

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate
From: J.M. Munro, Chair
Senate Committee on
Academic Planning
Subject: Curriculum Revisions
Faculty of Science
Date: November 18, 1993

Action undertaken by the Senate Committee on Undergraduate Studies (SCUS Reference 93-36) and the Senate Committee on Academic Planning (SCAP Reference (SCAP 93-43) gives rise to the following motion:

Motion:

"that Senate approve and recommend to the Board of Governors the curriculum revisions for the Faculty of Science as set forth in S.93 - 57 as follows:

- a) i) Requirements for Majors and requirements for Honors and Honors First Class
- ii) Withdrawal of Program Approval
- b) i) Upper Division requirements for B.Sc. Chemistry Major
- ii) Change in Co-op Calendar entry for Math & Stats
- iii) Change in Co-op Calendar entry for Management and Systems Science
- iv) Change in Computing Science and Statistics requirements for Mathematics Major and Honors Program
- v) Program changes resulting from renumbering of STAT 102-3 to STAT 301-3
- vi) Changes to Certificate Program in Actuarial Mathematics
- vii) Changes to Physics Computer Skills description
- viii) Changes to Chemical Physics Program
- ix) Change to Geography B.Sc. Program
- x) Change in Quaternary Studies Minor
- xi) Change in Biological Science Major

- c) New courses:
- | | |
|--------------|---|
| MATH 171 - 1 | Mathematics of Computer Explorations in Calculus I |
| MATH 172 - 1 | Mathematics of Computer Explorations in Calculus II |
| STAT 301 - 3 | Statistics for the Life Sciences |
| ACMA 315 - 3 | Creditability Theory and Loss Distributions |
| ACMA 325 - 3 | Actuarial Mathematics II |
| ACMA 335 - 3 | Risk Theory |
| ACMA 345 - 3 | Survival Models |
| ACMA 355 - 3 | Graduation of Life Tables |
| ACMA 365 - 3 | Mathematics of Demography |
| BISC 446 - 0 | Practicum V |
| BISC 457 - 3 | Plant Molecular Biology and Biotechnology |
| BISC 333- 3 | Developmental Biology |
| BISC 406 - 3 | Marine Biology and Oceanography |
- d) Course deletions:
- | | |
|--------------|--|
| STAT 102 - 3 | Introduction to Statistics, Option B |
| MACM 216 - 3 | Introduction to Computational Methods |
| MACM 401 - 3 | Switching Theory and Logical Design |
| MACM 402 - 3 | Automata and Formal Languages |
| BISC 201 - 3 | Cell Biology |
| BISC 203 - 3 | Developmental Biology |
| BISC 301 - 3 | Biochemistry - Intermediary Metabolism |
| BISC 401 - 3 | Biochemistry - Regulatory Mechanisms |
| ACMA 330 - 3 | Risk Models |
| ACMA 340 - 3 | Topics in Actuarial Mathematics |

For Information

Acting under delegated authority of Senate, SCUS has approved revisions to the following courses as detailed in SCUS 93-36

- Prerequisite change - STAT 101-3, STAT 103-3, STAT 302-3
- Course Description and Prerequisite Change - ACMA 310-3, ACMA 320-3
- Prerequisite change - PHYS 325
- Course Description and Prerequisite Change - PHYS 100/101/102
- Course Description Change - PHYS 455
- Calendar Description Change - PHYS 324
- Course Description Change - BISC 204-3
- Prerequisite Change - BISC 313-3, BISC 329-4, BISC 405-3, BISC 303-3, BISC 404-3, BISC 422-3, BISC 427-3, BISC 432-3, BISC 453-3, BISC 457-3,
- Vector Change - BISC 317-3
- Title and Description Change - BISC 406

A.2 Requirements for Majors and requirements for Honors and Honors First Class

Rationale:

In paper S.91-2, SCAP recommended a motion on Minimum Graduation Requirements in a memorandum to Senate on 11 December 1990. The SCAP motion amended recommendations from SCUS. Senate approved the SCAP recommendation with the effect that the University "Minimum Graduation Requirements" were changed and the following was eliminated from the Faculty of Science requirement: **"a grade point average of 2.00 in the upper division courses required in the program"** for Majors. As the Faculty of Science has a minimum requirement of "28 semester hours of upper division credit courses numbered 300 and 400 as specified by the major program" out of a minimum of 44 semester hours of upper division credit, it became possible for a student to graduate with a GPA less than 2.00 in the "upper division courses required in the program". Example: a Majors student with a CGPA of 2.00 (over 120 semester hours of credit) with a GPA of 1.85 in the "upper division courses required in the program" could graduate. The effect was to weaken the Faculty of Science graduation requirement.

The Faculty of Science requests that the following revisions be made to the Calendar (p. 145 of the 1993/94 Calendar):

Current text (p. 145)

Change to: (revision indicated in bold)

Requirements for Major

- 120 semester hours of credit which include

- a minimum of 28 semester hours of upper division credit courses numbered 300 and 400 as specified by the major program
- additional semester hours of upper division credit bringing the total to a minimum of 44 semester hours of upper division credit
- a minimum of 12 semester hours of electives in subjects taken outside the Faculty of Science (excluding EDUC 401 to 407) including a minimum of 6 semester hours taken in the Faculty of Arts

add after "..... 6 semester hours taken in the Faculty of Arts"

- **a grade point average of 2.00 in the upper division courses required in the program**

- additional requirements as specified by the major program

- **additional requirements as specified by the major program and in the General Information section of this Calendar (page 21)**

Requirements for Honors and Honors First Class

- 132 semester hours of credit as prescribed by the honors department which include
 - a minimum of 48 semester hours of upper division credit in one subject area
 - additional semester hours of upper division credit bringing the total to a minimum of 60 semester hours of upper division credit
 - a minimum of 12 semester hours of electives in subjects taken outside the Faculty of Science (excluding EDUC 401 to 407) including a minimum of 6 semester hours taken in the Faculty of Arts

Replace: ...as prescribed by the honors department... with: ... as prescribed by the Honors program

- additional requirements as specified by the honors program

- additional requirements as specified by the honors program and in the General Information section of this Calendar (page 21)

and

For students enrolled at the University beginning Fall 1991 or thereafter

- upper division grade point average (GPA) and cumulative grade point average (CGPA) as specified in the *General Information* section of this Calendar

or

For students enrolled at the University before Fall 1991

- a graduation grade point average of 3.00 for honors or 3.50 for first class honors calculated on the required 132 semester hours or on 60 required semester hours of upper division credit

Delete this section

A.3 Withdrawal of Program Approval

Rationale: Departments should have the authority to remove those students from their programs who, by their performance have shown that they no longer can pursue their original goals.

Add to Faculty of Science program guidelines (p. 145 of 1993/94 Calendar)

A student whose progress, in the judgment of the department, is below the standard for graduation from a program may be refused entry to, or required to withdraw from, that program in the department

B. Program Changes

B.1 Upper Division Requirements for B.Sc. Chemistry Major

Rationale: The Chemistry Department wishes to restrict students from using an excessive number of directed study course credits for the Chemistry major degree. The intent of this restriction is to encourage students to take a few extra (elective) regular upper division courses (beyond the core program) in their major subject area. Similar restrictions already exist in the Biochemistry program (BICH 493-15: "Students may not receive credit for a total of more than 15 semester hours in research courses", p. 172 of 92/93 Calendar) and for Mathematics Majors (who are "required to take at least three 400 division MATH, STAT or MACM courses, none of which may be a Directed Studies, Job Practicum or Honors Essay course", p. 161 of 92/93 Calendar).

The following Calendar change is required for the 94/95 Calendar:

Page	Current text (1993/94 Calendar)	Change to:
154.2	Electives (40 semester hours) to complete the B.Sc. requirement of 44 hours upper division credit (see Faculty of Science requirements)	Add immediately after current text given at left: Students may not include more than 15 credit hours of Individual Study/Undergraduate Research courses in the minimum of 44 hours of upper division credit required for the B.Sc. degree.

B.2 Change in Co-op Calendar Entry for Mathematics and Statistics

Change from (pg 161-62 in 93/94 Calendar):

Co-operative Education

Co-operative Education is a program which integrates work experience with academic study. The student spends alternate semesters on campus and in paid, study-related jobs.

Arrangements for entry into the program are made through the Mathematical Sciences Co-op Co-ordinator. For further details on the co-op system students should refer to the *Co-operative Education* section.

Interested Mathematics and Statistics students should contact the Co-op Co-ordinator, Ms. Kerstin Baxter, TLX 10507, telephone 291-4123.

to:

Co-operative Education

Students in the Mathematics and Statistics program are invited to apply to enter Co-operative Education, a program which integrates work experience with academic study. For further details on the co-op system, students should refer to the *Co-operative Education* section in this calendar.

Mathematical Sciences Co-op students work in a variety of environments with both private and public sector employers. Past work term duties include statistical analysis, end-user support, survey design, application programming, mathematical modeling, and actuarial analysis.

Interested students should contact the Mathematical Sciences Co-op Co-ordinator, Kertsin Baxter (291-4123, TLX 10507) for admission requirements and further information.

B.3 Change in Co-op Calendar Entry for Management and Systems Science Program.

Change from (pg. 159 in 93/94 Calendar):

Co-operative Education Program

Students in the Management and Systems Science program are encouraged to enter Co-operative Education, a program which integrates work experience with academic study. Interested MSSC students should contact the Management and Systems Science Co-ordinator, telephone 291-4123, for more information. Arrangements for entry into the program are made through the Mathematical Sciences Co-op Co-ordinator, LB 7600, telephone 291-3239. For more detailed information see the *Co-operative Education* section.

to:

Co-operative Education

Students in the Management and Systems Science program are encouraged to enter Co-operative Education, a program which integrates work experience with academic study. For further details, students should refer to the *Co-operative Education* section of this calendar.

MSSC Co-op students work in a variety of environments with both private and public sector employers. Past work term duties include modeling, application programming, marketing end-user support, MIS, and systems analysis.

Interested students should contact the Mathematical Sciences Co-op Co-ordinator, Kerstin Baxter (291-4123, TLX 10507), for admission requirements and further information.

B.4 Computing Science and Statistics Requirements for Mathematics Major and Honors Program

Rationale: Inspired in part by the Mathematics and Statistics Departmental Review in 1987, the Department wishes to ensure that Mathematics major and honor students are exposed to courses in computing and statistics.

Change from (pg. 162, column 1):

and either 3 additional hours in lower division Mathematics or Statistics (MATH 100-2, 110-3 and 190-4 may not be included) or Computing Science (CMPT) 101-4, 102-3, 103-3 or Mathematics/Computing Science (MACM) 216-3. This requirement would normally be met by the end of the fourth level.

to:

and any one of CMPT 101-4, 102-3 or 103-3, and any course labeled STAT and 3 additional hours in lower division Mathematics or Statistics (MATH 100-3, 110-3, and 190-4 may not be included). This requirement would normally be met by the end of the fourth level.

B.5 Program changes resulting from renumbering of STAT 102-3 to STAT 301-3.

- (i) Mathematics Major and Honors Program (pg. 162, item iv in column 1)**

From: STAT 302 may not be counted as part of the 30 hours

To: **Neither STAT 301 nor STAT 302 may be counted as part of the 30 hours.**

- (ii) Mathematics Minor Program (pg. 162, item (ii) in column 2)**

From: These courses may not include PHYS 413-3

To: **These courses may not include PHYS 413-3 or STAT 301-3.**

(iii) Statistics Major and Honors Program (pg. 162, item 8, in column 2)

From: (8) In addition to requirements (1) to (6) for a major...STAT, ACMA or MACM

To: (8) In addition to requirements (1) to (6) for a major...STAT, ACMA or MACM excluding STAT 301 and 302.

B.6 Changes to Certificate Program in Actuarial Mathematics

Rationale for changes.

The present program does not fulfill this purpose as well as it could for the following reasons:

1. The course load in each of the four (4) existing ACMA courses is too heavy and it is impossible for the instructor to cover all the material. Furthermore, after taking the courses, even the very good students are not fully prepared to take the corresponding professional exams. Other universities offering Actuarial programs would offer about 8 to 12 courses in order to cover the same amount of material; and even this is seen as very demanding for the students.
2. Some of the required courses of the present program only cover parts of the syllabi of the corresponding professional exams.
3. The Society of Actuaries and the Canadian Institute of Actuaries have changed their requirements for qualification since the present program was designed.

Therefore, a new Certificate Program in Actuarial Mathematics is being proposed. What follows is a description of the proposed Certificate Program in Actuarial Mathematics, a list of changes that would have to be made to the Calendar and some additional information.

Please note that the existing four courses ACMA 310, 320, 330 and 340 will be replaced by the eight courses described in Section A. This enables all material of these four courses to be covered and also allows for further topics to be treated. All courses will not be offered each year. Two additional ACMA courses beyond the three currently offered will be offered each year, allowing some students with previous courses to complete the Certificate Program in one year, something that was not possible before.

REVISED . CERTIFICATE PROGRAM IN ACTUARIAL MATHEMATICS

Course description:

ACMA 310-3 Mathematics of Compound Interest.

Measurement of interest, present value. Equations of value. Basic annuities: immediate, due, perpetuity. General annuities. Yield rates: cash flow analysis, reinvestment rate, portfolio and investment year methods. Amortization schedules and sinking funds. Bonds and other securities. Applications: real estate mortgages, depreciation methods. Interest rate disclosure and regulation in Canada. This course covers the syllabus of *Course 140 of the Society of Actuaries*. (3-1-0) *Prerequisite*: MATH 152 must precede or be taken concurrently.

ACMA 315-3 Credibility Theory and Loss Distributions.

Statistical distributions useful in general insurance. Inferences from general insurance data. Experience rating. Credibility theory: full credibility, partial credibility, Bayesian credibility. Estimation of loss distributions. Modeling loss distributions: ungrouped data, truncated and shifted data, clustering. Applications: inflation. This course covers the syllabus of *Part 4B of the Casualty Actuarial Society*. (3-0-0) *Prerequisite*: STAT 280 must precede or be taken concurrently.

ACMA 320-3 Actuarial Mathematics I.

Survival distributions: age at death, life tables, fractional ages, mortality laws, select and ultimate life tables. Life insurance: actuarial present value function (apv), moments of apv, basic life insurance contracts, portfolio. Life annuities: actuarial accumulation function, moments of apv, basic life annuities. Net annual premiums: actuarial equivalence principle, loss function, accumulation type benefits. Actuarial reserves: prospective loss function, basic contracts, recursive equations, fractional durations. This course covers part of the syllabus of *Course 150 of the Society of Actuaries*. (3-1-0) *Prerequisites*: ACMA 310. MATH 232 and STAT 280 must precede or be taken concurrently.

ACMA 325-3 Actuarial Mathematics II.

Actuarial reserves: allocation of the loss to the policy years. Multiple life functions: joint-life, last-survivor. Multiple decrement models: stochastic and deterministic approaches, associated single decrement, fractional durations. Valuation theory for pension plans. Insurance models including expenses: gross premiums and reserves, type of expenses, modified reserves. Nonforfeiture benefits and dividends: equity concept, cash values insurance options, asset shares, dividends. This course covers part of the syllabus of *Course 150 of the Society of Actuaries*. (3-1-0) *Prerequisite*: ACMA 320.

ACMA 335-3 Risk Theory.

The economics of insurance: utility theory, optimal insurance. Individual risk models for a short term: individual claim, sums of independent claims, approximations for the distribution, applications. Collective risk models for a single period: aggregate claims, compound poisson distribution, approximations. Collective risk models over an extended period: claims processes, adjustment coefficient, discrete time model, surplus below the initial level, maximal aggregate loss. Applications: claim amount distribution, stop-loss reinsurance. This course covers the syllabus of *Course 151 of the Society of Actuaries*. (3-1-0) *Prerequisite*: ACMA 320.

ACMA 345-3 Survival Models.

Actuarial survival models: select, aggregate, study design. Mathematics of survival models: distribution of T, parametric survival models, conditional and truncated distributions, transformed random variables. Life table: traditional form, fractional ages, select and ultimate tables. Estimating survival models from complete data samples: study design, exact time of death, grouped times of death. Estimating survival models from incomplete data samples: study design, moments procedures, maximum likelihood procedures. Estimation of parametric survival models. General population data. This course covers the syllabus of *Course 160 of the Society of Actuaries*. (3-0-0) *Prerequisite*: ACMA 320.

ACMA 355-3 Graduation of Life Tables.

Definition of graduation. Smoothness. Fit-testing. Graduation methods: moving-weighted-average, Whittaker, Bayesian, parametric. Smooth-junction interpolation. Two-dimensional graduation. This course covers the syllabus of *Course 165 of the Society of Actuaries*. (3-0-0) *Prerequisites*: ACMA 320 and MACM 316.

ACMA 365-3 Mathematics of Demography.

Data: collection, errors. Measures of mortality and fertility: crude rates, age-specific rates, adjusted measures. Construction of life tables from census data: US 1979-81, Canada 1985-87. Stationary population: survivorship group, lexis diagram, applications. Stable population: foundations, growth rate, applications, quasi-stable populations. Population projections: inter-censal, post-censal, logistic curve, component method. Uses of census data. This course covers the syllabus of *Course 161 of the Society of Actuaries*. (3-0-0) *Prerequisite*: ACMA 320.

Curriculum:

Required courses:

MATH 151

MATH 152

MATH 232

STAT 270
ACMA 310

STAT 280
ACMA 320

Four of the following six courses:

ACMA 315 ACMA 325 ACMA 335 ACMA 345 ACMA 355 ACMA 365

One of the following two courses: MACM 316 STAT 330

Correspondence between SOA exams and SFU courses:

SOA exams	SFU courses	SOA exams	SFU courses
100	MATH 151, 152, 232	150	ACMA 320, 325
110	STAT 270, 280	151	ACMA 335
120	STAT 330 (partly)	160	ACMA 345
130	MATH 308 (partly)	161	ACMA 365
135	MACM 316	165	ACMA 355
140	ACMA 310	CAS 4B	ACMA 315

Calendar changes to Calendar Description of Mathematics and Actuarial Mathematics Program

- (i) Changes to Statistics Minor Option (pg. 162, column 2, item ii)

From:

(ii) obtain credit for at least 5 of the following courses STAT 330, 350, 380, 402, 410, 420, 430, 440, 480, 460 and ACMA 330. (This will normally include STAT 330, 350 and 450.)

To:

(ii) obtain credit for at least 5 of the following courses STAT 330, 350, 380, 402, 410, 420 430, 440, 450, 460, ACMA 315, ACMA 320, ACMA 335 and ACMA 345. (This will normally include STAT 330, 350 and 450.)

- (ii) Certificate in Actuarial Mathematics (pg. 162, column 2 to pg. 163, column 1)

Replace the entire section with:

Certificate in Actuarial Mathematics

This certificate program is designed to prepare the student for taking most of the Society of Actuaries Associateship examinations (SOA courses 100 through 165) or the Casualty Actuarial Society Associateship examinations (Parts 1 through 4). To obtain the Certificate, the following courses must be completed:

Required courses:

MATH 151	MATH 152	MATH 232
STAT 270	STAT 280	
ACMA 310	ACMA 320	

Four of the following six courses:

**ACMA 315 ACMA 325 ACMA 335 ACMA 345 ACMA 355
ACMA 365**

One of the following two courses: MACM 316 STAT 330

Note: Students completing the above courses who are also enrolled in either a major or minor program in Mathematics may count these MATH, MACM, or STAT courses both toward the certificate in actuarial mathematics and for their major or minor program in Mathematics. The ACMA courses may be used to satisfy upper division requirements for a minor in Mathematics, minor in Statistics or major in Statistics.

B.7 Changes to Physics Computer Skills description**Rationale:**

The Co-op program has requested that a statement be inserted in the section on "Computer skills" in the Physics section of the Calendar.

Change from (pg 163, column 2):

Computing skills such as those obtained in CMPT 102 will be expected of students entering the second year Physics courses.

to:

Computing skills such as those obtained in CMPT 102 will be expected of students entering the second year Physics courses. The Co-op program highly recommends that Co-op students complete one of CMPT 101, CMPT 102 or CMPT 103, plus CMPT 112 prior to placement in the first work term.

B.8 Changes to Chemical Physics program**Rationale:**

Both the major and honors programs in Chemical Physics in the current calendar (1993-1994) list CHEM 332-3 and CHEM 336-2 as required courses. However the Chemistry Department has introduced a new course CHEM 331-3 "Practical Aspects of Inorganic Chemistry" which combines aspects of CHEM 332-3 and CHEM 336-2.

It is the opinion of the Chemical Physics Committee that the single course CHEM 331-2 is a suitable replacement for the previous two courses.

- (i) Change Upper Division major program requirements for Chemistry, plus total number of hours (pg 153, column 2)

From:

Upper Division Requirements

(total 43-44 semester hours)

CHEM	316-3	Introductory Instrumental Analysis
	332-3	The Chemistry of Transition Elements
	336-2	Inorganic Chemistry Laboratory I
	361-3	Physical Chemistry II (or PHYS 385-3 Quantum Physics)
	367-2	Physical Chemistry Laboratory II ^(a)
	462-3	Molecular Spectroscopy

To:

Upper Division Requirements

(total 38-39 semester hours)

CHEM	316-3	Introductory Instrumental Analysis
	331-3	Practical Aspects of Inorganic Chemistry ^(f)
	361-3	Physical Chemistry II (or PHYS 385-3 Quantum Physics)
	367-2	Physical Chemistry Laboratory II ^(a)
	462-3	Molecular Spectroscopy

- (ii) Change Upper Division Honors program requirements for Chemistry, plus total number of hours (pg. 153, column 2)

From:

Upper Division Requirements

(total 51-53 semester hours)

CHEM	332-3	The Chemistry of Transition Elements
	336-2	Inorganic Chemistry Laboratory I (or NUSC 341-3 Introduction to Radiochemistry)
	361-3	Physical Chemistry II (or PHYS 385-3 Quantum Physics)
	367-2	Physical Chemistry Laboratory II ^(a)
	462-3	Molecular Spectroscopy

plus 5 semester hours of electives from upper division Chemistry or Nuclear Science courses.

To:

Upper Division Requirements

(total 46-47 semester hours)

CHEM	331-3	Practical Aspects of Inorganic Chemistry
	361-3	Physical Chemistry II (or PHYS 385-3 Quantum Physics)
	367-2	Physical Chemistry Laboratory II(a)
	462-3	Molecular Spectroscopy

plus 5 semester hours of electives from upper division Chemistry or Nuclear Science courses.

- (iii) Footnotes to Chemical Physics Program (pg. 154, column 1)

Under "Notes for Major and Honors Programs add:

(f) CHEM 331-3. The prerequisite CHEM 118-2 may be waived. CHEM 218-3 is required and may be taken concurrently.

B.9 Change to Geography B.Sc. program

- (i) Change upper division requirements of Geography Major (page 157, column 1)

From:

Required Geography Courses - 400 level

Two of

GEOG	412-4	Quaternary Geology and Geomorphology
	413-4	Geomorphology III
	414-4	Climatology III
	415-4	Advanced Biogeography
	416-4	Pleistocene Geography
	418-4	Terrain Evaluation
	419-4	Mass Transfer in the Biosphere (8 hours)

To:

Required Geography Courses - 400 Level

Two of

GEOG	412-4	Quaternary Geology and Geomorphology
	413-4	Geomorphology III
	414-4	Climatology III
	415-4	Advanced Biogeography
	416-4	Pleistocene Geography
	417-4	Soil Science II
	418-4	Land Evaluation
	419-4	Mass Transfer in the Biosphere (8 hours)

- (ii) Change upper division requirements of Physical Geography minor program (pg. 158, column 1)

From:

Upper Division Requirements

A minimum of 16 hours selected from:

GEOG	311-4	Hydrology
	313-4	Geomorphology II
	314-4	Climatology II
	315-4	Regional Ecosystems
	316-4	Ecosystem Biogeochemistry
	317-4	Soil Geography
	412-4	Quaternary Geology and Geomorphology
	413-4	Geomorphology III
	414-4	Climatology III
	415-4	Advanced Biogeography
	416-4	Pleistocene Geography
	418-4	Terrain Evaluation
	419-4	Mass Transfer in the Biosphere

To:

Upper Division Requirements

A minimum of 16 hours selected from:

GEOG	311-4	Hydrology
	313-4	Geomorphology II
	314-4	Climatology II
	315-4	Regional Ecosystems
	316-4	Ecosystem Biogeochemistry
	317-4	Soil Science I
	412-4	Quaternary Geology and Geomorphology
	413-4	Geomorphology III
	414-4	Climatology III
	415-4	Advanced Biogeography
	416-4	Pleistocene Geography
	417-4	Soil Science II
	418-4	Land Evaluation
	419-4	Mass Transfer in the Biosphere

- (iii) Change upper division requirement of Geography major (page 157, column 1)

From:

Three of

GEOG	311-4	Hydrology
	313-4	Geomorphology II
	314-4	Climatology II
	315-4	Regional Ecosystems

316-4	Ecosystem Biogeochemistry	
317-4	Soil Geography	(12 hours)

To:

Three of:

311-4	Hydrology	
313-4	Geomorphology II	
314-4	Climatology II	
315-4	Regional Ecosystems	
316-4	Ecosystem Biogeochemistry	
317-4	Soil Science I	(12 hours)

B.10 Change in Quaternary Studies Minor

Change the Calendar description of the Quaternary Studies Minor (pg. 165, column 2)

From:

Upper Division Requirements (14-16 semester hours)

All students must take the following:

One of

ARCH	410-5	Advanced Archeometry
ARCH	411-5	Archaeological Dating

One of

BISC	434-5	Paleoecology and Palynology
ARCH	340-5	Introductory Zooarchaeology

One of

GEOG	412-4	Quaternary Geology and Geomorphology
GEOG	416-4	Pleistocene Geography

Both of

QUAT	400-1	Seminar in Quaternary Studies
QUAT	401-1	Field School

To:

Upper Division Requirements (14-16 semester hours)

All students must take the following:

One of

ARCH	410-5	Advanced Archaeometry
ARCH	411-5	Archaeological Dating

One of

ARCH	340-5	Introductory Zooarchaeology
ARCH	365-3	Ecological Archaeology
BISC	434-5	Paleoecology and Palynology

One of

ARCH	438-5	Geoarchaeology
GEOG	412-4	Quaternary Geology and Geomorphology
GEOG	416-4	Pleistocene Geography

Both of

QUAT	400-1	Seminar in Quaternary Studies
QUAT	401-1	Field School

B.11 Change in Biological Science Major

(i) Change (pg. 151 column 1) the lower division core

From:

Courses in Biological Sciences

50 lower division total

To:

Courses in the Faculty of Science

BISC	101-4	Introduction to Biology
BISC	102-4	Introduction to Biology
BISC	202-3	Genetics
BISC	204-3	Introduction to Ecology
BICH	221-3	Cell Biology and Biochemistry (or BISC 201)
BICH	222-3	Molecular Biology and Biochemistry

plus

CHEM	102-3	General Chemistry I
CHEM	115-2	General Chemistry Laboratory I

a minimum of 10 semester hours selected from:

CHEM	103-3	General Chemistry II
CHEM	118-2	General Chemistry Laboratory II
CHEM	150-3	Organic Chemistry I
CHEM	155-2	Organic Chemistry Laboratory I
CHEM	250-3	Organic Chemistry II
CHEM	255-2	Organic Chemistry Laboratory II

plus

MATH	154-3	Calculus I for the Biological Sciences (or MATH 151-3)
MATH	155-3	Calculus II for the Biological Sciences (or MATH 152-3)
STAT	301-3	Statistics for the Life Sciences
(or STAT	102-3	Introduction to Statistics, Option B)
PHYS	101-3	General Physics I (or Phys 120)
PHYS	102-3	General Physics II (or Phys 121)

50 Lower Division Total

- (ii) Change (pg. 151, column 2) the upper division requirements and electives

From:

BISC 301-3

.

BISC 400-3 Evolution

The remaining seven...

To:

One of

BICH 322-3

Molecular Physiology

BICH 321-3

Intermediary Metabolism

One of

BISC 305-3

Animal Physiology

BISC 366-3

Plant Ecophysiology

One of

BISC 306-3

Invertebrate Biology

BISC 316-3

Vertebrate Biology

One of

BISC 326-3

Biology of Non-vascular Plants

BISC 337-3

Comparative Morphology, Distribution and Evolution of Vascular Plants

All of

BISC 333-3

Developmental Biology

BISC 329-4

Introduction to Experimental Techniques

BISC 400-3

Evolution

The remaining six....

- (iii) Change (pg. 151, column 2) the upper division requirements and electives

From:

*Students may substitute...this requirement."

To:

*Students may substitute a maximum of two courses from among BICH 321, 322, 421, 422 and 423, GEOG 315, 415 and 419, KIN 305, 306, 326, 336 and 431 to satisfy this requirement.

- (iv) Change (pg 151, column 2) typical lower division core program

From:

Level 2

.

STAT 102-3 Introduction to Statistics, Option B
Electives

To:

Level 2

BISC	101-4	Introduction to Biology
CHEM	150-3	Organic Chemistry I (or CHEM 103-3 General Chemistry II)
CHEM	155-2	Organic Chemistry Laboratory I (or CHEM 118-2 General Chemistry Laboratory II)
MATH	155-3	Calculus II for the Biological Sciences
PHYS	101-3	General Physics I

Level 3

CHEM	250-3	Organic Chemistry II (or CHEM 150-3 Organic Chemistry I)
CHEM	255-2	Organic Chemistry Laboratory II (or CHEM 155-2 Organic Chemistry Laboratory I)
PHYS	102-3	General Physics II
BICH	221-3	Cell biology and Biochemistry (or BISC 201-3 Cell Biology)

and one of

BISC	202-3	Genetics
BISC	204-3	Introduction to Ecology

Level 4

STAT	301-3	Statistics for the Life Sciences (or STAT 102-3 Introduction to Statistics, Option B)
BICH	222-3	Molecular Biology and Biochemistry

and one of

BISC	202-3	Genetics
BISC	204-3	Introduction to Ecology

(v) Change (pg. 152, column 1) Minor program

From:

At least two of

BISC	201-3
	202-3
	203-3
	204-3

To:

At least two of:

BISC	202-3	Genetics
BISC	204-3	Introduction to Ecology
BICH	221-3	Cell Biology and Biochemistry
BICH	222-3	Molecular Biology and Biochemistry

- (vi) Change (pg 152, column 1) Environmental Toxicology Minor Program lower division requirements

From:

BISC 101-4	Introduction to Biology
102-4	Introduction to Biology
201-3	Cell Biology
CHEM 102-3	General Chemistry I
103-3	General Chemistry II
115-2	General Chemistry Laboratory I
118-2	General Chemistry Laboratory II
150-3	Organic Chemistry I
155-2	Organic Chemistry Laboratory I
250-2	Organic Chemistry II
MATH 154-2	Calculus I for the Biological Sciences (or MATH 151-3)
155-3	Calculus II for the Biological Sciences (or MATH 152-3)
PHYS 101-3	General Physics I (or PHYS 120-3)
102-3	General Physics II (or PHYS 121-3)
STAT 102-3	Introduction to Statistics, Option B

To:

BISC 101-4	Introduction to Biology
102-4	Introduction to Biology
BICH 221-3	Cellular Biology and Biochemistry (or BISC 201-3)
CHEM 102-3	General Chemistry I
103-3	General Chemistry II
115-2	General Chemistry Laboratory I
118-2	General Chemistry Laboratory II
150-3	Organic Chemistry I
155-2	Organic Chemistry Laboratory I
250-2	Organic Chemistry II
255-2	Organic Chemistry Laboratory II
MATH 154-3	Calculus I for the Biological Sciences (or MATH 151-3)
155-3	Calculus II for the Biological Sciences (or MATH 152-3)
PHYS 101-3	General Physics I (or PHYS 120-3)
102-3	General Physics II (or PHYS 121-3)

- (vii) Change (pg 152, column 1) Environmental Toxicology Minor Program upper division requirements

From:

BISC 312-3	Environmental Toxicology I
313-3	Environmental Toxicology II
432-3	Chemical Pesticides and the Environment

To: BISC 312-3 Environmental Toxicology I
 313-3 Environmental Toxicology II
 432-3 Chemical Pesticides and the Environment
 STAT 301-3 Statistics for the Life Sciences

D. Summary of New Course Proposals

D.1 MATH 171-1 and MATH 172-1 New Courses in Computing Applications to Calculus

Rationale: The Mathematics and Statistics Department wishes to offer supplementary courses in computer applications to calculus. The courses are one credit each and accompany the standard calculus sequences. The courses may not be taken without the analytical calculus courses (MATH 151/154/157 for the new course MATH 171, and MATH 152/155/158 for the new course MATH 172).

MATH 171-1 (1-0-2) Mathematics of Computer Explorations in Calculus I
This supplement to MATH 151/154/157 gives students the opportunity to explore and investigate the underlying principles of differential calculus using leading edge computer software currently used in mathematical and

scientific research and industry. Previous experience with computers would be beneficial, but it is not required.

Prerequisite: B.C. Math 12 (or equivalent) with a grade of at least B or Math 100 with a grade of at least C.

Corequisite: Math 151/154/157. Other students may register with special permission.

Textbooks: "*Calculus with Computers*" by Tasoula Berggren, Simon Fraser University. This manual is a collection of selected activities for computer based projects in differential calculus.

"*First Leaves: A Tutorial Introduction to Maple V*" by B. Char, K. Geddes et al. Springer-Verlag, New York, 1992.

- UNIT 1 Learning to use the software
- UNIT 2 Functions and tangent line approximations
- UNIT 3 Continuity of functions and limits
- UNIT 4 Proofs about derivatives using the definition
- UNIT 5 Roots of polynomials and of derivatives
- UNIT 6 Maxima, minima and points of inflection
- UNIT 7 Investigating special functions using limits and derivatives
- UNIT 8 Investigating more graphs of functions
- UNIT 9 Implicit differentiation
- UNIT 10 Newton's method
- UNIT 11 The problem on shortest lines by Apollonius
- UNIT 12 Proofs by induction

MATH 172-1 (1-0-2) Mathematics of Computer Explorations in Calculus II
This is a supplement to MATH 152/155/158

Prerequisites: Math 151/154/157

Corequisites: Math 152/155/158. Other students may register by special permission.

Textbook: "*Calculus with Computers*" by Tasoula Berggren, Simon Fraser University. This manual is a collection of selected activities for computer based projects in integral calculus.

"*First Leaves: A Tutorial Introduction to Maple V*" B.Char, K. Geddes et al. Springer-Verlag, New York, 1992.

- Unit 1 Learning to use the software
- Unit 2 Investigating the integrability of functions
- Unit 3 Approximate Integration - Simpson's Rule
- Unit 4 Finding Integrals using Mathematics software
- Unit 5 A problem in finding Area A/ Area B for cubic functions
- Unit 6 Improper Integrals
- Unit 7 The volume remains finite while the area becomes infinite
- Unit 8 Arc Length
- Unit 9 Centroids
- Unit 10 Harmonic Series
- Unit 11 McLaurin Series

Unit 12 Taylor Series
Unit 13 Generating a Taylor Series

D.2 New Course Proposal for STAT 301-3 (3-0-1) Statistics for the Life Sciences

Rationale:

This service course for students in Biochemistry, Biological Sciences, and Kinesiology is being developed at the request of representatives from these programmes and in consultation with them. It will replace STAT 102. The primary goal of the revisions is to develop a course with the more experienced student in mind. The course will be taken by students who typically will have had some exposure to experimentation. After the students have come to understand the basic concepts and analysis techniques in STAT 301, they will then typically have an opportunity to reinforce them in subsequent courses in their own discipline. Integration of this course into the Life Sciences programs will be handled by a steering committee with representatives from the Biochemistry program, Biological Sciences Department, School of Kinesiology and Department of Mathematics and Statistics. The course will first be offered in 94-3, at which time STAT 102 will be dropped.

Evaluation:

The attached schedule allows for a single mid-semester test. Normally, there would be a three-hour final examination. In addition, exercises would usually be assigned once a week, and short tests might be given to test the students' understanding of key concepts.

Calendar Description:

*STAT 301-3 Statistics for the Life Sciences. An introductory course in research methodology and associated statistical analysis techniques for students with training in the life sciences. (3-0-1†) *Prerequisite: Either the student must have 45 semester hours of credit or MATH 152 or 155 must precede or be taken concurrently. Students with credit for STAT 101, 102, 103 or 270 (formerly MATH 272) may not take STAT 301 for further credit.* [Mathematics minor, major, and honours students may not use this course to satisfy the required number of semester hours of upper division Mathematics credit. However, they may include the course to satisfy the total number of required hours of upper division credit.]

Course Content:

1. Data Summaries and Displays
2. Summarizing the Relationship between Variables
3. The Research Process
4. Case Studies
5. Basic Probability Calculations
6. Distributions for Count Data
7. Hypothesis Tests and Confidence Intervals
8. Comparing Two Treatments

9. Inference on the Relationship between Two Variables
10. Comparing Several Treatments
11. Analyzing Frequency Counts

D.3 New Course Proposals for Actuarial Mathematics

Rationale:

The changes in the program and course content are listed in B.6. The new courses are ACMA 315-3, ACMA 325-3, ACMA 335-3, ACMA 345-3, ACMA 355-3 and ACMA 365-3.

D.4 New Course Proposals for Biosciences

(i) BISC 446-0 Practicum V

Rationale:

The Co-op program has requested that a fifth work term course BISC 446-0 be made available to Co-op students. The Calendar description is in Appendix B.

(ii) BISC 457 Plant Molecular Biology and Biotechnology

Rationale:

Although this course is currently in the Calendar, it has never been offered. The proposed changes (which are on a new course proposal form) are to the vector, title and course content. The course outline is given on the following page.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information

Department: Mathematics & Statistics

Abbreviation Code: MATH

Course Number: 171

Credit Hours: one

Vector: 1-0--2

Title of Course: Mathematics of Computer Explorations in Calculus I

Calendar Description of Course: This supplement to MATH 151/154/157 gives students the opportunity to explore and investigate the underlying principles of differential calculus using leading edge computer software currently used in mathematical and scientific research and industry. Previous experience with computers would be beneficial, but it is not required.

Nature of Course: one lecture per week with open lab.

Prerequisite (or special instructions): B.C. math 12 (or equivalent) with a grade of at least B or MATH 100 with a grade of at least C. Corequisite: MATH 151, MATH 154 or MATH 157. Other students may register with special permission.

What course (courses), if any, is being dropped from the calendar if this course is approved: none.

2. Scheduling

How frequently will the course be offered? once per year

Semester in which the course will first be offered? fall

Which of your present faculty would be available to make the proposed offering possible: L. Berggren, T. Berggren, P. Borwein, A. Freedman, J. Hebron, S. Thomason.

3. Objectives of the Course: To explore the concepts of differential calculus by using cutting-edge technology which students may use in their future careers.4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

Faculty none

Staff none

Library Two sets of Maple manuals (three volumes) on reserve.

Audio Visual use of computer projection system.

Space none

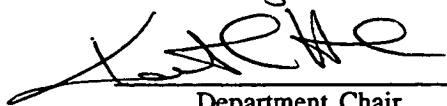
Equipment none

5. Approval

Date:

July 21, 93

Oct 20 /93



Department Chair



Dean

Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information

Department: Mathematics & Statistics

Abbreviation Code: MATH

Course Number: 172

Credit Hours: one

Vector: 1-0--2

Title of Course: Mathematics of Computer Explorations in Calculus II

Calendar Description of Course: This supplement to MATH 152/155/158 gives students the opportunity to explore and investigate the underlying principles of integral calculus using leading edge computer software currently used in mathematical and scientific research and industry. Previous experience with computers would be beneficial, but it is not required.

Nature of Course: one lecture per week with open lab.

Prerequisite (or special instructions): MATH 151, MATH 154 or MATH 157. Corequisite: MATH 152, MATH 155 or MATH 158. Other students may register with special permission.

What course (courses), if any, is being dropped from the calendar if this course is approved: none.

2. Scheduling

How frequently will the course be offered? once per year

Semester in which the course will first be offered? spring

Which of your present faculty would be available to make the proposed offering possible: L. Berggren, T. Berggren, P. Borwein, A. Freedman, J. Hebron, S. Thomason.

3. Objectives of the Course: To explore the concepts of integral calculus by using cutting-edge technology which students may use in their future careers.4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

Faculty none

Staff none

Library Two sets of Maple manuals (three volumes) on reserve.

Audio Visual use of computer projection system.

Space none

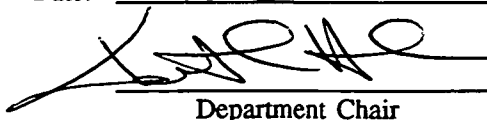
Equipment none

5. Approval

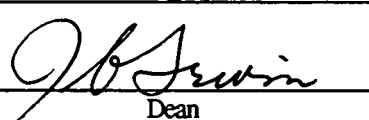
Date:

July 21, 93

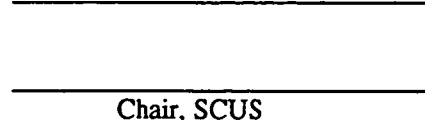
Oct 20 / 93



Department Chair



Dean



Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information Department: Mathematics and Statistics
 Abbreviation Code: STAT Course Number: 301 Credit Hours: 3 Vector: 3-0-1†

Title of Course: Statistics for the Life Sciences

Calendar Description of Course: An introductory course in research methodology and associated statistical analysis techniques for students with training in the life sciences.

Nature of Course: Three hours of lectures supported through the Statistics Workshop.

Prerequisites (or special instructions): Either the student must have 45 semester hours of credit or a minimum of 30 semester hours including MATH 152 or MATH 155. Students with credit for STAT 101, 102, 103, or 270 (formerly MATH 272) may not take STAT 301 for further credit. [Mathematics minor, major, and honors students may not use this course to satisfy the required number of semester hours of upper division mathematics. However, they may include the course to satisfy the total number of required hours of upper division credit.]

What course (courses), if any, is being dropped from the calendar if this course is approved: STAT 102

2. Scheduling

How frequently will the course be offered? Twice a year (fall and spring semesters).

Semester in which the course will first be offered? 94-3

Which of your present faculty would be available to make the proposed offering possible:
 Drs. Dean, Eaves, Lockhart, Routledge, Swartz, and Weldon.

3. Objectives of the Course: To introduce students in biochemistry, biological sciences, and kinesiology to the fundamentals of experimental design and associated statistical analysis.

4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

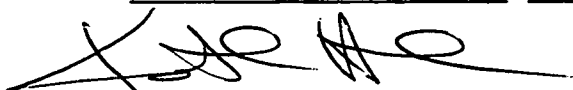
Faculty	)	
	)	
Staff	)	
	)	
Library	)	
	)	
Audio Visual	)	None. This is a replacement of the existing
	)	course STAT 102.
Space	)	
	)	
Equipment	)	

5. Approval

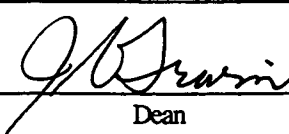
Date:

5 Oct 93

Oct 20 / 93



Department Chair



Dean

Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information

Department: Mathematics & Statistics

Abbreviation Code: ACMA

Course Number: 315-3

Credit Hours: three

Vector: 3-0-0

Title of Course: Credibility Theory and Loss Distributions.

Calendar Description of Course: Statistical distributions useful in general insurance. Inferences from general insurance data. Experience rating. Credibility theory: full credibility, partial credibility, Bayesian credibility. Estimation of loss distributions. Modeling loss distributions: ungrouped data, truncated and shifted data, clustering. Applications: inflation. This course covers the syllabus of *Part 4B of the Casualty Actuarial Society*.

Nature of Course: Lecture.

Prerequisites (or special instructions): STAT 280 must precede or be taken concurrently.

What course (courses), if any, is being dropped from the calendar if this course is approved:

2. Scheduling

How frequently will the course be offered? once per year

Semester in which the course will first be offered? Spring 1994.

Which of your present faculty would be available to make the proposed offering possible:

Dean, Lockhart, Parker, Reilly, Routledge, Swartz, Weldon.

Objectives of the Course: To introduce the subject of credibility theory and to study some basic distributions useful for general insurance companies

4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

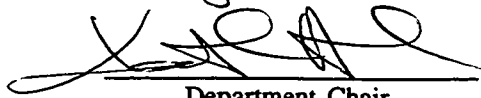
Faculty	)	
	)	
Staff	)	
	)	
Library	)	
	)	None
Audio Visual	)	
	)	
Space	)	
	)	
Equipment	)	

5. Approval

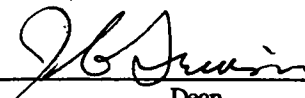
Date:

May 18, 93

Oct 20/93



Department Chair



Dean



Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information

Department: Mathematics & Statistics

Abbreviation Code: ACMA

Course Number: 325-3

Credit Hours: three

Vector: 3-1-0

Title of Course: Actuarial Mathematics II.

Calendar Description of Course: Actuarial reserves: allocation of the loss to the policy years. Multiple life functions: joint-life, last-survivor. Multiple decrement models: stochastic and deterministic approaches, associated single decrement, fractional durations. Valuation theory for pension plans. Insurance models including expenses: gross premiums and reserves, type of expenses, modified reserves. Nonforfeiture benefits and dividends: equity concept, cash values insurance options, asset shares, dividends. This course covers part of the syllabus of *Course 150 of the Society of Actuaries*.

Nature of Course: Lecture.

Prerequisites (or special instructions): ACMA 320.

What course (courses), if any, is being dropped from the calendar if this course is approved:

2. Scheduling

How frequently will the course be offered? once per year

Semester in which the course will first be offered? Fall 1994.

Which of your present faculty would be available to make the proposed offering possible:
 Lockhart, Parker, Reilly, Weldon.

3. Objectives of the Course: To generalize the actuarial functions studied in ACMA 320.4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

Faculty	)	
	)	
Staff	)	
	)	
Library	)	
	)	None
Audio Visual	)	
	)	
Space	)	
	)	
Equipment	)	
	)	

5. Approval

Date:

May 18, 93

Oct 20 / 93



Department Chair



Dean



Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information

Department: Mathematics & Statistics

Abbreviation Code: ACMA Course Number: 335-3 Credit Hours: three Vector: 3-1-0

Title of Course: Risk Theory.

Calendar Description of Course: The economics of insurance: utility theory, optimal insurance. Individual risk models for a short term: individual claim, sums of independent claims, approximations for the distribution, applications. Collective risk models for a single period: aggregate claims, compound Poisson distribution, approximations. Collective risk models over an extended period: claims processes, adjustment coefficient, discrete time model, surplus below the initial level, maximal aggregate loss. Applications: claim amount distribution, stop-loss reinsurance. This course covers the syllabus of *Course 151 of the Society of Actuaries*.

Nature of Course: Lecture.

Prerequisite (or special instructions): ACMA 320.

What course (courses), if any, is being dropped from the calendar if this course is approved: ACMA 330.

2. Scheduling

How frequently will the course be offered? once per year

Semester in which the course will first be offered? Summer 1995.

Which of your present faculty would be available to make the proposed offering possible:

Dean, Lockhart, Parker, Reilly, Routledge, Swartz, Weldon.

3. Objectives of the Course: To introduce the individual and collective risk models used to estimate the probability of ruin of an insurance company.4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

Faculty	)	
	)	
Staff	)	
	)	
Library	)	
	)	
Audio Visual	)	None
	)	
Space	)	
	)	
Equipment	)	
	)	

5. Approval

Date:

May 17, 1993

Oct 20/93



Department Chair



Dean

Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information

Department: Mathematics & Statistics

Abbreviation Code: ACMA Course Number: 345-3 Credit Hours: three Vector: 3-0-0

Title of Course: Survival Models.

Calendar Description of Course: Actuarial survival models: select, aggregate, study design. Mathematics of survival models: distribution of T, parametric survival models, conditional and truncated distributions, transformed random variables. Life table: traditional form, fractional ages, select and ultimate tables. Estimating survival models from complete data samples: study design, exact time of death, grouped times of death. Estimating survival models from incomplete data samples: study design, moments procedures, maximum likelihood procedures. Estimation of parametric survival models. General population data. This course covers the syllabus of *Course 160 of the Society of Actuaries*.

Nature of Course: Lecture.

Prerequisite (or special instructions): ACMA 320.

What course (courses), if any, is being dropped from the calendar if this course is approved:

2. Scheduling

How frequently will the course be offered? once per year

Semester in which the course will first be offered? Summer 1994.

Which of your present faculty would be available to make the proposed offering possible:
 Dean, Lockhart, Parker, Reilly, Routledge, Swartz, Weldon.

3. Objectives of the Course: To study different methods of estimating survival models.4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

Faculty)
)
 Staff)
)
 Library)
)
 Audio Visual) None
)
 Space)
)
 Equipment)
)

5. Approval

Date:

May 18, 93

Oct 20 / 93



Department Chair



Dean

Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information

Department: Mathematics & Statistics

Abbreviation Code: ACMA Course Number: 355-3

Credit Hours: three

Vector: 3-0-0

Title of Course: Graduation of Life Tables.

Calendar Description of Course: Definition of graduation. Smoothness. Fit-testing. Graduation methods: moving-weighted-average, Whittaker, Bayesian, parametric. Smooth-junction interpolation. Two-dimensional graduation. This course covers the syllabus of *Course 165 of the Society of Actuaries*.

Nature of Course: Lecture.

Prerequisites (or special instructions): ACMA 320 and MACM 316.

What course (courses), if any, is being dropped from the calendar if this course is approved: ACMA 340.

2. Scheduling

How frequently will the course be offered? once per year

Semester in which the course will first be offered? Fall 1995.

Which of your present faculty would be available to make the proposed offering possible:
 Lockhart, Parker, Reilly, Russell, Trummer, Weldon.

Objectives of the Course: To familiarize students with some methods of graduation used by actuaries.4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

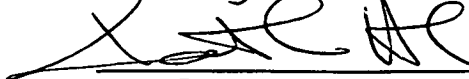
Faculty	)	
	)	
Staff	)	
	)	
Library	)	
	)	
Audio Visual	)	None
	)	
Space	)	
	)	
Equipment	)	
	)	

5. Approval

Date:

May 17, 93

Oct 20 / 93



Department Chair



Dean

Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
COURSE PROPOSAL FORM

1. Calendar Information

Department: Mathematics & Statistics

Abbreviation Code: ACMA Course Number: 365-3

Credit Hours: three

Vector: 3-0-0

Title of Course: Mathematics of Demography.

Calendar Description of Course: Data: collection, errors. Measures of mortality and fertility: crude rates, age-specific rates, adjusted measures. Construction of life tables from census data: US 1979-81, Canada 1985-87. Stationary population: survivorship group, lexis diagram, applications. Stable population: foundations, growth rate, applications, quasi-stable populations. Population projections: inter-censal, post-censal, logistic curve, component method. uses of census data. This course covers the syllabus of *Course 161 of the Society of Actuaries*.

Nature of Course: Lecture.

Prerequisite (or special instructions): ACMA 320.

What course (courses), if any, is being dropped from the calendar if this course is approved:

2. Scheduling

How frequently will the course be offered? once per year

Semester in which the course will first be offered? Spring 1995.

Which of your present faculty would be available to make the proposed offering possible:
Lockhart, Parker, Reilly, Weldon.

3. Objectives of the Course: To study the mathematics of demography for stationary and stable populations.4. Budgetary and Space requirements (for information only)

What additional resources will be required in the following areas:

Faculty	)	
	)	
Staff	)	
	)	
Library	)	
	)	None
Audio Visual	)	
	)	
Space	)	
	)	
Equipment	)	
	)	

5. Approval

Date: May 18, 93 Oct 20/93

[Signature] [Signature]

Department Chair Dean Chair, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIESNEW COURSE PROPOSAL FORM1. Calendar InformationDepartment: BiosciencesAbbreviation Code: BISC Course Number: 333 Credit Hours: 3 Vector: 3-1-0Title of Course: Developmental Biology

Calendar Description of Course:

Classical and modern experimental approaches will be described for understanding the development of the embryos of several species having common and distinctive features. These approaches are at the organismal, cellular, molecular, and genetic levels.

Nature of Course Lecture

Prerequisites (or special instructions):

BISC 202, BICH 221, BICH 222

What course (courses), if any, is being dropped from the calendar if this course is approved: BISC 203

2. SchedulingHow frequently will the course be offered? Twice per yearSemester in which the course will first be offered? 95-1

Which of your present faculty would be available to make the proposed offering possible? B. Brandhorst, M.J. Smith

3. Objectives of the Course

Modern developmental biology depends on concepts and methods introduced in the prerequisite course on cellular and molecular biology, and genetics. Students entering the current course, BISC 203, which lacks these prerequisites, have variable course-work backgrounds and considerable remedial teaching is required. The new prerequisites will allow a broader, more contemporary course to be offered.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library Resources adequate since this course is a modification of an existing course.

Audio Visual

Space

Equipment

5. ApprovalDate: 30/9/93Oct 20 1993

BAM. Koun
Department Chairman

JB Swain
Dean

33
Chairman, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIESNEW COURSE PROPOSAL FORM1. Calendar InformationDepartment: Biological SciencesAbbreviation Code: BISC Course Number: 446 Credit Hours: 0 Vector: N/ATitle of Course: PRACTICUM V

Calendar Description of Course:

Fifth semester of work experience in the Biological Sciences Co-operative Education Program.

Nature of Course

Prerequisites (or special instructions):

BISC 444-0

What course (courses), if any, is being dropped from the calendar if this course is approved:

2. SchedulingHow frequently will the course be offered? Each SemesterSemester in which the course will first be offered? 93-3

Which of your present faculty would be available to make the proposed offering possible?

3. Objectives of the Course

To provide the option of a fifth Co-op work term in those circumstances where considered appropriate by the Co-op co-ordinators for Biological Sciences.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library

Audio Visual N/A

Space

Equipment

5. ApprovalDate: 31/3/93D. McKeown
Department ChairmanOct 20 / 93
J. B. Frewin
Dean34
Chairman, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIESNEW COURSE PROPOSAL FORM1. Calendar InformationDepartment: Biological SciencesAbbreviation Code: BISC Course Number: 457 Credit Hours: 3 Vector: 3-0-4Title of Course: Plant Molecular Biology and BiotechnologyCalendar Description of Course:

An introduction to plant molecular biology and the techniques and applications of plant genetic engineering.

Nature of CoursePrerequisites (or special instructions):

BISC 321, or permission of the Department

What course (courses), if any, is being dropped from the calendar if this course is approved:

2. SchedulingHow frequently will the course be offered? Once every yearSemester in which the course will first be offered? N/A

Which of your present faculty would be available to make the proposed offering possible? Dr. A.R. Kermode

3. Objectives of the Course

This lecture/laboratory course will provide the student with a thorough understanding of the principles and practice of plant molecular biology. Emphasis will be upon the techniques and applications of plant genetic engineering. The procedures for plant transformation, beginning with tissue culture followed by foreign gene introduction, and regeneration and analysis of transformants, will be reviewed. Several examples of agronomic traits which have been successfully engineered in plants will be used to illustrate how genes are cloned, constructs made, genes introduced, and the transformants evaluated for gene expression.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff 1 laboratory instructor is presently available

Library Journals: (1) The Plant Journal is currently on order by the library. The journals Plant Molecular Biology & Transgenic Research are not absolutely essential.
Audio Visual

Lecture room with overhead projector and slide projector (for approx. 30 students)
Space Teaching laboratory in new building

Equipment Table top centrifuge, electroporator, laminar flow hood, gene gun

5. ApprovalDate: July 12/93

BAM Keown
Department Chairman

Oct 20/93
J. B. Swain
Dean

35
Chairman, SCUS

E. Summary of Course Deletions

- E.1 Delete STAT 102-3
- E.2 Delete MACM 216-3
- E.3 Delete MACM 401-3
- E. 4 Delete MACM 402-3
- E.5 Delete BISC 201-3
- E.6 Delete BISC 203-3
- E.7 Delete BISC 301-3
- E.8 Delete BISC 401-3
- E.9 Delete ACMA 330-3
- E.10 Delete ACMA 340-3

MEMORANDUM

W.A.C. Bennett Library, Simon Fraser University
Burnaby, British Columbia, Canada V5A 1S6

Date: 7 October, 1993

From: Ralph Stanton (Collections Librarian)

To: Harvey Gerber, Department of Mathematics and
Statistics

Re: Library Course Assessment for STAT 301

I have assessed the Library's ability to support STAT 301
here are the results.

STAT 301-3 Statistics for the Life Sciences.

This course, which is a replacement for STAT 102-3, will first be offered in 94-3, then twice a year after that. There is one textbook listed on the course outline and it is in the Library collection. The Library's holdings were compared with those of other B.C. Universities in the subject *Mathematical Statistics* and we have 442 titles to UBC's 347 and U-VIC's 158. There is no need to alter the Library collection profile.

THERE ARE NO LIBRARY COSTS ASSOCIATED WITH THIS COURSE.

Please contact me to discuss this assessment if you have any concerns or questions (Phone 5946).

c.c. Sharon Thomas, Head, Library Collections Management

**SIMON FRASER UNIVERSITY
W.A.C. BENNETT LIBRARY
MEMORANDUM**

To: Gary Parker
Mathematics/Statistics

From: Sharon Thomas
Head, Library
Collections

Subject: ACMA courses

Date: July 12, 1993

cc:

The proposed changes to the ACMA courses are not substantive and do not reflect any changes which would affect the Library. I see no additional expenditures arising out of these amendments.

Sharon Thomas



SIMON FRASER UNIVERSITY

MEMORANDUM

To: J. Osborne Chair, SCUS	Date: October 27, 1993
	From: Katherine Heinrich Chair, Department of Mathematics & Statistics
Subject: MATH 171, 172	

The Department of Mathematics and Statistics accepts the responsibility of supplying copies of the MAPLE manual to the library (to a maximum cost of \$235).

KH:mm

cc: D. Boal
H. Gerber

A large, stylized handwritten signature, likely of Katherine Heinrich, written in black ink.

MEMO

TO: Dr. David Boal, Chair Faculty of Sciences
Undergraduate Curriculum Committee

FROM: Ralph Stanton (Library Collections Management Office)

RE: Library Assessment of New Course Proposals:
BISC 333 Developmental Biology
BISC 406 Marine Biology and Oceanography
BISC 457 Plant Molecular Biology and Biotechnology

DATE: 26 October, 1993

BISC 333 Developmental Biology

This course will be offered twice per year beginning in 95-1 to about 30 students. This course is a modification of BISC 203.

The average cost of books in this subject is \$70 (BNA93-p.24)

B.C. UNIVERSITY LIBRARY COMPARISON

We have compared our holdings to those of U-VIC and UBC in subject headings associated with this course as follows:

	UVIC	UBC	SFU
Embryology	19	240	90
Echinodermata	3	7	7
Vertebrates	12	64	39
Cells	13	161	48
Cell Differentiation	16	85	56
Genomes	1	7	7
	---	---	---
Total	64	564	247

PEER GROUP COMPARISON

We developed a comparison of our holdings to a peer group for a 10 year period (top 80%) using the Amigos collection development system for selected Library of Congress call numbers associated with the subjects noted in the previous table, as follows:

	Peer Group	SFU	Gap +or-
QL995	8	6	2
QL381	3	3	0
QL605	5	3	2
QH581	26	16	10
QH607	19	17	2
QH447	4	4	0
	---	---	---
Totals	65	49	16*

The gap with UBC is large and probably expected but the gap with the peer group is not significant for the 10 year time period. *We would like the Biological Sciences Department to look over the enclosed lists to see if there are any vital resources which must be bought.* Otherwise there are no costs attached to this course.

THERE ARE NO COSTS ASSOCIATED WITH THIS COURSE.

BISC 406 Marine Biology and Oceanography

This course will be offered every second year beginning in 94-3 to about 24 students.

The average cost of books in this subject is \$70 (BNA93-p.24).

The required textbook for this course is in the Library. There is no reading list associated with this course.

B.C. UNIVERSITY LIBRARY COMPARISON

We have compared our holdings to those of U-VIC and UBC in subject headings associated with this course as follows:

	UVIC	UBC	SFU
Marine Biology	43	179	75
Estuarine Ecology	9	23	10
Marine Plankton	5	18	11
Biological Diversity	6	21	6
	--	---	---
Total	63	241	102

PEER GROUP COMPARISON

We developed a comparison of our holdings to a peer group for a 10 year period (top 80%) using the Amigos collection development system for selected Library of Congress call numbers associated with the subjects noted in the previous table, as follows:

	Peer Group	SFU	Gap +or-
QH91	18	11	7
QH451	2	0	2
	--	--	-
Totals	20	11	9*

The gap with UBC is large and probably expected but the gap with the peer group is not significant for the 10 year time period. *We would like the Biological Sciences Department to look over the enclosed lists to see if there are any vital resources which must be bought.* Otherwise there are no costs attached to this course.

THERE ARE NO COSTS ASSOCIATED WITH THIS COURSE.

BISC 457 Plant Molecular Biology and Biotechnology

This course will be offered annually with a start date to be announced to about 20 students.

The average cost of books in this subject is \$70 (BNA93-p.24). The two texts in the course outline are in the Library catalogue, one is on loan and we would like to purchase an added copy for \$70.

B.C. UNIVERSITY LIBRARY AND AMIGOS COMPARISON

In the original version of this assessment dated 26 October 1993 we developed comparisons to B.C. libraries and using the Amigos system. This process revealed gaps which we proposed to fill. However, the course instructor Alison Kermode informed us 29/10/93 that the Library collection is more than adequate and that no further resources are required either in monographs or serials.

Lin Kemp also noted 28/10/93 that none of the material in the gap lists is required for this course and that the texts listed in the outline are no longer used. However one title is on loan at the present time and this indicates its usefulness while its presence in the course outline indicates that it has been associated with this course. We continue to want to buy an added copy of this text at \$70

but we do not think that any disagreement on this point should hold up this course.

SERIALS

The Library holds the serial *Plant Journal* and *Plant Molecular Biology* but not *Transgenic Research* (\$N/A). The New Course Proposal form indicates that this resource is not absolutely essential, we agree.

COST SUMMARY:

THE ONE TIME COST ASSOCIATED WITH THIS COURSE IS \$70. THE
~~RECURRING COST ASSOCIATED WITH THIS COURSE IS \$000--TRANSFER~~
FROM BASE.

* Bibliographical lists of these gap titles have been included with the original assessments.

Please call me if you have any questions or problems you would like to discuss (5946).

RS

c.c. Sharon Thomas, Library
Alison Kermode
Lin Kemp