Fall term. MATH 151 is offered in the fall and spring. For the last two years the Mathematics Department at SFU has not been able to find a lecture theatre large enough to support the enrolment of MATH 151 in the fall terms, and has had to resort to putting students into an 'overflow' section for the first few weeks of term until enrolments drop to about 500, which is the size SFU's largest theatre will support.

At UBC, over 50% of ALL students in Calculus I courses have had at least one semester of high school calculus. Severe financial constraints have led to still larger classes during the day with more students each year having to be accommodated through unwanted late afternoon and evening classes.

Right now the mixing of students with different calculus backgrounds is causing many problems in Calculus I. Most of those with AP credit are repeating these courses. Although students may take the Calculus challenge examination, they prefer to repeat the course in order to attach a grade to it on their transcript. Students should not repeat courses which they have mastered. [At UBC students are not allowed to repeat courses which have been passed while at UBC.] In addition, it appears that the Ministry is very anxious to see inter-university cooperation on this issue.

## 2. Proposed Calendar Entry

### UBC - SFU - UVic - UNBC Calculus Examination Certificate

All prospective SFU, UBC, UNBC and UVic students who have completed or who are registered in a calculus course in secondary school are eligible to write a Calculus Challenge examination. Students who pass this will be awarded a UBC - SFU - UVic - UNBC Calculus Examination Certificate. These students will be able to obtain credit for MATH 151 at SFU, or MATH 100 at UBC, or MATH 100 at UVic or MATH 100 at UNBC, with the mark obtained on the challenge examination appearing on their transcripts, if requested, after enrolling at one of the four universities.

Each year one of the universities hosts the examination in April and August. Only one attempt is permitted. Application must be made to the Mathematics Department hosting the examination in a given year to write the Calculus Challenge examination, prior to entering one of the four universities from secondary school. After enrolling at one of the universities, a student may apply to the Mathematics department at that university to receive credit for the Calculus Challenge Examination, as shown on the UBC - SFU - UVic - UNBC Calculus Examination Certificate. The student's transcript will then show Challenge credit for MATH 151 at SFU or MATH 100 at UBC or MATH 100 at UNBC or MATH 100 at UVic, with the grade obtained. Grade conversions are noted on the Certificate for grades at each of the four universities. Students already eligible for transfer credit because of high AP or IB scores will keep this eligibility regardless of their examination score and can waive the examination score and/or credit.

#### Registration

Applications to write the Calculus Challenge examination must be made by March 15 for the April examination, or by July 19 for the August examination. Applications should be made to the Mathematics department hosting the examination in a particular year. In 1999, UBC will coordinate the examination; in 2000 SFU will coordinate the examination. In 1999, a non-refundable fee of \$76.50, must accompany the application to UBC, payable to the Department of Mathematics, UBC.

#### Examination

In April, the examinations will take place at participating high schools or at the host university, and in August, the examination will be held at the host university: UBC in 1999, SFU in 2000. The UBC examination is a 2 1/2 hour exam; SFU's is a 3 hour examination.

A course syllabus and samples of recent examinations and their solutions are available from the Mathematics Departments of UBC (for students writing during 1998/99) and SFU (for students writing during 1999/2000) for a cost of \$15 for Canadian addresses and \$20 for non-Canadian addresses (GST and postage included).

Further enquiries about writing the UBC-SFU-UVic-UNBC Calculus Examination Certificate should be directed to:

- 3,
- **Math Challenge 100**, Department of Mathematics, The University of British Columbia, 121-1984 Mathematics Road, Vancouver, BC, V6T 1Z2; Telephone (604) 822-6430; FAX (604) 822-6074; e-mail: [math@math.ubc.ca](mailto:math@math.ubc.ca) . UBC hosts the examination in 1999. *Only contact UBC if you plan to write in 1999.*
  - **Math Challenge 151**, Department of Mathematics and Statistics, Simon Fraser University, Burnaby, BC, V5A 1S6; Telephone (604) 291-3332; FAX (604) 291-4947, email: [mast\\_chair@sfu.ca](mailto:mast_chair@sfu.ca). SFU hosts the examination in 2000. *Only contact SFU if you plan to write in 2000.*

### 3. Ministry of Education, Skills and Training Requirements

1. A Provincial Standard in Calculus. MATH 151 at SFU, MATH 100 at UBC, MATH 100 at UNBC and MATH 100 at UVic all have a common syllabus. Appendix A provides the syllabuses for these courses at SFU and UBC; Appendix B provides samples of past exams, and their marking schemes from SFU; samples of past exams and their marking schemes from UBC. Appendix C provides grade conversions for the universities.
2. A single credential or certificate to be issued to all students. We propose that this be a letter from the department on university letterhead. Appendix D provides a sample of such a certificate.
3. A single cost or charge for all students. This is set at \$76.50 for 1998/99 (payable to the Department of Mathematics, UBC).
4. Administrative contact to provide information to students and schools. This will be provided by the Department of Mathematics at UBC in 1998/99 and the Mathematics and Statistics Department at SFU in 1999/2000.
5. Statement of Portability among the four universities. This is covered in our proposed policies.
6. Information on participating schools and previous results on the UBC Math 100 Challenge Exam; probable times of examinations. These are listed in Appendix E.

# Proposal for Major and Honors programs in Actuarial Science

## TABLE OF CONTENTS

1. Declaration and Rationale
2. Program Goals
3. Course Changes
4. Proposed Calendar Entry
  - Requirements for a major
  - Requirements for an honors
5. Correspondence between SFU courses and professional exams
6. External Review Reports
  - a) Professor R.L.Brown, FSA, FCIA, University of Waterloo,  
Vice President of the Society of Actuaries,  
Past President of the Canadian Institute of Actuaries.
  - b) Gordon Latter, FSA, FCIA,  
Leong and Associates.
7. Response to External Review Reports
8. Response to Student Questionnaire

# Proposal for Major and Honors programs in Actuarial Science

This is a proposal for the introduction of major and honors degrees in Actuarial Science. The courses are all in place and this would create a program that would be unique in British Columbia.

## Rationale

The primary motivations for this proposal are as follows:

I. The assessment of financial risk is a major and growing part of modern society whether it be in the area of investment or the areas of general insurance, health and life insurance, employee benefit plans or pension plans in either private or government run plans. The actuarial field in general and the broad insurance industry in particular constitute a major industry with an appetite for talented students who have an aptitude for mathematics. One of the best preparations for employment in this field is a training in Actuarial Science. The proposed programs will provide opportunities for Simon Fraser University students to enter this large and growing field.

II. Currently, students wishing to pursue a program in actuarial studies do so through the existing Actuarial Certificate Program. Some students take this as a post-baccalaureate study program and some as part of their bachelor's degree at SFU, obtaining either a BSc in Mathematics or a BSc in Mathematics (Statistics Option). However, the recent conversion of the Statistics Option to a degree program and the pending changes to the BSc degree in Mathematics make both of these options much less appropriate for actuarial students as they make it more difficult for actuarial students to take an appropriate blend of actuarial mathematics, mathematics, statistics, business and economics.

III. The current Actuarial Certificate Program introduces students to the mathematical foundations of Actuarial Science. The proposed degree programs will not only strengthen the statistical content but will also give recognition to the fact that actuaries must work in a business context and become familiar with markets, investment and economic principles. Students pursuing courses of study at other universities that are almost identical to that in this proposal receive degrees in Actuarial Mathematics or Actuarial Science and it seems timely that they now do so at Simon Fraser.

IV. Since the existing Actuarial Certificate Program is focussed on upper level courses and since it is a "certificate" as opposed to a degree, many students only become aware of the program late in their studies, making it difficult for them to pick up the most suitable supporting courses or to join the Co-op Education program in a timely manner. A degree in Actuarial Science will raise the visibility of the program and interested students will be able to plan their programs much more appropriately. One extremely important advantage from this will be that they will be able to commence the challenging syllabus of examinations offered by the Society of Actuaries and the Casualty Actuarial



Society at a much earlier stage in their studies. This will greatly enhance their prospects for attractive Co-op Education job placements and even permanent job placements.

## **Program Goals**

The program is designed to give students a strong foundation in actuarial mathematics and business to prepare them to apply their mathematical skills in a business context to problems concerning the evaluation of financial risk and financial risk management both as it relates to the insurance industry and to non-traditional employers. In particular, the core courses have been chosen to include courses that will prepare students for the examinations of the Society of Actuaries and the Casualty Actuarial Society.

## **Course Changes**

No new courses are proposed at this time.

# Proposed Calendar Entry

## Actuarial Science Program

K10512 Shrum Science Centre. (604) 291 3331 Tel, (604) 291-4947 (Fax),  
<http://www.math.sfu.ca> Internet

Program Coordinator  
Norman Reilly, Mathematics and Statistics

The Department of Mathematics and Statistics offers a program of study within the Faculty of Science leading to the degree of Bachelor of Science with a major or honors in Actuarial Science. These programs train students in the mathematical foundations of financial risk management.

## Prerequisite Requirement

Unless otherwise stipulated, students must have obtained a grade of C or better in prerequisites for courses labelled ACMA offered by the Department of Mathematics and Statistics.

## General Requirements

For both the major and honors programs, students must satisfy the requirements of the Faculty of Science in regard to upper division credit, breadth, and grade point average.

## REQUIREMENTS FOR A MAJOR

- Under University regulations a general degree requires a minimum of 44 upper division credits in courses numbered 300 and above, completion of at least 120 credit hours, and completion of the major program.
- Students will also be required by the Department of Mathematics and Statistics to obtain credit for the following courses.

## LOWER DIVISION REQUIREMENTS

1. Mathematics:

MATH 151-3 Calculus I  
MATH 152-3 Calculus II  
MATH 251-3 Calculus III  
MATH 232-3 Elementary Linear Algebra

2. Statistics

STAT 270-3 Introduction to Probability and Statistics  
STAT 280-3 Applied Probability Models

3. Computing

Two Computing Science courses.

4. Economics

ECON 103-3 Principles of Microeconomics  
ECON 105-3 Principles of Macroeconomics

5. English/Philosophy

Two English or Philosophy courses

6. Business/Economics

Two courses from the following list

BUS 207-3 Managerial Economics  
BUS 251-3 Financial Accounting  
BUS 254-3 Managerial Accounting  
ECON 210-3 Money and Banking  
ECON 290-3 Canadian Microeconomics  
ECON 291-3 Canadian Macroeconomics

Required Lower Division Hours = 42 hrs

**UPPER DIVISION REQUIREMENTS FOR A MAJOR**

1. Actuarial Mathematics

ACMA 310-3 Mathematics of Compound Interest  
ACMA 315-3 Credibility Theory and Loss Distribution  
ACMA 320-3 Actuarial Mathematics I  
ACMA 335-3 Risk Theory  
ACMA 425-3 Actuarial Mathematics II  
ACMA 445-3 Survival Models

2. Statistics

STAT 330-3 Linear Models in Applied Statistics I  
STAT 350-3 Linear Models in Applied Statistics II  
STAT 450-3 Statistical Theory

3. Mathematics/Business

At least nine hours of courses from the following list:

MATH 308-3 Linear Programming  
MATH 310-3 Introduction to Ordinary Differential Equations  
MACM 316-3 Numerical Analysis I  
BUS 312-4 Business Finance  
BUS 315-4 Investments  
ECON 301-5 Intermediate Microeconomic Theory  
ECON 305-5 Intermediate Macroeconomic Theory

Required Upper Division Hours = 36

Students must complete 44 hours of upper division work in total, none of which may be a Job Practicum; STAT 301 or STAT 302.

## **REQUIREMENTS FOR AN HONORS**

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

•For an honors degree in Actuarial Science, a student must complete the following upper division requirements in addition to the lower and upper division requirements for a major specified above.

1. STAT 380-3 Introduction to Stochastic Processes
2. Two courses from the list:

ACMA 455-3 Graduation of Life Tables  
ACMA 465-3 Mathematics of Demography  
BUEC 433-5 Forecasting in Business and Economics  
BUS 410-3 Financial Institutions  
BUS 413-4 Corporate Finance

3. Other Requirements

Additional upper division courses in any course labelled ACMA /BUS /BUEC /CMPT/ECON/MATH /MACM /Stat to bring the total required courses hours to 50. (BUEC 333, Elementary Economics and Business Statistics II, may not be used to satisfy this requirement).

## **Cooperative Education**

Students are strongly advised to participate in the Cooperative Education Program.

## RESPONSE TO LETTERS FROM REVIEWERS

We were very appreciative of the thoughtful comments from the external reviewers of the proposal (Professor R.L.Brown, University of Waterloo and Gordon Latter, Leong and Associates) and we have responded to their suggestions regarding the program content by strengthening the Business and Economics options in the proposal - a recommendation made by both reviewers. Most importantly this led to the inclusion of Bus 413 Financial Management and certain prerequisite courses. The syllabus for Bus 413 matches that for the Casualty Actuarial Society exam 5B and even recommends the same text. So this is a very appropriate and relevant addition to the program.

We have some reservations though, in regard to the recommendation from Gordon Latter to the effect that the passing of the professional exams should be the sole goal of the program. We consider the preparation of students for the professional exams an important goal but not the only goal. For one thing, several of the core courses are of potential interest to students who do not plan on a career in the actuarial field and we believe that instructors must have the discretion to emphasize and develop parts of the syllabus that they consider important and should not be constrained to one sole goal. This balanced approach has been working so far as our students have been successful both in passing the professional exams and in finding job placements.

**Student Job Placements, 97-3**

Co-op: ICBC  
Hong Kong and Shanghai Banking Corporation (2)

Other: Mercer & Co.  
Watson Wyatt  
Coles-Hewitt  
Towers Perrin  
Seaboard Life

## Simon Fraser University Course Recommendations for the Society of Actuaries and Casualty Actuaries Society Examinations

Society of Actuaries Examination	Casualty Actuaries Society Examination	Simon Fraser University Recommended Courses
100	Part 1	MATH 151, 152, 232, 242, 251, 310
110	Part 2	STAT 270, 280, 330, 450
120	Part 3A	STAT 330, 350, BUEC 433
130	-	MATH 308
-	Part 3B	No SFU course equivalent (possibly ACMA-395/495 guided study)
135	Part 3C	MACM 316
140	-	ACMA 310
150	-	ACMA 320, 325
151	-	ACMA 335, STAT 280, 450
160	-	ACMA 345, STAT 280
161	-	ACMA 365
165	-	ACMA 355
-	Part 4A	ACMA 310, 320, 325
-	Part 4B	ACMA 315, STAT 280, 450
-	Part 5A	ACMA 335, ECON 103, ECON 105 (more ECON recommended)
-	Part 5B	BUS 413

\* Examination CAS 4B is a Canadian Institute of Actuaries Fellowship requirement.




Waterloo, Ontario, Canada  
N2L 3G1

Faculty of Mathematics  
Department of Statistics  
and Actuarial Science  
(519) 885-1211  
Fax (519) 746-1875  
e-mail: sas-adm@jееves.uwaterloo.ca

## MEMORANDUM

To: Dr. Norman Reilly  
Department of Statistics and Actuarial Science  
Simon Fraser University  
Burnaby, British Columbia,  
V5A 1S6

From: Rob Brown   
Department of Statistics and Actuarial Science  
University of Waterloo

Date: January 22, 1998

Re: Actuarial Mathematics at Simon Fraser University

---

It is with pleasure that I send you my comments about your proposal for a major and honours degree in Actuarial Mathematics at SFU.

In my mind, your proposal is sufficient, suitable and timely. It would provide students at SFU the broad-based education needed to enter the actuarial profession. It also recognizes that much of the needed education for the future actuary will be received in Departments and Disciplines not necessarily labelled Actuarial Science. I see in your proposal an appropriate mix of courses in Mathematics, Statistics, Economics and Business. You are indeed fortunate to be on a campus that offers these courses without having





to add to the course offerings or expand on required human resources.

I strongly believe that the actuary of the future will think more in terms of modern statistical modelling than in terms of the 'old' pure Life Contingencies. To build a program limited to Life Contingencies would be a mistake, but one that you are not making in my mind.

I would suggest, however, that you consider advanced courses in Mathematical Models in Finance, and at least one course designed for Property/Casualty students. These courses could take the place of one or more of "Graduation of Life Tables" and/or "The Mathematics of Demography" (although I have a personal allegiance to the latter).

I would add that the timing of the proposal is appropriate. I just checked with the secretary of the Vancouver Actuaries Club, and found that there are now 192 individuals qualified to be on the mailing list for the Club, despite there being no single agency with an overwhelming number of actuaries. Only a decade ago, this number would have been less than 100. This is evidence of the growth of employment for actuaries and the new breadth of the actuarial profession.

Finally, I would note that in a recent visit to British Columbia, I visited Dr. Jim Totten at the University College of the Cariboo in Kamloops (he used to teach Computer Science at Waterloo). He has a small but vibrant (and growing) number of bright mathematics students who have shown a keen interest in Actuarial Science. They would be perfect candidates to feed into a program such as the one you envisage.

I have made some small comments on some details of the proposal in writing on the document directly.

I wish you the best of luck in this venture.



**LEONG & ASSOCIATES  
ACTUARIES AND CONSULTANTS INC.**

February 3, 1998

Dr. Norman Reilly  
Department of Mathematics and Statistics  
Simon Fraser University  
Burnaby, BC  
V5A 1S6

Dear Norman:

In response to your December 5, 1997 letter, I would like to thank you for the opportunity to comment on your proposal.

After having the opportunity to teach ACMA 310 "Interest Theory" last fall, coupled with numerous discussions with SFU students and other professionals in Vancouver, I would like to make two recommendations to improve the program:

**1. Primary Goal: Passing SOA Exams**

In your proposal under "Program Goals", you state in general terms what the program will be designed to do. This is an excellent definition, however, I feel that a primary program goal should be preparing students to pass the Society of Actuaries' Examinations ("SOA Exams"). This should be an explicit goal of the new program.

**Student Commitment**

As you mentioned in Item IV of your proposal, the primary motivation for improving the program is to increase awareness in order that students pursue actuarial studies earlier in their careers. I concur totally. However, if students enroll in second and third year actuarial courses with no interest of pursuing an actuarial mathematics degree, it will make it difficult to meet everyone's goals. For example, the non-actuarial students will view the course as unfairly difficult whereas the legitimate actuarial students will be underprepared for the SOA Exams.

**Competitive to Other Universities / Increasing Employment Opportunities**

As a result of meeting the above stated primary motivation, students will not only be better prepared to pass the SOA exams, but will ultimately graduate with more SOA examination credits. This will go a long way to improving their job prospects. In terms of employment opportunities, SOA exam credits typically outweigh a student's grade point average.

In summary, students and faculty members must realize that the standards in the actuarial courses at SFU should be set to match those expected of a student writing the SOA exams.

## 2. Secondary Recommendation: Improve Commerce / Business Foundation

Although you alluded to the idea of a stronger business underpinning for future students, I feel that this area should be stressed more in your proposal.

A quick survey of the major actuarial firms in Vancouver revealed that they have targeted universities such as the University of Manitoba which have provided a strong business foundation when recruiting new hires. Not only do students appear to be better prepared, as mentioned under item 1 above, but students from universities outside B.C. also appear to have a better business foundation.

Given that we should walk before we can run, this might be an appropriate long-term (or at least secondary) objective. In the meantime, even increasing the number of business courses required for completion of a degree in actuarial mathematics certainly would go a long way to preparing students for a successful career in the actuarial field.

### Implementation of an Actuarial Degree Program

Whether or not the above recommendations are followed, I fully endorse your proposal to expand the actuarial program at SFU. The advantages of such a program would be:

- adequately preparing students for a successful career;
- filling a current void in the university education system in B.C.; and
- providing SFU with a unique program such that graduating students may enter a field which is in demand.

### Summary

In closing, I would like to thank you again for the opportunity to comment on an excellent proposal and wish you the best of luck in your endeavours to expand the actuarial program. In the meantime, if you would like anything else, please feel free to contact me.

Yours very truly,

  
Gordon Latter  
Consulting Actuary

GL:cc  
Enc.

SFUleL203

# Actuarial Mathematics Degree

## Questionnaire

1. Are you intending to pursue the Actuarial Certificate Program to completion?

15

Yes

2

No

2. Would you be interested in a BSc(Major) in Actuarial Mathematics?

4

No

3

Perhaps

1

Yes

4

Very

2

Would  
Definitely  
Register

3. Would you be interested in a BSc(Hons) in Actuarial Mathematics?

6

No

4

Perhaps

Yes

3

Very

3

Would  
Definitely  
Register

4. If you answered 'No' in questions 2 and 3, would you have been interested in an Actuarial Mathematics degree if such a degree had been available at an earlier stage in your studies?

10

Yes

No

5. Are you planning on a career in the Actuarial Field?

13

Yes

2

No

6. What is your current declared/intended major?

Name (Optional):



## FOR INFORMATION

(SCUS Reference: SCUS 98 – 24 b)

(SCAP Reference: SCAP 98 – 66 b)

- b) Earth Sciences Program  
Acting under delegated authority, SCUS approved curriculum revisions as follows:
  - i) Change of prerequisite: EASC 102-3, 203-3, 401-3  
Change of number, title and prerequisite: EASC 308-3
  - ii) New course:
    - EASC 317-3 Global Geophysics
    - EASC 412-3 Advanced Geochemistry
    - EASC 417-3 Exploration Seismology
  - iii) Change of requirements for Majors
  - iv) New course:
    - EASC 411-3 Applied Environmental Geology

## FOR INFORMATION

(SCUS Reference: SCUS 98 – 24 c)

(SCAP Reference: SCAP 98 – 66 c)

- c) Environmental Science Program  
Acting under delegated authority, SCUS approved curriculum revisions as follows:
  - i) Change of requirements: Pollutant Transport Stream
  - ii) New courses:
    - EVSC 380-0 Practicum I
    - EVSC 381-0 Practicum II
    - EVSC 480-0 Practicum III
    - EVSC 481-0 Practicum IV
    - EVSC 482-0 Practicum V

## FOR INFORMATION

(SCUS Reference: SCUS 98 – 24 d)  
(SCAP Reference: SCAP 98 – 66 d)

- d) Biochemistry Program  
Acting under delegated authority, SCUS approved curriculum revisions as follows:
  - i) Proposed new streams: Biochemistry and Molecular Biology
  - ii) New courses:
    - BICH 426-3 Immunology
    - BICH 435-3 Genomic Analysis



## FOR INFORMATION

(SCUS Reference: SCUS 98 – 24 e)

(SCAP Reference: SCAP 98 – 66 e)

- e) B.Sc. in Geography Program  
Acting under delegated authority, SCUS approved curriculum revisions as follows:
  - i) Change B.Sc. Honors and Major Programs from Geography to Physical Geography
  - ii) Change of prerequisite: GEOG 311-4
  - iii) Change of Upper Division requirements: B.Sc. Major Program  
Change of requirements: B.Sc. Honors Program  
Change of Calendar statement: B.Sc. Major Program

## FOR INFORMATION

(SCUS Reference: SCUS 98 – 24 f)  
(SCAP Reference: SCAP 98 – 66 f)

- f) Marine Science Program  
Acting under delegated authority, SCUS approved curriculum revisions as follows:
  - i) Change of description and prerequisite: MASC 401-3, 410-6, 411-6, 412-6, 413-3, 415-3, 425-3, 430-6, 437-3, 440-3, 445-3, 446-3, 480-3

## FOR INFORMATION

(SCUS Reference: SCUS 98 – 24 g)  
(SCAP Reference: SCAP 98 – 66 g)

- g) Department of Chemistry  
Acting under delegated authority, SCUS approved curriculum revisions as follows:
  - i) Change of prerequisite: CHEM 360-3

## FOR INFORMATION

(SCUS Reference: SCUS 98 - 29)

(SCAP Reference: SCAP 98 - 66 h)

- h) Department of Biological Sciences  
Acting under delegated authority, SCUS approved curriculum revisions as follows:
  - i) Change in course description: BISC 306
  - ii) Change in title and description: BISC 310
  - iii) Change in prerequisite: BISC 342, 443, 444, 446
  - iv) Change in title, description, vector and prerequisite: BISC 356
  
- i) General Science Program
  - i) Addition of PHYS 190 to list of General Education courses
  - ii) Deletion of CHEM 121 and 281 from Lower Division requirements
  - iii) Editorial changes to General Science degree
  
- j) Faculty of Science
  - i) Addition of Optometry to list of accredited professional programs eligible for transfer credit towards B.Sc. degree