S.05-78

SIMON FRASER UNIVERSITY

Senate Committee on University Priorities
Memorandum

TO: Senate

FROM: John Waterhouse
Chair, SCUP
Vice President, Academic

RE: Proposal for a Joint Major Program in Mathematics and Computing Science (MACM)
(SCUP 05-045)

DATE: May 31, 2005

At its May 18, 2005 meeting SCUP reviewed and approved the proposal from the Senate Committee on Undergraduate Studies for the establishment of a new Joint Major Program in Mathematics and Computing Science (MACM), which is now forwarded to Senate for approval.

Motion

That Senate approve and recommend to the Board of Governors the proposal for a Joint Major Program in Mathematics and Computing Science (MACM), and the consequential changes to the Joint Honors Program in Mathematics and Computing Science.

encl.

c: J. Jones
M. Plischke
N. Reilly
J. Delgrande
B. Lewis

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate Committee on University Priorities

From: R. Blackman, Chair
Senate Committee on Undergraduate Studies

Subject: Faculty of Applied Sciences
New Major in the MACM Program
(SCUS Reference: SCUS 05-8)

Date: May 2, 2005

At the SCUS meeting held on April 12, 2005, SCUS approved in principle and recommended approval by SCUP the submission by the School of Computing Science for a new MACM Major to complement the existing Honors program, effective September 1, 2005.

The relevant documentation is attached for review by SCUP.

CA.SFU.FAS.UCC/Papers:2004-31E

Mathematics and Computing Science Program Revisions

B. Bart, R. Cameron, D. Mitchell, M. Monagan, L. Stacho

Revision E - May 25, 2005

Introduction

Mathematics and Computing Science have a longstanding relationship through a shared Honors program and a series of MACM courses. This document proposes an expansion of this relationship through the introduction of a MACM Major to complement the Honors program. In addition, a revision of the Honors program is proposed to position it appropriately with respect to the major and to simplify the structure of the requirements.

These changes are to be effective as of September 1, 2005.

1. Proposed Calendar Text - Introduction and Lower Division Requirements
2. Proposed Calendar Description - MACM Major
3. Proposed Calendar Description - MACM Honors
4. Proposed Calendar Description - General Requirements

1. Proposed Calendar Text - Introduction and Lower Division Requirements

The calendar text introducing the program and its lower division requirements should be revised as follows.

Current	Proposed
Mathematics and Computing Science Honors Program This honors program is offered jointly by the Department of Mathematics and the School of Computing Science. Entry requires permission of both the department and the school. Graduates may proceed to graduate work in either mathematics or computing science. (Depending on the student's particular area of interest, a small amount of additional undergraduate work in either mathematics or computing science may be required.) Normally, students apply for acceptance upon completion of the lower division requirements. Early acceptance is available for SFU students and transfer students with high CGPAs and program related GPAs. Direct acceptance is also possible for secondary school students with strong admission GPAs. Students must complete 132 credit hours, as specified below.	**Mathematics and Computing Science MACM Major and Honors Programs** MACM major and honors programs are offered cooperatively by the Department of Mathematics and the School of Computing Science. In general, students are expected to meet the requirements of both the department and the school with respect to admission, continuation and graduation requirements.
Lower Division Requirements CMPT 126-3 Introduction to Computer Science and Programming (or CMPT 120 and 125)	**Lower Division Requirements - MACM Major** CMPT 126-3 Introduction to Computer Science and

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CMPT 150-3 Introduction to Computer Design CMPT 225-3 Data Structures and Programming CMPT 250-3 Introduction to Computer Architecture CMPT 275-4 Software Engineering MACM 101-3 Discrete Mathematics I MACM 201-3 Discrete Mathematics II MACM 202-4 Mathematical Modeling and Computation MATH 151-3 Calculus I MATH 152-3 Calculus II MATH 232-3 Elementary Linear Algebra MATH 242-3 Introduction to Analysis MATH 251-3 Calculus III PHIL 100-3 Knowledge and Reality* STAT 270-3 Introduction to Probability and Statistics *a 100 division English course or PHIL 120 may be substituted Note 1: A student who, in satisfaction of upper division requirements (see below), wishes to use group e) as one of the two upper division required groups taken from the list a), b), c), d), e) must also obtain credit for the lower division course MATH 252. Note 2: A student wishing to use courses from group a) to satisfy requirements is advised that STAT 280 is a prerequisite for STAT 380.	Programming (or CMPT 120 and 125) CMPT 150-3 Introduction to Computer Design CMPT 225-3 Data Structures and Programming MACM 101-3 Discrete Mathematics I MACM 201-3 Discrete Mathematics II MATH 151-3 Calculus I MATH 152-3 Calculus II MATH 232-3 Elementary Linear Algebra MATH 242-3 Introduction to Analysis MATH 251-3 Calculus III STAT 270-3 Introduction to Probability and Statistics Plus one of CMPT 275-4 Software Engineering MACM 202-4 Mathematical Modeling and Computation In addition, students must complete writing and breadth requirements in accord with the regulations of both the department and the school. **Lower Division Requirements - MACM Honors** Students pursuing the MACM honors program must complete both of the following courses as well as the remaining requirements of the MACM major. CMPT 275-4 Software Engineering MACM 202-4 Mathematical Modeling and Computation

Rationale

The lower division requirements of the MACM major are based on the core requirements of the existing MACM honors program. The specific reference to PHIL 100 or an alternative is deleted in favor of a more generic statement with respect to writing and breadth requirements that are consistent with the requirements of the units. As of 2006/7, this text should also be appropriate to the proposed WQB requirements of the university curriculum. To make room for WQB requirements without overloading the lower division, CMPT 250 is deleted from the requirements.

The notes are no longer relevant to the revised upper division structure as described subsequently.

2. Proposed Calendar Description - MACM Major

The following description of upper division requirements of the MACM major is proposed.

Proposed
Upper Division Requirements - MACM Major Students must complete the following core requirements. All of CMPT 307-3 Data Structures and Algorithms MACM 316-3 Numerical Analysis I MATH 332-3 Introduction to Applied Algebraic Systems Plus one of

CMPT 300-3 Operating Systems I
CMPT 371-3 Data Communications and Networking
CMPT 379-3 Principles of Compiler Design

Plus one of
MATH 308-3 Linear Optimization
MATH 310-3 Introduction to Ordinary Differential Equations
MATH 345-3 Introduction to Graph Theory

In addition, students must complete further coursework to reach a total of 21 upper division MATH credits and 24 upper division CMPT credits including the core requirements. MACM courses are counted in an alternating fashion towards the MATH and CMPT credit requirements, starting with the first MACM course taken counting towards either MATH or CMPT. A total of 12 credits must be taken at the 400-level or higher, including at least 3 credits each of CMPT and MATH credit.

Rationale

The MACM major is introduced with upper division credit hour requirements based on approximately two-thirds each of the corresponding upper division requirements of the CMPT and MATH major programs.

3. Proposed Calendar Description - MACM Honors

The following calendar text describes the proposed restructuring of the MACM Honors program, building upon the proposed MACM Major.

Current	Proposed
Upper Division Requirements Students must complete all of MACM 316-3 Numerical Analysis I CMPT 307-3 Data Structures and Algorithms CMPT 354-3 Database Systems I CMPT 405-3 Design and Analysis of Computing Algorithms plus one of MATH 308-3 Linear Programming MATH 343-3 Applied Discrete Mathematics • the required courses in two of the groups a), b), c), d), e) below and in two of the groups f), g), h), i), j) below. • additional courses as required taken from any of the lists a) - k) below to bring the total upper division credits in MATH or STAT to at least 25 and the total credits in upper division CMPT to at least 25 where, for this purpose, credit obtained in MACM courses is divided evenly between MATH and CMPT. • the Social Aspects of Computing requirement of	**Upper Division Requirements - MACM Honors** Students must complete the following core requirements. All of CMPT 307-3 Data Structures and Algorithms CMPT 405-3 Design and Analysis of Computing Algorithms MACM 316-3 Numerical Analysis I MATH 310-3 Introduction to Ordinary Differential Equations MATH 332-3 Introduction to Applied Algebraic Systems MATH 345-3 Introduction to Graph Theory Plus one of MACM 300-3 Introduction to Formal Languages and Automata with Applications CMPT 308-3 Computability and Complexity Plus one of CMPT 300-3 Operating Systems I CMPT 371-3 Data Communications and Networking Plus one of CMPT 361-3 Introduction to Computer Graphics CMPT 379-3 Principles of Compiler Design Plus one of

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the computing science major and honors program • additional courses as required to bring the total number of upper division credits to at least 60. [Course tables (a) through (k) omitted for brevity]	MATH 308-3 Linear Optimization MATH 309-3 Continuous Optimization In addition, students must complete further coursework to reach a total of 27 upper division MATH credits and 30 upper division CMPT credits including the core requirements. MACM courses are counted in an alternating fashion towards the MATH and CMPT credit requirements, starting with the first MACM course taken counting towards either MATH or CMPT. A total of 18 credits must be taken at the 400-level or higher, including at least 6 credits each of CMPT and MATH credit.

Rationale

This restructuring greatly simplifies the nature of the MACM honors program, deleting the 11 tables of specializations and the overly structured distribution requirements across these tables. The total upper division credit included within the MACM honors is increased from 50 to 57 credits, appropriately positioning the program in comparison to the MACM major at 45 credits. Although this represents an increased upper division credit it still falls within the 60 upper division credits required for an honors degree.

4. Proposed Calendar Description - General Requirements

Current	Proposed
General Requirements The program is subject to Faculty of Science and University general regulations. Admission to courses and prerequisites are subject to departmental requirements. Admission to and continuation in the program requires an overall GPA of at least 3.00.	**General Requirements** The program is subject to Faculty of Science and University general regulations. Admission to courses and prerequisites are subject to departmental requirements. Graduation from the MACM major is contingent upon achieving a CGPA and UDGPA of 2.00 or better. In addition, students must also achieve a CGPA and UDGPA of 2.00 or better within each of the CMPT, MACM and MATH designations. Admission, continuation and graduation in the MACM honors program is contingent upon 3.00 or better on all relevant grade point averages. FAS Residency Requirements apply to the CMPT course credits used towards the program.

Rationale

Consistent with overall SFU regulations, students must meet more detailed program GPA requirements for graduation as well as overall GPA requirements. At least one half of the overall CMPT credits and two thirds of the upper division CMPT credits must be completed at SFU in accord with FAS residency requirements.

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