SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate

From: L. Salter
Chair, SCAP

Subject: Department of Mathematics and Statistics - Proposed Certificate Program in Actuarial Mathematics
Reference: SCUS 89-48
SCAP 89-52

Date: November 9, 1989

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

Motion:

"That Senate approve and recommend approval to the Board of Governors as set forth in S.89-67 the proposed Certificate Program in Actuarial Mathematics including

New courses		
	ACMA 310 - 3	Introduction to Actuarial Mathematics
	ACMA 320 - 3	Actuarial Mathematics
	ACMA 330 - 3	Risk Models
	ACMA 340 - 3	Topics in Actuarial Mathematics"

SIMON FRASER UNIVERSITY

MEMORANDUM

To.......Dr...R...Frindt................... | From......M...Singh...............................

.......Chair.,.Fac...of.Science..UCC........ | ......Chair.,.UGSC..Math..&..Stats........

Subject...New..Program-..Actuarial.Math...... | Date......September..18.,..89...................

Please, find enclosed herewith a proposal for a certificate program in Actuarial Mathematics. The program shall be offered at Harbour Center. Since the last five years, the demand for studies in Actuarial Science has substantially increased. I have been conducting the exams for the first two ASA courses numbered 100 and 110 on behalf of the Actuaries Society at Simon Fraser University campus. Whereas the number of candidates used to be around 8 in 1982, it was around 22 for each course this year. The examinations for other courses are held at other Vancouver locations. There are a whole lot of students whom I see every year who are interested in pursuing a career as Actuaries, but are somewhat apprehensive in taking the initiative for lack of a structured program in an academic institution in Vancouver. The enclosed program addresses that problem quite well. It is time we get into this area which shall not only benefit our undergraduates at SFU but students in other institutions as well as a number of adults working in the investment industry in Vancouver.

Needless to say this program fits rather nicely at the Downtown campus. We are already offering courses such as MA 100, MA110, MA 151, Stat 101, MA 292 (Actuarial Mathematics, equivalent to ACMA 320) at Harbour Center. The books and journals necessary to complement this program shall be placed at the Belzberg Library, Harbour Center.
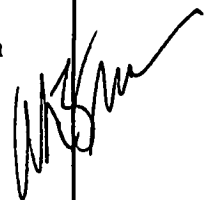
I would appreciate it if you could consider this proposal in the meeting on September 20, 89.

Manohar Singh

SFU SIMON FRASER UNIVERSITY

MEMORANDUM

	Date: September 15, 1989
To: UG Curriculum Committee Faculty of Science	From: A. R. Freedman, L. Weldon with the assistance of Harry Satanov, (Fellow of The Society of Actuaries)

Subject: Certificate Program and Minor Program in Actuarial Mathematics

The Canadian Institute of Actuaries (the CIA!) is a co-sponsor of the "Society of Actuaries Examinations". We propose a certificate program in Actuarial Mathematics for SFU at Harbour Centre which will train candidates for all the Examinations required for admission to the Society of Actuaries (ASA) as an Associate. (Admission to the Society as a Fellow is a much more advanced program, based on the Associateship, and we are not considering any training in this area at present). In the process, a Bachelor's degree candidate will obtain a minor in Mathematics by completing the required courses for the Certificate.

The program of examinations, required by the ASA for the Associateship, is reproduced below. The Society calls them "courses" but at present there is only one way of satisfying the "course" requirement and that is to pass the examination set by the ASA. For several years now there have been discussions within the ASA concerning the possibility of granting accreditation to institutions to offer the ASA courses (as regular classroom courses) and SFU will surely be ready for this if the present proposal is realized. The "credits" listed for the courses below indicate the relative lengths of the corresponding examinations (each 10 credits is approximately one hour of examination time). Actually, for the Associateship, the ASA requires the candiate to pass only 200 of the 210 credits represented by these courses so that one 10 credit examination may be omitted.

ASA Course #	"Credits"	Course Name
100	30	Calculus and Linear Algebra
110	30	Probability and Statistics
120	15	Applied Statistical Methods
130	15	Operations Research
135	10	Numerical Methods
140	10	Mathematics of Compound Interest

150	40	Actuarial Mathematics
151	15	Risk Theory
160	15	Survival Models
161	10	Mathematics of Demography
162	10	Construction of Actuarial Tables
165	10	Mathematics of Graduation

Total 210

The contents in the first five of these examinations is covered by courses already offered by the Department of Mathematics and Statistics. Specifically:

ASA Course #	Corresponding SFU Courses
100	MATH 151, MATH 152, MATH 232
110	STAT 270, STAT 280
120	STAT 330*
130	MATH 308, STAT 280
135	MACM 216 (OR MACM 316)

*STAT 330, when offered at Harbour Centre, may have to be altered somewhat to be made more suitable to ASA course 120.

The material in the remaining ASA courses (140 through 165) will be covered in four new 3 credit hour courses in actuarial mathematics with the new course designation ACMA (for actuarial mathematics). We note that this is a very modest proposal. For example, the University of Waterloo covers the material for only ASA 140 and 150 in four separate courses. Briefly, our proposal is as follows:

ACMA 310-3   Introduction to Actuarial Mathematics (3-1-0)
This course will cover ASA 140 and the first 1/3 ASA 150.

ACMA 320-3   Actuarial Mathematics (3-1-0).
This course will cover the remainder of ASA 150.

ACMA 330-3   Risk Models (3-1-0).
This course will cover ASA 151 and 160.

ACMA 340-3   Topics in Actuarial Mathematics (3-1-0).
This course covers ASA 161, 162 and 165.

Completed course proposal forms for these four new courses are attached.

Frequency of offering. The minimum offering for the four ACMA courses is as follows:

	FALL	SPRING	SUMMER
Even year	ACMA 310-3	ACMA 320-3	ACMA 330-3
Odd year	ACMA 310-3	ACMA 320-3	ACMA 340-3

(That is, 310 and 320 are offered once a year and 330 and 340 alternate years, resulting in 3 offerings per year).

For the courses which cover the first part of the Associateship, namely MATH 151, 152, 232, 308; STAT 270, 280, 330; AND MACM 216, we would have to see what the demand is and what resources are made available. Given substantial enrolments at the various stages of this program, a typical offering pattern might be:

MATH 151, 152, 232 and STAT 270   once a year
MATH 308, MACM 216, STAT 280, 330   once every two years

This would produce 6 offerings per year for a total of 9 courses per year at Harbour Centre for the program. This would be a maximum. In the early stages, the Harbour Centre versions of these non-ACMA courses would be offered less frequently.

We are asking now that the four new courses be approved and the certificate program, in general, be approved in principle.

To obtain the certificate, the following courses must be completed:

MATH 151, 152, 232, 308
MACM 216 (or MACM 316)
STAT 270, 330, 280
ACMA 310, 320, 330, 340

NOTE: The above program was approved by the Department of Mathematics and Statistics at its meeting of September 11, 1989.

ARF:jc
Attach.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

1. **Calendar Information**   Department: **Mathematics & Statistics**

   Abbreviation Code:___ACMA___ Course Number:___310___ Credit Hours:___3___ Vector:___3-1-0___

   Title of Course: __Introduction to Actuarial Mathematics__

   Calendar Description of Course: Measurement of Interest Annuities, Amortization, Sinking Funds, Bonds, etc. Survival Distributions, Life Tables, Life Insurance and Life Annuities. This course provides training for the Society of Actuaries examinations, course numbers 140 and part of 150.

   Nature of Course Lectures and Tutorial.

   Prerequisites (or special instructions):

   > MATH 151, 152 and STAT 270.

   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 a year.

   Semester in which the course will first be offered? Fall 1990

   Which of your present faculty would be available to make the proposed offering possible: N. Reilly, M. Singh, L. Weldon

3. **Objectives of the Course**

   See calendar description. This course is one of four new courses in Actuarial Mathematics included in proposed SFU at Harbour Centre certificate and Math Minor program in Actuarial Mathematics.

4. **Budgetary and Space Requirements** (for information only)

   What additional resources will be required in the following areas:

   Faculty 1/4 faculty person.

   Staff

   Library See attached note.

   Audio Visual

   Space

   Equipment

5. **Approval**

   Date:

signature	CHW. Jones	11/1/89
Sept 18, 1989	Oct. 17 1989.	_signature_
Department Chairman	Dean	Chairman, SCUS

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a.

Attach course outline.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

1. **Calendar Information**   Department: Mathematics & Statistics

   Abbreviation Code: ACMA Course Number: 320 Credit Hours: 3 Vector: 3-1-0

   Title of Course: Actuarial Mathematics

   Calendar Description of Course: Continuation of Actuarial Mathematics begun in
   ACMA 310 including Net Premiums, Reserves, Multiple Life functions, Valuation
   Theory, Insurance Models, etc. This course provides training for the Society
   of Actuaries examinations, course number 150.

   Nature of Course Lectures and tutorial.

   Prerequisites (or special instructions):

   ACMA 310.

   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 a year.

   Semester in which the course will first be offered? Spring 1990

   Which of your present faculty would be available to make the proposed offering
   possible: N. Reilly, M. Singh, L. Weldon

3. **Objectives of the Course**

   See calendar description. This course is one of four new courses in Actuarial
   Mathematics included in proposed SFU at Harbour Centre certificate and Math
   Minor program in Actuarial Mathematics.

4. **Budgetary and Space Requirements** (for information only)

   What additional resources will be required in the following areas:

   Faculty   1/4 faculty person.

   Staff

   Library   See attached note.

   Audio Visual

   Space

   Equipment

5. **Approval**

   Date:

   _____   CHW. Jews   11/1/89

   Sept. 16, 1989   Oct. 17 1989   _____
   Department Chairman   Dean   Chairman, SCUS

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a.
Attach course outline).

6

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

1. **Calendar Information**   Department: Mathematics & Statistics

   Abbreviation Code: ACMA Course Number: 330   Credit Hours: 3   Vector: 3-1-0

   Title of Course: Risk Models

   Calendar Description of Course: Economics of Insurance, Risk Models, both individual and collective, short term and extended period. Applications of Risk Theory, Survival Models, estimating models from complete and incomplete data samples, maximum likelihood estimation techniques, etc. This course provides training for the Society of Actuaries examinations, course numbers 151 and 160.

   Nature of Course Lectures and tutorial.

   Prerequisites (or special instructions):

   ACMA 320, STAT 280 is recommended.

   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 every two years.

   Semester in which the course will first be offered? Summer 1990

   Which of your present faculty would be available to make the proposed offering possible: N. Reilly, M. Singh, L. Weldon

3. **Objectives of the Course**

   See calendar description. This course is one of four new courses in Actuarial Mathematics included in proposed SFU at Harbour Centre certificate and Math Minor program in Actuarial Mathematics.

4. **Budgetary and Space Requirements** (for information only)

   What additional resources will be required in the following areas:

   Faculty 1/4 faculty person.

   Staff

   Library See attached note.

   Audio Visual

   Space

   Equipment

5. **Approval**
   Date: Sept 18, 1989   CHW. Jams   11/1/85

                                 Oct. 17 1989   F. Sain

        Department Chairman   Dean   Chairman, SCUS

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a. Attach course outline).

7

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

1. **Calendar Information**   Department: Mathematics & Statistics

   Abbreviation Code: ACMA   Course Number: 340   Credit Hours: 3   Vector: 3-1-0

   Title of Course: Topics in Actuarial Mathematics

   Calendar Description of Course: This course covers topics in the Mathematics of
   Demography; the construction of Actuarial Tables and the Mathematics of Graduation.
   This course provides training for the Society of Actuaries examinations.course
   numbers 161, 162 and 165.

   Nature of Course   Lectures and tutorial.

   Prerequisites (or special instructions):

         ACMA 310, MACM 216 (or MACM 316) and STAT 270.

   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 every two years.

   Semester in which the course will first be offered? Summer 1991

   Which of your present faculty would be available to make the proposed offering
   possible: N. Reilly, M. Singh, L. Weldon

3. **Objectives of the Course**

   See calendar description. This course is one of four new courses in Actuarial
   Mathematics included in proposed SFU at Harbour Centre certificate and Math
   Minor program in Actuarial Mathematics.

4. **Budgetary and Space Requirements** (for information only)

   What additional resources will be required in the following areas:

   Faculty   1/4 faculty person.

   Staff

   Library   See attached note.

   Audio Visual

   Space

   Equipment

5. **Approval**

   Date: _Sept. 18, 1989_ _CHW. Jones_ _11/1/89_

   _____ _Oct 17 1989_ _R.S___
   Department Chairman   Dean   Chairman, SCUS

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a.
Attach course outline).

The required library resources should include:

Journals: 1. Transactions of the Society of Actuaries
              2. Transactions of the Society of Actuaries - Reports
              3. Society of Actuaries - Records
              4. ARCH (Actuarial Research Clearing House)
              5. The Actuary (Soc. of Act. Newsletter)

Monographs / Notes / Study Manuals   (see attached)

9.

A.S.M. — STUDY MANUALS: (Prices include shipping. See page one (1) for authors and contents).

Course No.	Old Part No.	Order No.	Contents	When Avail.	Price	How Many?	Amount
110	2	2-1*	Solutions to 11/81 and 5/82 exams	Now	$18.00		$
		2-1Q	Questions for 11/81 and 5/82 exams	Now	4.00		
		2-2*	Solutions to 5/83 and 5/85 exams	Now	20.00		
		2-2Q	Questions for 5/83 exam	Now	2.00		
120, 130, 135	3	3-1	2 practice exams and solutions	Now	29.00		
		3-2*	Solutions to 11/84 exam	Now	14.00		
		3-2Q	Questions for 11/84 exam	Now	2.00		
(Order numbers with prefix "3" contain solutions to all 3 course numbers 120, 130 and 135.)		3-3*	Solutions to 11/85 exam	Now	14.00		
		3-3Q	Questions for 11/85 exam	Now	2.00		
		3-4*	Solutions to 5/86 exam	Now	16.00		
		3-4Q	Questions for 5/86 exam	Now	2.00		
		3-5*	Solutions to 11/86 exam	Now	17.00		
		3-5Q	Questions for 11/86 exam	Now	2.00		
		120-1*	Solutions to 5/87 exam	Now	7.00		
		120-1Q	Questions for 5/87 exam	Now	2.00		
		120-2*	Solutions to 11/87 exam	Now	7.00		
		120-2Q	Questions for 11/87 exam	Now	2.00		
		120-3	Solutions to 5/88 exam	Now	8.00		
		120-4	Solutions to 11/88 exam	Now	8.00		
		120-5	Solutions to 5/89 exam	Aug. 15	8.00		
		130-1*	Solutions to 5/87 exam	Now	7.00		
		130-1Q	Questions for 5/87 exam	Now	2.00		
		130-2*	Solutions to 11/87 exam	Now	7.00		
		130-2Q	Questions for 11/87 exam	Now	2.00		
		130-3	Solutions to 5/88 exam	Now	8.00		
		130-4	Solutions to 11/88 exam	Now	8.00		
		130-5	Solutions to 5/89 exam	Aug. 15	8.00		
		135-1*	Solutions to 5/87 exam	Now	7.00		
		135-1Q	Questions for 5/87 exam	Now	2.00		
		135-2*	Solutions to 11/87 exam	Now	7.00		
		135-2Q	Questions for 11/87 exam	Now	2.00		
		135-3	Solutions to 5/88 exam	Now	8.00		
		135-4	Solutions to 11/88 exam	Now	8.00		
		135-5	Solutions to 5/89 exam	Aug. 15	8.00		
140, 150	4	4-1	2 practice exams and solutions	Now	30.00		
(Order numbers with prefix "4" contain solutions to both course numbers 140 and 150.)		4-2*	Solutions to 5/84 & SOA practice exam	Now	32.00		
		4-2Q	Questions for 5/84 and SOA practice	Now	4.00		
		4-3*	Solutions to 11/85 exam	Now	16.00		
		4-3Q	Questions for 11/85 exam	Now	2.00		
		Note: The Society of Actuaries provides solutions to Part 4 exams subsequent to 11/85.					
151, 160, 162, 165	5	151-1	2 practice exams and solutions	Now	26.00		
		160-1	2 practice exams and solutions	Now	26.00		
		162-1	2 practice exams and solutions	Now	18.00		
		165-1	2 practice exams and solutions	Now	18.00		
141 & P-360U	EA-1	E-1*	Solutions to 5/84 exam	Now	15.00		
		E-1Q	Questions for 5/84 exam	Now	2.00		
		E-4*	Solutions to 5/85 exam	Now	15.00		
		E-4Q	Questions for 5/85 exam	Now	2.00		
		E-5	Solutions to 5/86 exam	Now	16.00		
		E-6	Solutions to 5/87 exam	Now	16.00		
		E-7	Solutions to 5/88 exam	Now	17.00		
P-365U	EA-2	P-1*	Solutions to 11/84 and 11/85 exams	Now	30.00		
		P-1Q	Questions for 11/84 and 11/85 exams	Now	4.00		
		P-2	Solutions to 11/86 exam	Now	17.00		
		P-3	Solutions to 11/87 exam	Now	17.00		
		P-4	Solutions to 11/88 exam	Aug. 15	17.00		

Total amount for manuals (carry to page 3) $_____

*IMPORTANT NOTE: We do not provide the questions for the last three exams, since the Society of Actuaries includes these questions with its Study Notes. Questions for older exams may be ordered as listed above ("Q" order numbers). (Questions for Course 110 5/85 exam is included in the Society of Actuaries Preliminary Actuarial Examinations booklet).

10.

A.S.M. — TEXTBOOKS (Prices include shipping. Editions are as specified in 1989 SOA catalogs).

Author	Title	Price	No.	Amt.
COURSE 100				
Bradley	Primer for Linear Algebra	44.00		
Kolman	Introductory Linear Algebra	45.00		
Lipshutz	Linear Albegra	11.00		
Purcell	Calculus with Analytic Geom.	56.00		
Purcell	Study Guide to above text	22.00		
Thomas	Calculus and Analytic Geom.	59.50		
Thomas	Solution Manual — Part 1	17.00		
Thomas	Solution Manual — Part 2	15.00		
COURSE 110				
Hoel	Intro. to Probability Theory	46.50		
Hoel	Intro. to Statistical Theory	46.50		
Hogg	Intro. to Math. Statistics	44.00		
Mood	Intro. to Theory of Statistics	50.50		
Spiegel	Theory & Prob. of Statistics	11.50		
Tanur	Stat.: Guide to the Unknown	17.50		
COURSE 120				
Miller	Intermed. Business Statistics	47.00		
COURSE 130				
Hillier	Intro. to Operations Research	50.50		
Jensen	Study Guide to Hillier	18.00		
COURSE 135				
Burden	Numerical Analysis	47.00		
COURSE 140				
Kellison	Theory of Interest	22.50		
COURSE 141 (EA-1 SEG. A)				
Bowers	Actuarial Mathematics	65.50		
Jordan	Life Contingencies	26.00		
Kellison	Theory of Interest	22.50		
Parmenter	Theory of Interest	29.00		
COURSE 150				
Bowers	Actuarial Mathematics	65.50		
COURSE 151				
Bowers	Actuarial Mathematics	65.50		
COURSE 160				
London	Survival Models	28.00		

Author	Title	Price	No.	Amt.
COURSE 161				
Keyfitz	Demography through Problems	40.00		
Pollard	Demographic Techniques	26.00		
COURSE 162				
Batten	Mortality Table Construction	36.00		
COURSE 165				
London	Graduation: Revision of Est.	28.00		
COURSE 210				
Black	Life Insurance	46.00		
McGill	Fund. of Private Pensions	37.00		
Webb	Insurance Company Operations	24.00		
COURSE 220				
Cohen	Investment Analysis	42.50		
McGill	Fund. of Private Pensions	37.00		
Weston	Managerial Finance	48.00		
Weston	Study Guide to above text	19.00		
COURSE G-320				
Johnson	Flexible Benefits	25.50		
Rosenbloom	Employee Benefits Planning	40.50		
COURSE G-522				
Winklevoss	Cont. Care Retirement Commun.	27.00		
COURSE G-523				
Doran	Measuring & Funding Corp. Liab.	26.00		
COURSE I-343U				
Meyer	Life & Health Insurance Law	26.50		
COURSE I-441U				
Black	Life Insurance	46.00		
LIMRA	Marketing for Actuaries	33.00		
COURSE I-445				
O'Grady	Individual Health Insurance	36.00		
COURSE P-362U				
Allen	Pension Planning	36.50		
Bleakney	Ret. Systems for Public Empl.	16.00		
COURSE P-562U				
Meyers	Social Security	35.50		
COURSE P-563U				
Allen	Pension Planning	36.50		

Total amount for textbooks $_____

Total amount for manuals (from page 2) _____

New York State residents only: add local sales tax _____

Add foreign charges (see below) _____

(Make checks payable to A.S.M.) GRAND TOTAL $_____

INSTRUCTIONS FOR MAIL ORDERS

1. Please send payment with your order. Make checks payable to A.S.M.
2. For phone orders, see page 1.
3. Orders will be shipped by UPS (included in price). Please use street address as UPS cannot deliver to a P.O. box.
4. AIRMAIL FOR FOREIGN ORDERS: Canadian: Add $3.00 per book. (No charge for manuals). Overseas: Add $3.00 per manual, $14.00 per book.
5. To our foreign friends. We CANNOT accept checks drawn on foreign banks (unless payable through a U.S. branch bank). Payment must be in U.S. funds by international postal or bank money order.

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