SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate

From: Senate Committee on
Undergraduate Studies

Subject: School of Computing Science -
Curriculum Revisions

Date: January 21, 1986

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of January 21, 1986 gives rise to the following motion:

MOTION:

"That Senate approve and recommend approval to the Board of Governors, as set forth in S.86-21, the following curriculum changes:

i) Prerequisite and curriculum revisions including new course MACM 300-3 Introduction to Formal Languages and Automata with Applications, and deletion of MACM 306-3 Introduction to Automata Theory.

ii) Changes to Upper Division Degree Requirements for majors.

SIMON FRASER UNIVERSITY

MEMORANDUM

SCUS 86-d.

o...Senate..Committee..on..Undergraduate..Studies........ | From...R.D...Cameron...Director..of..Undergraduate........

.... | .Programs,..Computing..Science............................

Subject...CMPT..Curriculum..Revisions:..S.85-57............. | Date ...January..13,..1986.......................................

The School of Computing Science and the Department of Mathematics and Statistics have now reached agreement on a mutually acceptable proposal for curriculum revision in the area of Automata Theory. Essentially, we have agreed to replace the proposed CMPT 309 course with a jointly-offered course numbered MACM 300. Although Computing Science has concerns about such joint administration, we are willing to try it subject to review after 2 years. We therefore propose that SCUS approve the following motions and forward them to Senate.

1. Moved that classical computing science theory be integrated into the Computing Science curriculum as follows.

   a. Space freed up by the removal of formal logic from CMPT 205 be used to introduce automata theory.

   b. A new course MACM 300-3 (Introduction to Formal Languages and Automata with Applications) is proposed as a joint offering of the School of Computing Science and the Department of Mathematics and Statistics and is included in the area of Theoretical Computing Science. See attached course proposal.

   c. MACM 306 (Introduction to Automata Theory), MACM 401 (Switching Theory and Logical Design) and MACM 402 (Automata and Formal Languages) are eliminated from the area of Theoretical Computing Science.

   d. The prerequisite statement for CMPT 483 (Parsing and Interpretation) is changed to read: "*Prerequisites: CMPT 205, 275, 383, MACM 300.*"

   e. The prerequisite statement for MACM 401 (Switching Theory and Logical Design) is changed to read: "*Prerequisites: CMPT 101 or 104 (or 103 with a grade of B or higher) and MACM 300 or MACM 306. Students who have obtained credit for MATH 401 may not receive further credit for MACM 401.*"

   f. The prerequisite statement for MACM 402 (Automata and Formal Languages) is changed to read: "*Prerequisites: MACM 300 or MACM 306. Students who have obtained credit for MATH 402 may not receive further credit for MACM 402.*"

   g. MACM 306 is eliminated as a course and is consequently dropped from the table of Computing Mathematics courses that can be used to satisfy upper division requirements

in Computing Science.

2. Moved that the Upper Division Degree Requirements for Majors in Computing Science be approved as given in S.85-57. (Note: this item was referred back to SCUS by Senate at its December 4, 1985 meeting to be amended as necessary to resolve the problem of CMPT 309. No amendments are needed, however.)

In terms of the Computing Science upper division requirements, the above motions only require changes to two of the tables shown in Appendix IV of S.85-57; these changes are shown below, comparing the original proposal as shown in S.85-57 and the revised proposal as described above.

TABLE I		TABLE I	
Computing Science Concentrations		Computing Science Concentrations	

Theoretical Computing Science
CMPT 307-3 Data Structures and Algorithms
309-3 Introduction to Formal Languages and Automata with Applications
405-3 Design and Analysis of Algorithms
406-3 Computational Geometry
409-3 Special Topics in Theoretical Computing Science

Theoretical Computing Science
CMPT 307-3 Data Structures and Algorithms
405-3 Design and Analysis of Algorithms
406-3 Computational Geometry
409-3 Special Topics in Theoretical Computing Science
MACM 300-3 Introduction to Formal Languages and Automata with Applications

TABLE III
Computing Mathematics Courses

MACM 306-3 Introduction to Automata Theory
316-3 Numerical Analysis I
401-3 Switching Theory and Logical Design
402-3 Automata and Formal Languages
MATH 308-3 Linear Programming
343-3 Combinatorial Aspects of Computing
408-3 Discrete Optimization
416-3 Numerical Analysis II

TABLE III
Computing Mathematics Courses

MACM 316-3 Numerical Analysis I
401-3 Switching Theory and Logical Design
402-3 Automata and Formal Languages
MATH 308-3 Linear Programming
343-3 Combinatorial Aspects of Computing
408-3 Discrete Optimization
416-3 Numerical Analysis II

SIMON FRASER UNIVERSITY
MEMORANDUM

To... SCUS

From... G.A.C. Graham, Chairman

Department of Mathematics & Statistics

Subject... CMPT CURRICULUM REVISION: S 85-57
/Dr. R.D. Cameron's memo of January 13, 1986

Date... 13 January 1985

This is to acknowledge that I have read and approve of the proposals made in Dr. Cameron's memo of January 13, 1986.

G.A.C. Graham

G.A.C. Graham

GACG/bcl

c.c. Dean of Science - Dr. G. Geen
      Dean of Applied Sciences - Dr. D. George

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

School of Computing Science
Dept. of Mathematics & Statistics

1. **Calendar Information**

Department:_____

Abbreviation Code: MACM **Course Number:** 300 **Credit Hours:** 3 **Vector:** 3-1-0

Title of Course: Introduction to Formal Languages and Automata with Applications

Calendar Description of Course:

Languages, grammars, automata and their applications. Turing machines. Computability and undecidability. Complexity theory.

Nature of Course Lecture/Tutorial

Prerequisites (or special instructions):

CMPT 205

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

MACM 306

2. **Scheduling**

How frequently will the course be offered? Twice a year or as required.

Semester in which the course will first be offered? 86-3

Which of your present faculty would be available to make the proposed offering possible: A. Freedman, C. Godsil, B. Hadley, R. Harrop, A. Liestman, A. Mekler J. Peters, N. Reilly

3. **Objectives of the Course**

To provide both a theoretical and an applied treatment of formal languages and automata.

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

What additional resources will be required in the following areas:

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

5. **Approval Date:** Jan. 13, 86 / 17 December 1985 / 13.1.86 / 17 Dec 15

_____ / _____ / _____
Department Chairman   Dean   Chairman, SCUS

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

MACM 300

Introduction to Formal Languages and
Automata with Applications

Course Outline

1. Chomsky Hierarchy - languages, grammars.

2. Regular and Context-Free Languages - grammars, finite and push-down automata.

3. Applications - text processing, artificial intelligence.

4. Deterministic Languages - LR(k) grammars, deterministic pushdown automata, application to compilers.

5. Turing Machines and Linear Bounded Automata - recursive, recursively enumerable and context-sensitive languages.

6. Computability and Complexity Theory - introduction to recursive function theory, time and space hierarchies, complexity measures.

Suggested Reference Book

Introduction to Automata Theory, Languages, and Computation
J.E. Hopcroft, J.D. Ullman
Addison-Wesley, 1979.

Prerequisites:

CMPT 205

4.5. Upper Division Degree Requirements for Majors

Moved that the following changes be made to upper division requirements for a CMPT major for the B.A., B.Sc., B.B.A. and B.Ed. degree.

1. The Social Aspects of Computing requirement is dropped for B.A., B.B.A., and B.Ed. degrees.

2. Candidates for the B.A., B.B.A. and B.Ed. degrees must, in addition to satisfying

   breadth and depth requirements, take one further course from the Computing Science depth areas or the list of Computing Science Electives to make up their total of 30 upper division CMPT credits.

3. The requirement for a concentration of 15 semester hours in another discipline is eliminated for the B.B.A., B.Ed. and B.Sc. degrees. The requirement is retained for the B.A. degree, in which case the department of concentration must be in the Faculty of Arts.

4. Candidates for the B.Sc. degree are required to take two further courses chosen the lists of Computing Science depth areas, Computing Science Electives or Computing Mathematics Electives, in addition to meeting depth and breadth requirements and completing MACM 316.

5. Candidates for the B.Sc. degree must additionally complete 9 credits of electives (at any level) from the Faculty of Arts.

Rationale

These changes strengthen the requirements for a B.Sc. degree in Computing Science, recognizing that the increasingly professional nature of the discipline places increasing requirements on the Computing background of graduates. The total number of required upper division credits has been raised to 39 from 36 (30 CMPT credits plus 6 upper division credits in a concentration).

At the same time, however, requirements for B.A., B.B.A. and B.Ed. are held to 30 upper division CMPT credits. The concentration of 15 credits outside of CMPT is dropped for B.B.A. and B.Ed. degree candidates as it is redundant in their case.