SIMON FRASER UNIVERSITY

S.75-183

MEMORANDUM

To SENATE	From SENATE COMMITTEE ON UNDERGRADUATE STUDIES
Subject COMPUTATIONAL MATHEMATICS OPTION	Date NOVEMBER 11, 1975

MOTION: "That Senate approve, and recommend approval to the Board of Governors, the following new courses as set forth in S.75-183:

MATH 243-3 - Discrete Mathematics
MATH 408-3 - Discrete Optimization
MATH 450-8 - Job Practicum in Computational Mathematics."

SIMON FRASER UNIVERSITY

S.75-183

MEMORANDUM

To SENATE	From SENATE COMMITTEE ON UNDERGRADUATE STUDIES
Subject COMPUTATIONAL MATHEMATICS OPTION	Date NOVEMBER 11, 1975

Action taken by the Senate Committee on Undergraduate Studies at its meeting of November 4, 1975 gives rise to the following motion:

MOTION

That Senate approve the following new courses: MATH 243-3 - Discrete Mathematics; MATH 408-3 - Discrete Optimization; MATH 450-8 - Job Practicum in Computational Mathematics.

Note: Following discussion of the objectives specified for a computational mathematics option, attention in SCUS turned to MATH 450-8 - Job Practicum. Members expressed particular concern that Job Practicums could affect students' eligibility for financial aid, could provide unfair competition for Union members, and could result in exploitation of students. Experience with students in job practica related to the Computing Science Program has indicated that arrangements could be made which included reasonable payment. On the other hand, insistence on payment might well limit placement opportunities. Department representatives indicated that the first priority in selecting placements would be the learning needs of the student, that the proposal anticipated students spending three days per week on the job practicum while carrying the balance of a normal course load and that participants would almost certainly enhance their prospects for part-time jobs and/or career placement. It was noted that four faculty members had indicated interest in involvement and that approximately twelve students were also interested. Furthermore, the proposal is supported by Manpower representatives on campus. Department representatives estimated that there would not likely be more than four or five placements per semester. There was consensus in SCUS that arrangements for the job practicum should not preclude payment for services.

SCUS was subsequently informed that staffing requirements had been inadvertently deleted from course proposal forms and that additional staff would be required in the near future if a Computational Mathematics Option is approved. It was noted that approval of the three new courses on their academic merits by SCUS and Senate implies no commitment to subsequent additional staffing.

Daniel R. Birch

SIMON FRASER UNIVERSITY SCUS 75-48

MEMORANDUM

To: H. Evans Secretary of SCUS	From: S. Aronoff S. Aronoff Dean of Science
Subject: COMPUTATIONAL MATHEMATICS OPTION	Date: October 29, 1975

The Faculty of Science, at its meeting of October 28, 1975, approved the attached proposal for a Computational Mathematics Option, including proposals for three new courses in Mathematics; 243, 408 and 450.

The supporting documentation is forwarded herewith for consideration by SCUS.

/pel

Encl.

U-75-14

SIMON FRASER UNIVERSITY

MEMORANDUM

To	Dr. D. Ryeburn, Chairman Faculty of Science Undergraduate Curriculum Committee	From	Dr. N.R. Reilly, Chairman Mathematics Department
Subject	MATHEMATICS 243, 408 and 450 PROPOSED COURSES: COMPUTATIONAL MATHEMATICS OPTION	Date	September 22, 1975

We propose to offer three new courses, Mathematics 243-3 (Discrete Mathematics), Mathematics 408-3 (Discrete Optimization), and Mathematics 450-8 (Job Practicum). These courses are to be a part of a computational Mathematics option, details of which are to be forthcoming in a few days.

Norman R. Reilly

NR/sh

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

1. Calendar Information

Department: MATHEMATICS

Abbreviation Code: MATH Course Number: 243-3 Credit Hours: 3 Vector: 3-1-0

Title of Course: DISCRETE MATHEMATICS

Calendar Description of Course: Trees, graphs, enumeration, error-correcting codes, paths and cycles in graphs, SDR's (Systems of Distinct Representatives), coloring algorithms, critical paths. Applications, discussion of computer representation and algorithm efficiency.

Nature of Course Lecture/tutorial

Prerequisites (or special instructions): Any 100 level mathematics or computing science course (except Math 100 or Math 190).

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? Twice yearly

Semester in which the course will first be offered? Fall 1976

Which of your present faculty would be available to make the proposed offering possible: Dr. Alspach, Dr. Brown, Dr. Berggren

Objectives of the Course To introduce basic discrete structures at a level for students in many disciplines. To introduce discrete modelling, applications and computational aspects.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty
Staff
Library
Audio Visual
Space
Equipment

NONE

5. Approval

Date: 22 Sept 1975 29/10/75

Norman R. Reilly — Department Chairman

S. Smith — Dean

Chairman, SCUS

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

DISCRETE MATHEMATICS

Math 243-3

Objectives

1. To teach how to formulate and analyze discrete models.
2. To introduce some combinatorial techniques.
3. To illustrate the use of combinatorics in discrete optimization.
4. To present applications to other fields, such as computing science, economics, probability, scheduling, etc. Some algebraic structures and their applications (cf. V)

Syllabus

I. Sets, relations, trees, graphs (and their computer representation). Some algebraic structures and their applications (cf. V) — 2 weeks

II. The questions of existence and enumeration. Combinations, permutations, partitions. The Inclusion - Exclusion principle. Recursion and generating functions. Latin squares, finite geometries, error-correcting codes. — 3-1/2 weeks

III. The Königsberg bridge problem. Eulerian trails and Hamiltonian cycles. The Marriage problem and Hall's theorem. Coloring algorithms, scheduling and the four-color problem. Assignment problems, and efficiency of computer algorithms. — 2 weeks

IV. Networks and the transportation problem. Critical paths. Multiprocessing systems. Examples from linear programming and game theory. Computational aspects of the preceding. — 4-1/2 weeks

V. Additional Optional Material

Semigroups, groups, fields, Boolean algebras and their relation to finite state machines, formal languages, coding theory, and switching theory.

Polya counting theory.

Game theory and decision making.

Linear programming.

Random walks.

Textbooks

R. R. Korfhage: Discrete Computational Structures, (AP)

F. P. Preparata & R. T. Yeh: Introduction to Discrete Structures, (AW)

G. Berman & K. Fryer: Introduction to Combinatorics (AP)

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

1. Calendar Information

Department: MATHEMATICS

Abbreviation Code: MATH Course Number: 408-3 Credit Hours: 3 Vector: 3-1-0

Title of Course: DISCRETE OPTIMIZATION

Calendar Description of Course: Modeling techniques, integer programming, network flows, dynamic programming, and combinatorial max-min relations. Computational aspect of the preceding.

Nature of Course Lecture/Tutorial

Prerequisites (or special instructions): Math 308-3

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? Yearly

Semester in which the course will first be offered? Spring 1977

Which of your present faculty would be available to make the proposed offering possible: Dr. Alspach, Dr. Brown

Objectives of the Course To study some modeling techniques for practical problems in operations research and engineering. To study standard discrete methods of optimization.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff None

Library None

Audio Visual None

Space None

Equipment None

5. Approval

Date: 22 Sept 1975 29/0/75

Norman R. Reilly — Department Chairman

S. Smith — Dean

Chairman, SCUS

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

DISCRETE OPTIMIZATION

Math 408-3

Objectives

1. To introduce some modeling techniques for practical problems in operations research and engineering.

2. To introduce standard discrete methods of optimization.

Syllabus

I. Decision making and problem formulation, models and their analysis, and computer representation, introductory examples. (1 week)

II. Review of linear programming, simplex method, duality. (1 week)

III. Integer programming, totally unimodular matrices, the transportation problem, the traveling salesman problem, the Knapsack problem, branch and bound methods, enumeration, and cutting plane methods. (5 weeks)

IV. Flows in networks, max flow-min cut theorem, minimum cost flows, shortest path algorithms, scheduling, and PERT. Algorithm efficiency. (3-1/2 weeks)

V. Combinatorial max-min relations, lattice point polyhedra, optimum matchings, Dynamic programming, and inventory scheduling. (2-1/2 weeks)

Textbook

Garfinkel & Nemhauser: Integer Programming (JW)

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

Calendar Information

Department: MATHEMATICS

Abbreviation Code: ____ Course Number: 450 Credit Hours: 8* Vector: Not applicable

Title of Course: JOB PRACTICUM

Calendar Description of Course: Participation in work/study program with business, industry, or government and in a weekly seminar. Open for students in the computational mathematics option; application must be made in advance.

Nature of Course Practical experience/seminar

Prerequisites (or special instructions): ~~Approval of computational mathematics option committee. Students normally will be in their fifth or sixth semester of study.~~ See Appendix A attached

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? Available every semester

Semester in which the course will first be offered? Spring 1977

Which of your present faculty would be available to make the proposed offering possible: Dr. Alspach, Dr. Eaves, Dr. Harrop, Dr. Russell

3. Objectives of the Course To allow students to gain practical experience related to their training. (See attached sheet)

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty
Staff
Library
Audio Visual
Space
Equipment

NONE

5. Approval

Date: 22 Sept 1975 29/0/75

Norman R. Reilly
Department Chairman

S. Arnoff
Dean

Chairman, SCUS

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

Does not count towards the 30 or 50 credits hours of upper division mathematics requirements.

Appendix A.

The prerequisites for MATH 450-8 have been made more explicit and yet will retain flexibility. They should now read:

Prerequisite: Approval of the department. Ordinarily students will be required to have completed at least four of the following courses: MATH 243-3, 302-3, 305-4, 308-3, 316-3, and CMPT 201-4. Students who have obtained credit for two or more of CMPT 411-5, 412-5, or 413-5 cannot subsequently obtain credit for MATH 450-8. (Mathematics majors and honors students may not use this course to satisfy the required number of semester hours of upper division mathematics courses. However, they may include the course to satisfy the total number of required hours of upper division credit.)

Norman R. Reilly

Norman R. Reilly

COMPUTATIONAL MATHEMATICS OPTION

We wish to include a Computational Mathematics Option within the Mathematics Department. In addition to providing a fourth option for a mathematics major (present options are pure, applied and statistics), the option has some unique characteristics. Major aspects of it are described below. The attached diagram presents a global view of the option's major courses.

I. Objectives

1. The primary objective is to produce students who are mathematically well versed in computational methods, optimization, and statistics, and who are also capable of solving practical problems in fields such as social, behavioural and biological sciences, government, business and industry. This will be achieved in two ways.

   (a) In addition to the regular mathematics course requirements and certain core courses within the option, the student will emphasize two of three of the five possible modules - economics and commerce, statistics, optimization, computational mathematics and computing science. (See diagram). With the appropriate emphasis, a student can easily acquire a minor in economics and commerce or computing science.

   (b) The student will gain practical experience by spending at least a semester with an industry, business, etc. This will occur well before the student's last semester. Motivation, responsibility, and practical insight gained through a work semester will be of great value for the student's development and would in turn generate enthusiasm and interest among other students. Initial response from several employers has been quite favourable.

2. A number of scattered courses will be unified into a viable option. Identifying and putting structure to these areas will aid students with these interests.

II. Advantages

1. While there is growing need for students with this type of training, to our knowledge no program of this kind exists in Western Canada. Similar programs have been quite successful at Waterloo and Stanford. The option's areas involve relevant and increasingly important topics.

2. This option will present an opportunity for better cooperation with economics and commerce and computing science, which would benefit all concerned.

III. Effects on Department

1. The department can mount the option with only two new courses, a 200-division Discrete Mathematics course and a 400-division Discrete Optimization course plus Job Practicum. It would be desirable to introduce a Game Theory course in the near future. At a lower priority, as need arises it would be desirable to introduce the courses Applied Algebra, Numerical Solution of Differential Equations, Information Theory and Coding, and Switching Theory II. This option will produce people with a sound background in some useful areas of mathematics and with the versatility to step into a wide variety of positions. We expect this option to generate new students in the department, to attract students from other disciplines, and to have little, if any, detrimental effect on current upper division offerings.

Immediate New Courses:

MATH 243-3 Discrete Mathematics (twice yearly)

MATH 408-3 Discrete Optimization (Yearly)

MATH 450-8 Job Practicum (?)

Future Courses:

Priority 1:	MATH 3--	Numerical Solution of Differential Equations
	MATH 4--	Game Theory
Priority 2:	MATH 4--	Information Theory and Coding
Priority 3:	MATH 2--	Applied Algebra
	MATH 4--	Switching Theory II

New Faculty Required: One

DESCRIPTION OF MATH 450-8 JOB PRACTICUM

Credit Hours - 8 (Not part of the 120 or 132 for honors - credit hours for graduation)

Prerequisite - 5 or 6 semesters in the program and approval of the Computational Mathematics committee (see below).

Obligations - The student spends 24 hours a week with a local business/industry/government and attends a weekly seminar; the course grade is based upon the seminar and a written report. There is no additional commitment of the "employer" or student but it is encouraged and expected that the student will frequently continue to work for the employer.

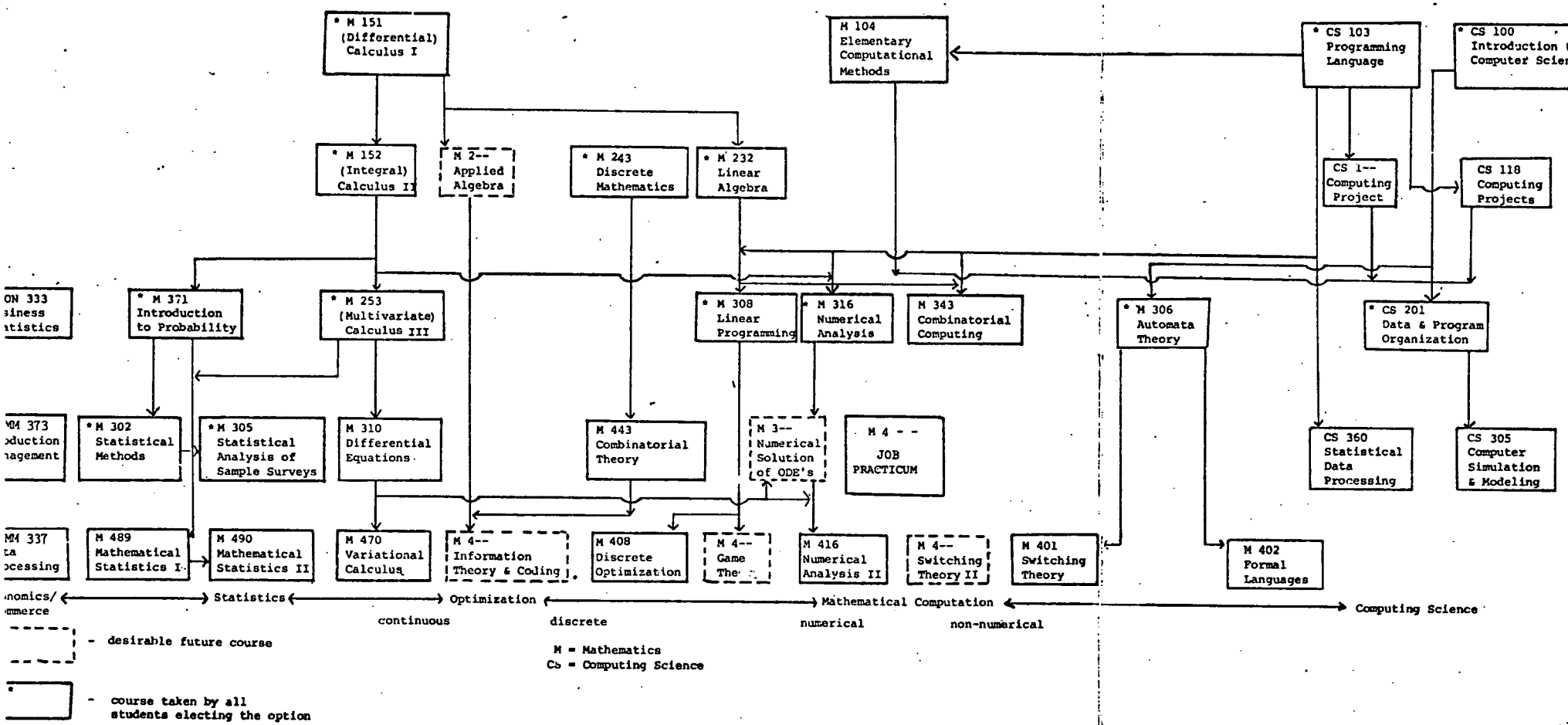
Duties of Computational Mathematics Committee:

1) Select the best qualified students;

2) Match students to jobs such that the students' areas of interest meet the employers' special needs;

3) Continuing supervision and evaluation of the students' work.

Drs. B. Alspach/R. Russell
Mathematics Department


* M 151 (Differential) Calculus I
M 104 Elementary Computational Methods
* CS 103 Programming Language
* CS 100 Introduction to Computer Science
* M 152 (Integral) Calculus II
M 2-- Applied Algebra
* M 243 Discrete Mathematics
* M 232 Linear Algebra
CS 1-- Computing Project
CS 118 Computing Projects
ON 333 siness atistics
* M 371 Introduction to Probability
* M 253 (Multivariate) Calculus III
* M 308 Linear Programming
* M 316 Numerical Analysis
M 343 Combinatorial Computing
* M 306 Automata Theory
* CS 201 Data & Program Organization
M4 373 oduction nagement
* M 302 Statistical Methods
* M 305 Statistical Analysis of Sample Surveys
M 310 Differential Equations
M 443 Combinatorial Theory
M 3-- Numerical Solution of ODE's
M 4 - - JOB PRACTICUM
CS 360 Statistical Data Processing
CS 305 Computer Simulation & Modeling
M4 337 ta ocessing
M 489 Mathematical Statistics I
M 490 Mathematical Statistics II
M 470 Variational Calculus
M 4-- Information Theory & Coding
M 408 Discrete Optimization
M 4-- Game The
M 416 Numerical Analysis II
M 4-- Switching Theory II
M 401 Switching Theory
M 402 Formal Languages
nomics/ mmerce
Statistics
Optimization
Mathematical Computation
Computing Science
continuous
discrete
numerical
non-numerical
- desirable future course
- course taken by all students electing the option
M = Mathematics
Cs = Computing Science

Additional paper for Oct. 17/75

SIMON FRASER UNIVERSITY

MEMORANDUM

To: D. Ryeburn, Chairman Undergraduate Curriculum Committee Faculty of Science	From: N. Reilly, Chairman Mathematics Department
Subject: MATH 450-8 (Job Practicum) Computational Mathematics Option	Date: October 8, 1975

The department wishes to change the credit arrangements for the proposed MATH 450-8 course. Originally, the proposal was that the course receive eight semester hours of credit, but that these eight hours not be counted as part of the 120 or 132 hours for a major or honors degree. Now we are persuaded that the eight hours should count as part of the 120 or 132, and as part of the 45 or 60 hours of upper division credit, but not as part of the required 30 or 50 hours of upper division credit in Mathematics courses. The rationale for this decision is given below.

First, the three practicum courses offered by the Computing Science Department count for credit and are designated as 400 division courses. However, no more than two hours of such credit is available as part of the 50 hours for the honors degree, and none of the credit is available as part of the 30 hours for a major. It would be a disservice to our students not to give them similar credit towards their degrees. Not giving such credit would be a disadvantage for the practicum.

Second, the practicum involves a weekly seminar and a paper at the end of the term, in addition to the practical experience the student gets. Hence, for the department to count this course for credit is reasonable and fair.

Third, we wish to discourage the practice of students being paid by the company, business, etc. for the practicum. The principal reason for this is that there are groups interested in accepting students from the practicum who would find it essentially impossible if pay were required on their part. By offering credit for the practicum, the students are being "paid" by making progress toward their degrees.

Fourth, the course should count as upper division elective credit since extensive 200 and 300 course level preparation is required (see below). However, it should not count towards the mathematics upper division credit requirements because 19 upper division credits are already required for the Computational Mathematics Option and there are many other available upper division courses for students in this option.

Fifth, there are political reasons for offering credit for this course. At the meeting of the Faculty of Science Undergraduate Curriculum Committee in which this was first discussed, there was general support and encouragement for this course. But several committee members also asked why students shouldn't receive more for this course, and in fact the opinion was expressed that for a student to aid a company with no remuneration was perhaps unethical. We feel that offering credit towards the degree is a reasonable answer.

The prerequisites for MATH 450-8 have been made more explicit and yet will retain flexibility. They should now read:

Prerequisite: Approval of the department. Ordinarily students will be required to have completed at least four of the following courses: MATH 243-3, 302-3, 305-4, 308-3, 316-3, and CMPT 201-4. Students who have obtained credit for two or more of CMPT 411-5, 412-5, or 413-5 cannot subsequently obtain credit for MATH 450-8. (Mathematics majors and honors students may not use this course to satisfy the required number of semester hours of upper division mathematics courses. However, they may include the course to satisfy the total number of required hours of upper division credit.)

Norman R. Reilly

Norman R. Reilly

SIMON FRASER UNIVERSITY, BURNABY, B.C., CANADA V5A 1S6
DEPARTMENT OF GEOGRAPHY, 291-3111

Dr. Robert D. Russel,
Department of Mathematics,
Simon Fraser University,
Burnaby, B.C.

May 12, 1975.

Dear Bob,

I read through the proposal for a "Computational Mathematics Programme" and I find it very interesting.

Within Geography itself, I do not see a great demand for this programme at the moment since the department is highly orientated towards non-quantitative Geography with a few exceptions. However, for the proposed Survey Sciences programme I could see an interesting combination, especially for the statistical and numerical portions.

I could see a special interest for the course on "Information Theory and Coding" which could become quite an interesting programme for theoretical and quantitative Geographers.

I am looking forward to more information on this programme and wish you success. Kind regards.

Sincerely yours,

T.K. Peucker
Associate Professor of Geography
& Computer Science.

SIMON FRASER UNIVERSITY

MEMORANDUM

To Bert

From Bao, Chong
Econ/Comm

Subject Comp. Math. option

Date Sept 30, 1975

I am excited over the option described. For the math. majors, the DEC could come up with a package of courses to round out their need in commerce & economics. I have some courses in mind, but the best fellow to advise you would be our chairman Bert Schoner. I have passed the description of the option to him already so that he can think about it.

With regard to the ~~math~~ econ. or commerce majors, only those who are strong in math & stat. would have been interest, especially if the department would make a special effort to define a program of specialization to recognize the special emphasis from the option. I have in mind a special field (say, O.R.) for some commerce majors and start working on them when they are in the second year via a program chairman.

The courses that will emerge from the option will also hold great interest for our graduate students in math. economics, finance and O.R. Thus I hope these courses should also be flexible enough on the catalogue for a graduate student to earn graduate credit.

Thanks, Bao

15

City of Vancouver

City Engineering Department: City Hall, 453 West 12 Avenue, Vancouver, British Columbia, Canada V5Y 1V4, (604) 873-7011

W.H. Curtis, P. Eng.
City Engineer

R.C. Boyes, P. Eng.
Deputy City Engineer

K.F. Dobell, P. Eng.
Assistant City Engineer
Departmental Services
& Sewers

P.S. Herring, P. Eng.
Assistant City Engineer
Water, Sanitation & Materials

H.D. Nicholson, P. Eng.
Assistant City Engineer
Electrical

S.D. Townsend, P. Eng.
Assistant City Engineer
Streets

R.G. Gascoyne, P. Eng.
Assistant City Engineer
Traffic

Please refer K. F. Dobell File No. H551-1

September 30, 1975.

Professor Brian Alspach,
Department of Mathematics,
Simon Fraser University,
Burnaby, B.C.
V5A 1S6

Dear Professor Alspach:

Ken Dobell has discussed with me your proposed program for Applied Mathematics students, involving work on real problems with agencies outside the University. I understand you are proposing that students in their third or fourth years, with reasonable background in Computer Sciences, Statistics and Mathematics, work, at no cost to the City, on a project of interest to us, for a three month period, under the joint supervision of City staff and University faculty. I believe such a program has real merit, and would be prepared, within the Engineering Department, to take up to 3 students a year, one at a time.

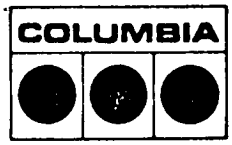
I look forward to hearing from you about your progress in developing this course.

Yours truly,

Wm. Curtis

W. H. Curtis,
City Engineer.

KFD/jmr



COLUMBIA COMPUTING SERVICES LTD.

TELEPHONE
(604)688-8501

1132 HAMILTON STREET
VANCOUVER, B.C. V6B 2S2

October 15, 1975

Dr. Brian Alspach
Associate Professor
Department of Mathematics
Simon Fraser University
Burnaby 2, B.C.

Dear Brian:

We are writing to confirm our interest in the student practicum program which the Simon Fraser Mathematics Department is planning. As you may perhaps be aware, this company has frequently employed Simon Fraser students on a part-time basis, and we would be pleased to continue this practice under a more formal arrangement sponsored by your department.

It is probably realistic to assume we could employ one student on a more or less continuous basis - that is, one in each semester. This will, of course, be influenced by the type of program you are planning and by the availability of projects which are suitable for student participation.

Thank you for letting us know about this project. We will be interested to hear how your plans develop.

Yours truly,
COLUMBIA COMPUTING SERVICES LTD.

James leNobel
President

Jl:cm

Edwin Reid & Associates Ltd.

Management Consultants
210 - 1155 West Georgia Street, Vancouver V6E 3H4, B.C.
Tel. 681-3623

October 1, 1975

Professor Brian Alspach
Department of Mathematics
Simon Fraser University
Burnaby, B.C.

Dear Professor Alspach,

I am writing with regard to your proposed work/study program for undergraduate students in mathematics at Simon Fraser University. Our firm is very favourably impressed with your plan, and when the program becomes operational we would certainly be interested in supporting one of your students if it is at all possible. We cannot be sure, of course, that at that time we will be involved in a project in which we could effectively make use of a student and which would be of benefit to him/her. This is a question which cannot be answered ahead of time since in the consulting business it is difficult to predict what projects one will be engaged in more than six months in the future. I can say two things, however. First of all, we are trying to expand our activity in the areas of statistics, computing, and operations research. If we are successful, we will be able to make use of a student. Secondly, I am personally quite positive about your proposed program, and I hope that when the time comes, you will give me a call. Even if we can't use a student at that particular time, I'm sure I will be able to suggest several firms that can.

I am glad to see that Simon Fraser University is initiating this program. There is no question that it will be extremely beneficial to your students. At the same time, I am certain that the program will make a very favourable impression on the business community and the public at large. I look forward to hearing from you in the future.

Yours truly,

Doug Williams

Douglas Williams, Ph.D.
Managing Director

RDW/dlw

SCUS 75-48
addendum

Dr. D.R. Birch, Chairman

Senate Committee on Undergrdduate Studies

SCUS Course Proposal Forms for
Mathematics 243-3 and 408-3

David Ryeburn, Chairman
Faculty of Science
Undergraduate Curriculum Committee

November 6, 1975

You will recall that after the meeting of November 4, 1975 I observed that the Budgetary and Space Requirements - Faculty spaces on these forms had been left blank, while at the time of the Faculty of Science meeting at which the courses had been approved, the requirements had been noted as 1/2 appointee for 243-3 and 1/3 appointee for 408-3. There was considerable discussion of the matter at the Faculty of Science meeting, and some disagreement as to what exactly emerged as the final position, but the Mathematics Department is prepared to go along with the following entry for each of the courses:

> It is hoped that it will be possible to offer this course for one year by a temporary re-allocation of resources and by reducing the frequency of certain offerings. However, such a sacrifice could not be maintained and additional faculty would be required in subsequent years in order to mount these courses.

If we can manage to offer the courses for one year by such re-adjustments and the courses then prove to be as valuable and popular as we are sure they will be, the case for allowing such new appointments to be made will be strengthened.

DR/pel

cc S. Aronoff
N. Reilly
H. Evans