SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate   From: J.W.G. Ivany
                                                              Chair, SCAP

Subject: Department of Mathematics and   Date: November 17, 1988
           Statistics - Curriculum Revisions

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 curriculum revisions in Department of Mathematics
and Statistics as set forth in S.88-53 including the proposed
new Applied Mathematics Honors and Major Programs.

SIMON FRASER UNIVERSITY
MEMORANDUM

To: R. Heath, Secretary
to Senate

From: P. Dobud, Administrative
Assistant to the Dean of
Science

Subject: Calendar Change:
Department of Mathematics and
Statistics

Date: October 12, 1988

This is to inform you that the Faculty of Science, at its meeting held on Tuesday October 11, 1988 has approved the following calendar changes for the DEPARTMENT OF MATHEMATICS AND STATISTICS. I would appreciate it very much if you would place these motions in the agenda of the next SCUS meeting for consideration and approval.

i) *That the title for the courses MATH 198-3 and MATH 398-3 be changed (Paper FSC 7-88)*

From:		To	
MATH 198-3	Selected Topics in Mathematicas and Statistics	MATH 198-3	Selected Topics in Mathematics
MATH 398-3	Selected Topics in Mathematicas and Statistics	MATH 398-3	Selected Topics in Mathematics

ii) *To approve the following correction In the MACM calendar entry: (Paper FSC 8-88)*

From:

k) THEORETICAL COMPUTING SCIENCE
Required courses
CMPT 406-3 Computational Geometry
409-3 Special Topics in Theoretical Computing Science.
MACM 300-3 Formal Language and Automata with Applications.

l) INTENSIVE APPLICATIONS
Required courses
CMPT 305-3 Computing Simulation and Modelling.
340-3 Computers in Biomedicine.
351-3 Introduction to Computer Graphics
362-3 Computers in Education.
451-3 Interactive Graphics and Animation Systems.

To:

k) THEORETICAL COMPUTING SCIENCE
CMPT 406-3 Computational Geometry.
409-3 Special Topics in Theoretical Computing Science.
MACM 300-3 Formal Language and Automata with Applications.

l) INTENSIVE APPLICATIONS
CMPT 305-3 Computing Simulation and Modelling.
340-3 Computers in Biomedicine.
351-3 Introduction to Computer Graphics.
362-3 Computers in Education.
451-3 Interactive Graphics and Animation Systems.

iii)   **To approve the Applied Mathematics Honors and Major Program as follows : (Paper FSC 9-88)**

APPLIED MATHEMATICS HONORS AND MAJOR PROGRAMS

The Applied Mathematics program leading to a
B.Sc. degree in Applied Mathematics offers
a solid background in Mathematics with an
orientation towards the applied aspects of
Mathematics for students planning careers
in technology industries, Numerical Analysis,
Theoretical and Applied Mathematics.

The required courses for the B.Sc. degree in
Applied Mathematics are as follows:

A. HONORS PROGRAM IN APPLIED MATHEMATICS

Lower Division required courses
(38-39 semester hours plus electives)

	MATH 151-3	Calculus I
	152-3	Calculus II
	232-3	Elementary Linear Algebra
	242-3	Introduction to Analysis
	251-3	Calculus III
	252-3	Vector Calculus
	STAT 270-3	Introduction to Probability and Statistics
	PHYS 120-3	Physics I
	121-3	Physics II
	CMPT 102-3	Introduction to Programming for Science Students
or	CMPT 101-4	Introduction to a High Level Programming Language A
or	CMPT 103-4	Introduction to a High Level Programming Language B

At least two of:
* MATH 262-4   Engineering Mechanics I
* 263-4   Engineering Mechanics II
* 265-4   Engineering Mechanics III

Upper Division required courses
(48 to 52 semester hours plus electives)
MATH 310-3   Introduction to Ordinary Differential Equations
MATH 313-3   Differential Geometry
MATH 314-3   Boundary Value Problems
MATH 320-3   Advanced Calculus of One Variable
MATH 322-3   Complex Variables
MATH 361-3   Mechanics of Deformable Media
MACM 316-3   Numerical Analysis I

At least one of:
MATH 308-3   Linear Programming
MATH 416-3   Numerical Analysis II
STAT   380-3   Introduction to Stochastic Processes

At least four of:
MATH 309-3   Continuous Optimization
MATH 408-3   Discrete Optimization
MATH 415-3   Ordinary differential Equations
MATH 418-3   Partial Differential Equations
MATH 419-3   Linear Analysis
MATH 424-3   Applications of Complex Analysis
MATH 438-3   Linear Algebra
STAT   330-3   Linear Models in Applied Statistics

At least four of:

* MATH 362-3   Fluid Mechanics I
* MATH 462-3   Fluid Mechanics II
* MATH 466-4   Tensor Analysis
* MATH 467-3   Vibrations
* MATH 468-4   Continuum Mechanics
* MATH 470-4   Variational Calculus
* MATH 471-4   Special Relativity
* PHYS 413-3   Advanced Mechanics

The students choices from the above courses must include
at least five courses at the 400 level. In addition, the number
of credit hours must total at least 132, of which at least 6 hours
must be in a Faculty other than the Faculty of Science and at
least 60 hours must be at the upper division.

B. MAJOR PROGRAM IN APPLIED MATHEMATICS

Lower Division required courses
(38-39 semester hours plus electives)

MATH	151-3	Calculus I
	152-3	Calculus II
	232-3	Elementary Linear Algebra
	242-3	Introduction to Analysis
	251-3	Calculus III
	252-3	Vector Calculus
STAT	270-3	Introduction to Probability and Statistics
PHYS	120-3	Physics I
	121-3	Physics II
CMPT	102-3	Introduction to Programming for Science Students
or CMPT	101-4	Introduction to a High Level Programming Language A
or CMPT	103-4	Introduction to a High Level Programming Language B

At least two of:

* MATH 262-4   Engineering Mechanics
*   263-4   Engineering Mechanics II
*   265-4   Engineering Mechanics III

Upper Division required courses
(30 to 32 semester hours plus electives)

MATH	310-3	Introduction to Ordinary Differential Equations
MATH	313-3	Differential Geometry
MATH	314-3	Boundary Value Problems
MATH	320-3	Advanced Calculus of One Variable
MATH	322-3	Complex Variables
MACM	316-3	Numerical Analysis I

At least two of:

MATH	308-3	Linear Programming
MATH	309-3	Continuous Optimization
MATH	408-3	Discrete Optimization
MATH	415-3	Ordinary Differential Equations
MATH	416-3	Numerical Analysis II
MATh	418-3	Partial Differential Equations
MATH	419-3	Linear Analysis
MATH	424-3	Applications of Complex Analysis
MATH	438-3	Linear Algebra
STAT	380-3	Introduction to Stochastic Processes

At least two of:

MATH	361-3	Mechanics of Deformable Media
MATH	362-3	Fluid Mechanics I
MATH	462-3	Fluid Mechanics II
MATH	466-4	Tensor Analysis
MATH	467-3	Vibrations
MATH	468-4	Continuum Mechanics
MATH	470-4	Variational Calculus
MATH	471-4	Special Relativity
PHYS	413-3	Advanced Mechanics

The students choices from the above courses must include
at least three courses at the 400 level. In addition, the number
of credit hours must total at least 120, of which at least 6 hours
must be in a Faculty other than the Faculty of Science and at
least 44 hours must be at the upper division.

*The package MATH 262, 263, 265 and 362 is well suited
  for students interested in engineering type of problems.

Thank you
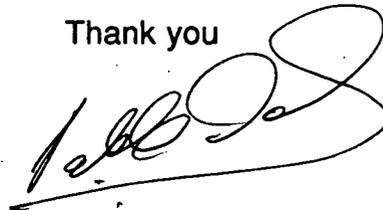
cc: Dr. B. Frindt, Chair, Faculty of Science Undergraduate Curriculum Committee
      Dr. A. Freedman, Chair, Department of Mathematics and Statistics
      Dr. M. Singh, Department of Mathematics and Statistics

SIMON FRASER UNIVERSITY
Department of Mathematics and Statistics

To:	Dr. R. Frindt, Chair	From:	M. Singh, Chair
	Faculty of Science UGCC		Math & Stats UGSC
Subject:	**CHANGE IN COURSE TITLES**	Date:	22 September 1988

Please find enclosed the proposal for change in course titles for Math 198-3 and Math 398-3.

Since we have now developed special topic courses such as Stats 290, Stats 390, and Stats 490, the course titles for Math 198 and Math 398 should be changed from "Selected Topics in Mathematics and Statistics" to Selected Topics in Mathematics". This change shall be consistent with the present description of courses in Mathematics versus courses in Statistics.

Ms. Bobbie Grant, Senate Secretary, has indicated to me that no new course proposal forms are necessary for a simple title change only.

PAPER FSC 8-88

SIMON FRASER UNIVERSITY
Department of Mathematics and Statistics

To:	Dr. R. Frindt, Chair	From:	M. Singh, Chair
	Faculty of Science UGCC		Math & Stats UGSC
Subject:	**CALENDAR ENTRY** MATHEMATICS AND COMPUTING SCIENCE PROGRAM	Date:	22 September 1988

On page 130 of the Calendar, the groups k) and l) have an error. The words "required courses" should be omitted from each of these groups. This was apparently a typing error since these courses were not required in the first place.

SIMON FRASER UNIVERSITY

Department of Mathematics and Statistics

To: **Dr. R. Frindt, Chair**   From: M. Singh, Chair
        Faculty of Science UGCC   Math & Stats UGSC

Subject: **APPLIED MATHEMATICS HONORS**   Date: 22 September 1988
          AND MAJOR PROGRAM

Please find enclosed a proposal for Applied Mathematics Honors and Major Programs that I would like the Faculty of Science to consider and hopefully approve.

The programs proposed are for a B.Sc. degree in Applied Mathematics. They are not an 'option' within the degree of B.Sc. in Mathematics.

Applied Mathematics consists of areas of mathematics which are closely related to other fields. Traditionally these fields of application have been mainly in the physical sciences and engineering, but nowadays sophisticated mathematical tools are used over a wide spectrum of disciplines. Applied Mathematicians are in increasing demand and the good student in the field is virtually sure of an interesting career whether he chooses industrial research, government laboratory or university.

The courses which constitute these programs are already in existence. The Department of Mathematics and Statistics offers sufficient courses at the undergraduate level for a student to specialize in Applied Mathematics. Details of a program for students interested in the Applied Mathematics of physics and engineering are given below. In addition, there are joint honors degree programs in Mathematics and Computer Science and in Mathematical Physics, both of which can include a substantial number of Applied Mathematics courses. A concentration in Applied Mathematics can also provide an excellent basis for a career in Engineering, and the programs in Engineering Science at SFU make considerable use of courses in this area. At the present moment a student who may take these courses receives a B.Sc. degree in Mathematics. What is being proposed is that such a degree be called B.Sc. in Applied Mathematics. The later shall constitute a more appropriate and fair description of the programs. During the last decade or so, not only Applied Mathematics has assumed an entity somewhat different from the descriptive of general mathematics, but many employers in the industrial world are beginning to demand such specific training in Applied Mathematics. A formal recognition of these programs shall provide a true description of a student's training.

_____
M. Singh

cc: A.R. Freedman, Chair, Mathematics and Statistics

MS/cll

SIMON FRASER UNIVERSITY
Department of Mathematics and Statistics

To: R. Frindt   From: K.L. Weldon
              Faculty of Science Curriculum Ctte.

Subject: **CHANGE IN THE MSSC PROGRAM**   Date: 13 September 1988

Two minor changes need to be made in the current Management and Systems Science program in order to bring it in line with recent changes in statistics courses.

a) **Current Program** (see attached)

Proposed Changes
      (1)   <u>Lower division Math requirement</u>
            Stat 270-3 replaces Math 272-3

      (2)   <u>Upper division Math requirement</u>
            STAT 330-3 replaces Math 372-3

Rationale
Math 272-3 has been replaced in the calendar by STAT 270-3, *Introduction to Probability and Statistics*, which is essentially the same course.

Math 372-3 has been replaced in the calendar by STAT 330-3, *Linear Models in Applied Statistics*, which is a substantially revised version of Math 372-3. It is felt that the course represents a strengthening of the MSSC program. The change in prerequisite (Math 232-3 required instead of Math 251-3) will not change the MSSC program as Math 251 is already a requirement.

K.L. Weldon

ADD

SIMON FRASER UNIVERSITY

Department of Mathematics and Statistics

To: R. Frindt   From: K.L. Weldon
Faculty of Science Curriculum Ctte.

Subject: **FACULTY OF SCIENCE UGCC**, MSSC, Date: 16 September 1988

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b)   In addition to the course renumbering that I advised you about in a recent memo (13 Sept.), there are some other changes in the calendar that are needed. In the paragraph about <u>recommended</u> courses (see p.127 of the 88/89 calendar):

MATH 304-3	should be replaced by	STAT 410-3
MATH 404-3	should be replaced by	STAT 430-3
MATH 472-3	should be replaced by	STAT 380-3.

I hope all these changes will appear in the 1989/90 calendar.
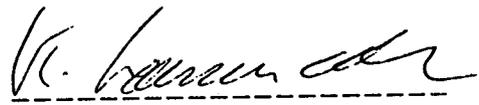
K.L. Weldon

KLW/cll

PROPOSED CHANGE IN VECTORS FOR MATH 232-3 and 155-3

Current: MATH 155-3 <u>Calculus II for the Biological Sciences</u> (3-1-0)
                 MATH 232-3 <u>Elementary Linear Algebra</u> (3-1-0)

Proposed: MATH 155-3 <u>Calculus II for the Biological Sciences</u> (3-0-1†)
                 MATH 232-3 <u>Elementary Linear Algebra</u> (3-0-1†)

RATIONALE: The vector change for Math 155-3 was already approved by the Department. However, a clerical error caused Math 155 to be omitted from the memo which went from the Faculty of Science to SCUS and, hence, the vector change for this course was not approved by Senate and will not appear in the next calendar. This course is taught in the Applied Calculus Workshop and should have the same vector as Math 154, 155, and 157, *i.e.* 3-0-1†.

Math 232-3 has been taught in the Calculus Workshop for several semesters now. This experiment has proven very successful, and it is time to acknowledge the permanent change in the way this course will be taught by changing the vector to 3-0-1†.

Changes in Prerequisites for Math Co-op Courses

Math 336-0 <u>Job Practicum I</u>

Current: *Prerequisites: Students must apply to the Department of Mathematics and Statistics at least one semester in advance. They will normally be required to have completed 60 semester hours of credit with a GPA of 2.5. This course will be graded on a pass/withdraw basis. A course fee is required.*

Proposed: *Prerequisites: Students must apply to and receive permission from the Department of Mathematics and Statistics at least one semester in advance. They will normally be required to have completed 45 semester hours of credit with a GPA of 2.5. This course will be graded on a pass/withdraw basis. A course fee is required.*

Math 337-0 <u>Job Practicum II</u>

Current: *Prerequisites: MATH 336 and completion of 75 credits; students must apply to the Department of Mathematics and Statistics at least one semester in advance. This course will be graded on a pass/withdraw basis. A course fee is required.*

Proposed: *Prerequisites: MATH 336 and permission of the Co-op Coordinator; students must apply at least one semester in advance. This course will be graded on a pass/withdraw basis. A course fee is required.*

Math 436-0 <u>Job Practicum III</u>

Current: *Prerequisites: MATH 337 and completion of 90 credits; students must apply to the Department of Mathematics and Statistics at least one semester in advance. This course will be graded on a pass/withdraw basis. A course fee is required.*

Proposed: *Prerequisite: MATH 337 and permission of the Co-op Coordinator; students must apply at least one semester semester in advance. This course will be graded on a pass/withdraw basis. A course fee is required.*

Math 437-0 <u>Job Practicum IV</u>

Current: *Prerequisites: MATH 436 and completion of 105 credits; students must apply to the Department of Mathematics and Statistics at least one semester in advance. This course will be graded on a pass/withdraw basis. A course fee is required.*

Proposed: *Prerequisites: MATH 436 and permission of the Co-op Coordinator; students must apply at least one semester in advance. This course will be graded on a pass/withdraw basis. A course fee is required.*

Rationale: The present prerequisite for Math 336 of 60 credit hours is too restrictive as some students will be ready to begin Co-op participation after fewer credit hours.

The credit hour restrictions in the prerequisites for Math 337, 436, and 437 are not adhered to and would technically preclude a back to back sequence of Co-op semesters. The only prerequisites in practice are the completion of the previous Co-op term (or its equivalent) and permission of the Co-op Coordinator.

Proposed Change in Prerequisite for STAT 302-3

Current: *Prerequisites: STAT 101 (or MATH 101) or STAT 102 (or MATH 102) or STAT 270 (or MATH 272) or ARC 376 or BUEC 232 (formerly 332). Students with credit for MATH 302 may not take STAT 302 for further credit.*

Proposed: Same as above but add *"or STAT 103".*

Rationale: STAT 103 is a course duplicate of both STAT 101 and STAT 102 and, therefore, will serve equally well as a prerequisite for STAT 302.