# SIMON FRASER UNIVERSITY

## *OFFICE OF THE VICE-PRESIDENT, ACADEMIC*

## MEMORANDUM

**To:**  Senate

**From:**  D. Gagan, Chair *David Gagan*
Senate Committee on Academic Planning

**Subject:**  Faculty of Applied Sciences -
Curriculum revisions

**Date:**  December 11, 1998

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

**Motion:**  Motion tabled by Senate (S.M. 11|1|99)

"that Senate approve and recommend to the Board of Governors as set forth in S.99 - 4 , the following:

b)  <u>School of Computing Science</u>
Proposed Software and Systems Diploma, on condition that approval be received from the Provincial Government to charge market fees."

**For Information:**
Acting under delegated authority of Senate, SCUS approved revisions as set forth in S.98 -

a)  School of Communication
c)  School of Engineering Science
d)  School of Resource and Environmental Management

**Any Senator wishing to consult the full report of curriculum revisions within the Faculty of Applied Sciences should contact Bobbie Grant, Senate Assistant at 291-3168 or e-mail bgrant@sfu.ca**

# SIMON FRASER UNIVERSITY

SCHOOL OF COMPUTING SCIENCE
FACULTY OF APPLIED SCIENCES

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September 29, 1998

Prof. Rob Cameron
Associate Dean
Faculty of Applied Sciences
Simon Fraser University
Burnaby, B.C. V5A 1S6

Dear Rob,

Please find herewith the proposal for the Software and Systems Diploma from the School of Computing Science. This was developed by Fred Popowich when he was the director of undergraduate programs. The School of Computing Science still needs to talk with the Faculty of Business Administration in regard to the course BUS 343, which needs to be taken in the second semester.

It is to be noted that a student could complete the diploma in four semesters (instead of six semesters) if the student could skip the two CO-OP semesters.

Please feel free to get back to me if you see the need for changes in this proposal.

Thanking You,

Sincerely yours,

Ramesh Krishnamurti
Director of Undergraduate
Programs School of Computing
Science Simon Fraser University
Burnaby, BC V5A 1S6

cc: Prof. Jim delgrande, Director, School of Computing Science

cc: Prof. Fred Popowich, School of Computing Science

# Software and Systems Diploma

The School of Computing Science proposes the introduction of a Post Baccalaureate Diploma in Software and Systems (SSD). This document introduces the curriculum for such a diploma, but does not consider issues related to the resources needed to put on such a program. The SSD focuses more on applied computing, having substantially fewer requirements in terms of theory. The proposed curriculum also includes an upper level business course in marketing. It is a cohort-based program in which groups of students would be accepted into the program at selected times, and would progress through the program together, in the same classes. The SSD is distinct from existing Post Baccalaureate Diplomas in terms of its emphasis on applied computing science, its extensive upper division computing requirements, its use of fixed courses, its use of cohorts, its incorporation of CO-OP semesters, its requirement for a business course. The program would be offered from SFU Harbour Centre with a cost-based tuition. Students would need to provide their own computing equipment.

The demand for such a cohort-based program is reflected in the success of the ARC-PDB pilot project which is currently being offered by the School of Computing Science using the facilities at Harbour Centre. There were over 200 applications for the 40 places offered in the joint SFU/UBC ARC project, and inquiries continue even now.

## Objective

The goal of the proposed diploma program is to provide graduates of disciplines other computing science with the knowledge and skills required to pursue a career in the information technology profession. The curriculum has been selected to provide a thorough grounding in computing science theory and application, and is combined with coop placements to facilitate practical experience within the profession. At the end of the program, the student will have nearly the same number of upper division computing science credits as required by a B.Sc. computing major.

## Proposed Format

Fifteen courses in total, over six semesters (4 academic / 2 coop)

## Admission Requirements

Baccalaureate degree (other than Computing Science).

## Proposed Curriculum

**MACM 101-3** Discrete Mathematics I
Introduction to counting, induction, automata theory, formal reasoning, modular arithmetic.

**BUS 343-3** Introduction to Marketing
The environment of marketing; relation of social sciences to marketing; evaluation of marketing theory and research; assessment of demand, consumer behavior analysis; market institutions; method and mechanics of distribution in domestic, foreign and overseas markets; sales organization; advertising; new product development, publicity and promotion; marketing programs.

**CMPT 150-3** Introduction to Computer Design

Digital design concepts are presented in such a way that students will learn how logic blocks can be designed and employed to construct a simple computer. Topics covered include: basic Von Neumann computer architecture; an introduction to assembly language; combinational logic design; and sequential logic design. An interactive logic simulation environment will be provided for assignments. Assembly language programming is introduced.

**CMPT 201-4** Data and Program Abstraction

Introduction to various widely used data structures such as strings, sets, stacks, queues, lists, hash tables and trees, and algorithms for searching and sorting. Several powerful tools and concepts such as interpretive languages, functional programming, modularization, abstract data types, object-oriented programming, specialized debuggers, extensible languages and automatic garbage collection will also be covered

**CMPT 275-4** Software Engineering I

The software life cycle: requirements/specification, design, implementation, check-out, maintenance. Software tools: requirement specification languages, program design languages, program editors, program transformation systems, test data generators, automatic verifiers. Integrated programming environments.

**CMPT 300-3** Operating Systems I

This course aims to give the student an understanding of what a modern operating system is – and the services it provides. It also discusses some basic issues in operating systems and provides solutions. Topics include multiprogramming, process management, memory management, and file systems.

**CMPT 320-3** Social Implications of a Computerized Society

An examination of social processes that are being automated and implications for good and evil, that may be entailed in the automation of procedures by which goods and services are allocated. Examination of what are dehumanizing and humanizing parts of systems and how systems can be designed to have a humanizing effect.

**CMPT 354-3** Database Systems I

Logical representations of data records. Data models. Studies of some popular file and database systems. Document retrieval. Other related issues such as database administration, data dictionary and security.

**CMPT 363-3** User Interface Design

This course provides a comprehensive study of user interface design. Topics include: goals and principles of UI design (systems engineering and human factors), historical perspective, current paradigms (widget-based, mental model, graphic design, ergonomics, metaphor, constructivist/ iterative approach, and visual languages) and their evaluation, existing tools and packages (dialogue models, event-based systems, prototyping), future paradigms, and the social impact of UI.

**CMPT 365-3** Multimedia Systems

Multimedia systems design, multimedia hardware and software, issues in effectively representing, processing, and retrieving multimedia data such as text, graphics, sound, image and video.

**CMPT 370-3** Information System Design

This course focuses on the computer-related problems of information system design and procedures of design implementation. Well-established design methodologies will be discussed, and case studies will be used to illustrate various techniques of system design.

**CMPT 371-3** Data Communications and Networking

Data communication fundamentals (data types, rates, and transmission media). Network architectures for local and wide areas. Communications protocols suitable for various architectures. ISO protocols and internetworking. Performance analysis under various loadings and channel error rates.

**CMPT 383-3** Comparative Programming Languages
Various concepts and principles underlying the design and use of modern programming languages are considered in the context of procedural, object-oriented, functional and logic programming languages. Topics include data and control structuring constructs, facilities for modularity and data abstraction, polymorphism, syntax, and formal semantics.

**CMPT 471-3** Networking II
This course covers the fundamentals of higher level network functionality such as remote procedure/object calls, name/address resolution, network file systems, network security and high speed connectivity/bridging/switching.

**CMPT 475-3** Software Engineering II
The team approach needed in the development of a software product will be examined in depth. Students will study team dynamics and team management, project estimation/planning/control, and the benefits of employing modern techniques at appropriate phases for a variety of software development lifecycles. The importance of configuration management, change management and control, release planning and of quality assurance throughout a project (reviews, inspections, testing strategies) will be brought out. A team project will allow students to try out these techniques.

## Program Structure

The following shows one potential structuring of the diploma.

| Semester 1 | Semester 2 | Semester 3 | Semester 4 | Semester 5 | Semester 6 |
|------------|------------|------------|------------|------------|------------|
| CMPT 150 | CMPT 275 | CO-OP | CO-OP | CMPT 300 | CMPT 370 |
| CMPT 201 | CMPT 320 | | | CMPT 363 | CMPT 383 |
| MACM 101 | CMPT 354 | | | CMPT 365 | CMPT 471 |
| | BUS 343 | | | CMPT 371 | CMPT 475 |

The intended start date of the program is January 1999. Courses taken during semester one could also be taken via distance education. Students with some prior computing experience could join into the program at the beginning of semester two, if they had prior credit for the first semester courses or if they were to use distance education to take first semester courses that they did not have prior credit for.

It is proposed that new cohorts be started every eight months (two semesters). Thus, eventually there will be three cohorts in the program at any one time, one of which will be in the co-op program at that time. The following shows the time frame for the first three cohorts (C1, C2 and C3). For example semester 6 of cohort 1, C1-6, will be held during 2000-3. Co-op semesters are shown in gray.

| 99-1 | 99-2 | 99-3 | 00-1 | 00-2 | 00-3 | 01-1 | 01-2 | 01-3 | 02-1 |
|------|------|------|------|------|------|------|------|------|------|
| C1-1 | C1-2 | | | C1-5 | C1-6 | | | | |
| | C2-1 | C2-2 | | | | C2-5 | C2-6 | | |
| | | C3-1 | C3-2 | | | | | C3-5 | C3-6 |

So, starting in 2000-2, there will be two cohorts taking academic courses in any one semester, and in each semester there will be seven computing courses being offered. There will be a total of 21 course offerings per year for all students in the program.

**FOR INFORMATION**

(SCUS Reference: SCUS 98 - 21)
(SCAP Reference: SCAP 98 – 63 a)

a)   <u>School of Communication</u>

Acting under delegated authority, SCUS approved curriculum
revisions as follows:

i)   New courses:
      CMNS 226-3 Introduction to Digital Video Techniques
      CMNS 431-4 News Research and Analysis
      CMNS 487-4 Special Topics in Communication
ii)  Change of prerequisite: CMNS 326-4, 358-4
      Change of title, description and prerequisite: CMNS 333-4, 433-4
      Change of description and prerequisite: CMNS 334-4
iii) Course deletions:
      CMNS 201-3 Introduction to Human Communication
                  Networks
      CMNS 305-4 Interpersonal Communication in a
                  Technological Environment
      CMNS 421-4 Issues Seminar
      CMNS 442-4 Science and Public Policy II: Standards
      CMNS 471-4 Selected Topics in Publishing

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**FOR INFORMATION**

(SCUS Reference:  SCUS 98 - 21)
(SCAP Reference:  SCAP 98 – 63 c)

    a)    <u>School of Engineering Science</u>

        Acting under delegated authority, SCUS approved curriculum revisions as follows:

        i)    Change to minimum CGPA requirement for first year students
        ii)    Changes to DS/ST policy
        iii)    Changes to Engineering Transfer Program
        iv)    Changes to Industrial Experience requirement
        v)    Course deletion:
                ENSC 453-4   Semiconductor Device Engineering
        vi)    Change of prerequisite:  ENSC 330-4

**FOR INFORMATION**

(SCUS Reference: SCUS 98 - 21)
(SCAP Reference: SCAP 98 – 63 d)

a)   <u>School of Resource and Environmental Management</u>

Acting under delegated authority, SCUS approved curriculum revisions as follows:

i)   Change of description:  REM 100-3
Change of prerequisite:  REM 311-3, 356-3, 412-3, 445-3
Change of description and prerequisite:  REM 471-3