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MEMORANDUM

ATTENTION Senate **DATE** March 24, 2010
FROM Jon Driver, Vice-President, Academic and Provost, and Chair, SCUP **PAGES** 1/1
RE: Faculty of Applied Sciences: Full Program Proposal for Systems One First Year Program (SCUP 10-28)

At its March 24, 2010 meeting SCUP reviewed and approved the Full Program Proposal for Systems One First Year Program within the Faculty of Applied Sciences.

Motion

That Senate approve and recommend to the Board of Governors the Full Program Proposal for Systems One First Year Program within the Faculty of Applied Sciences.

encl.

c: F. Popowich



OFFICE OF THE ASSOCIATE VICE-PRESIDENT, ACADEMIC AND ASSOCIATE PROVOST

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MEMORANDUM

ATTENTION	Senate Committee on University Priorities	DATE	March 5, 2010
FROM	Bill Krane, Chair	PAGES	1/1
RE:	Senate Committee on Undergraduate Studies Faculty of Applied Sciences (SCUS 10-13a)		

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of March 4, 2010, gives rise to the following recommendation:

Motion:

That SCUP approve and recommend to Senate the full program proposal for Systems One First Year Program (Surrey).

The relevant documentation for review by SCUP is attached.

New Program Proposal

Systems One First Year Program

Joseph Peters and Farid Golnaraghi
Faculty of Applied Sciences, Simon Fraser University

January 15, 2010

Executive Summary

- Systems One is proposed by the Faculty of Applied Sciences as a technology-oriented direct entry first year program at the Surrey campus.
- Mechatronics Systems Engineering and Software Systems majors will enrol in Systems One during their first year instead of the TechOne and Science Year One programs.
- The program consists of a core of required courses common to both Software Systems and Mechatronics together with additional requirements that are program-specific.
- Most of the courses in Systems One are existing courses. Two new jointly offered courses will be introduced to satisfy the lower division W requirement and a new course on Engineering Graphics and Design will be introduced for Mechatronics majors.
- The adoption of Systems One will require some modifications to existing courses in both the Software Systems and Mechatronics programs.
- The intended start date of the program is September 2010.

Rationale

Currently, the TechOne and Science Year One programs provide entry pathways for Software Systems (SoSy) and Mechatronics Systems Engineering (MSE) majors at the Surrey campus. There is general agreement that the TechOne courses are not well-matched to the needs of SoSy and MSE. The Science Year One program is a viable alternative for prospective SoSy majors (but students will have to make up some courses when they transfer into the SoSy or MSE program). The proposed Systems One program will provide a focussed direct entry option for students who have already decided to major in Software Systems or Mechatronics Systems Engineering.

Systems One has been designed to take advantage of the natural synergies between the technology-oriented Software Systems and Mechatronics programs. The common core includes a Software Systems course, a Mechatronics course, a technical writing course, and a history of technology course. Students in both major programs will take these courses together. The fact that these courses will be required for both programs and the way that the courses will be scheduled will create a de facto cohort program.

The somewhat rigid structure of Systems One is a common characteristic of engineering programs that have to adhere to accreditation requirements. Computing Science programs typically allow more flexibility, but the organization of Systems One fits well with the Surrey campus focus on “first year experience” and the contents are consistent with the plan to offer an accredited semi-professional program in Computing Science at the Surrey campus.

1. **Credential to be awarded:** No credential. This is a first year program.
2. **Location:** SFU Surrey campus.
3. **Faculty:** Faculty of Applied Sciences.
4. **Anticipated program start date:** September 2010.
5. **Description of the proposed program:**

Aims, goals, and/or objectives

The Systems One program will provide a direct entry option for students who have already decided to major in Software Systems or Mechatronics Systems Engineering. The program has been designed to satisfy all first year requirements of both programs and to introduce all students to both fields of study.

Anticipated contribution to mandate and strategic plan of the institution

The design and organization of Systems One fits well with the Surrey campus focus on “first year experience” and the contents are consistent with the plan to offer an accredited semi-professional program in Computing Science at the Surrey campus.

Target audience

All students who qualify for admission to first year programs in Engineering Science and Computing Science. It is expected that the majority of applicants will be BC Secondary students.

Content

The common core: (12-15 credit hours)

CMPT 120/125 or CMPT 128 - Introduction to Computing Science and Programming

ENSC 182 - Mechatronics Design I

CMPT 105W/ENSC 105W - Process, Form, and Convention in Professional Genres (new)

CMPT 106/ENSC 106 - ~~Technology and Society (new)~~ Applied Science, Technology and Society (new)

Additional SoSy requirements: (9-10 credit hours)

CMPT 150 - Introduction to Computer Design

MACM 101 - Discrete Mathematics I

MATH 150 or 151 - Calculus I

Additional MSE requirements: (21-22 credit hours)

CHEM 120 or CHEM 121 - General Chemistry I

ENSC 104 - Engineering Graphics and Design (new)

MATH 151 - Calculus I

MATH 152 - Calculus II

MATH 232 - Linear Algebra

PHYS 140 - Mechanics and Modern Physics

PHYS 141 - Optics, Electricity, and Magnetism

New Courses

CMPT 105W/ENSC 105W is a technical writing course that teaches the fundamentals of informative and persuasive communication for professional engineers and computing scientists. Students will learn to think critically about contemporary technical, social, and ethical issues. In addition to individual writing assignments, students will work in teams to develop and deliver PowerPoint and poster presentations.

CMPT 106/ENSC 106 is an introduction to the practices of engineering and software engineering. It surveys the history and current states of these technical fields. The social and political aspects of engineering decisions will be illustrated by case studies. The course is a co-requisite to CMPT 105W/ENSC 105W.

ENSC 104 teaches the fundamentals of graphical communication in order to help students to think and communicate visually in the context of engineering design. The course will focus on representing three-dimensional objects in two-dimensional space. Students will apply the theory to real-world problems involving mechatronics products.

Delivery methods

No changes. All courses are lecture-based and some have associated tutorials and/or labs.

Linkages between learning outcomes and curriculum design

Students in Systems One will have guaranteed access to all required courses in the Software Systems or Mechatronics Systems Engineering programs. The way that the courses are scheduled will create a de facto cohort program.

Distinctive characteristics

Systems One has been designed to take advantage of the natural synergies between the technology-oriented Software Systems and Mechatronics programs.

Anticipated completion time for the degree

Not applicable.

Enrolment plan for the length of the program

This is a direct entry first year program for the Software Systems and Mechatronics Systems Engineering programs. The admission requirements are the same as the current admission requirements specified in the SFU calendar. The enrolment targets are set by the university.

Policies on faculty appointments

No changes.

Policies on student evaluation (degree requirements)

No changes.

Policies on program assessment

The program will be included in the departmental external reviews that SFU conducts every six years. It will also be assessed by the Canadian Engineering Accreditation Board and eventually by one or more Computing Science accreditation boards.

Level of support and recognition from other post-secondary institutions (including plans for admissions and transfers) and relevant regulatory or professional bodies

Support from other institutions is not required because there is no change to degree requirements. The program is consistent with the requirements of the Canadian Engineering Accreditation Board.

Evidence of student interest and labour market demand

Enrolments in both Software Systems and Mechatronics Systems Engineering programs have been increasing steadily and all Canadian and American government studies forecast continuing growth in these areas for the foreseeable future.

Related programs in other British Columbia post-secondary institutions

This joint first year program between Software Systems and Mechatronics Systems Engineering will be unique in British Columbia.

6. Contact Information

See below.

Additional Information Required by SFU

A. Contact information for the faculty member responsible for program development

Joseph Peters, Associate Director - Surrey, School of Computing Science, 778-782-7576 (Surrey), 778-782-3780 (Burnaby), peters@cs.sfu.ca

Farid Golnaraghi, Associate Director - Surrey, School of Engineering Science, 778-782-8054 (Surrey), 778-782-7650 (Burnaby), mfgolnar@sfu.ca

B. Summary of requirements for graduation (courses, projects/thesis, etc.)

Systems One will add three required first year courses to the Software Systems program but there will be no change to the number of credit hours required for graduation. In the Mechatronics program, Systems One will replace three TECH courses with three new courses.

C. Summary of resources (faculty members, space, equipment) required to implement the program

Resources to support Systems One will be drawn from those used to support Computing Science and Engineering Science students in the old TechOne program.

D. Brief description of any program and associated resources that will be reduced or eliminated when the new program is introduced

See part C.

E. List of faculty members who will be teaching/supervising, what percentage of their teaching will be devoted to the program, and their areas of research specialization

Two new lecturer positions are being requested. These lecturers will teach the three new courses CMPT 105W/ENSC 105W, CMPT 106/ENSC 106, and ENSC 104, as well as the existing course ENSC 182 which is currently taught by a sessional instructor. These courses are the only ones that increase the current teaching loads in Computing Science and Engineering Science. All other ENSC and CMPT courses in Systems One are existing courses that will be taught by the faculty who currently teach them.

F. For a program where the intention is to charge a premium fee, a budget

No changes to existing fees are anticipated.

Software Systems Calendar Change #1

The addition of the following section to page 76 of the Calendar, after the description of the Faculty of Applied Sciences. Specifically, placed after section entitled "Residency Requirements" and before section entitled "School of Computing Science":

Systems One Program

Systems One is a technology-oriented direct entry first year program at the Surrey campus. Mechatronics Systems Engineering and Software Systems majors will enroll in Systems One during their first year. The program consists of a core of required common courses, together with additional requirements that are program-specific.

The Common Core

CMPT 120-3/125-3 or CMPT 128-3 – Introduction to Computing Science and Programming

ENSC 182-3 Mechatronics Design I

CMPT 105W-3/ENSC 105W-3 Process, Form, and Convention in Professional Genres

CMPT 106-3/ENSC 106-3 Applied Science, Technology and Society

Plus additional requirements described in the respective programs.

Software Systems Calendar Change #2

The following changes should be made to page 79 of the Calendar, specifically to the section entitled "Software Systems Major Program". The original text is included below, with the additions underlined in blue:

Software Systems Major Program

This program provides skills, knowledge and thought processes necessary for professional software production, while also providing a broad background of various computing systems that graduates encounter in their careers. For course planning information, visit <http://www.cs.sfu.ca/undergrad/Advising>

First-year Requirements

The first year of Software Systems is the Systems One program, a joint program with the Mechatronics Systems Engineering program. The courses required for Systems One are included in the following lists of requirements.

Systems Requirements

Students complete all of

CMPT 150-3 Introduction to Computer Design

CMPT 250-3 Introduction to Computer Architecture

CMPT 300-3 Operating Systems I

ENSC 182-3 Mechatronics Design I

and two of

CMPT 170-3 Introduction to Web Application Development

CMPT 371-3 Data Communications and Networking

CMPT 471-3 Networking II

CMPT 354-3 Database Systems I

CMPT 454-3 Database Systems II

CMPT 401-3 Operating Systems II
CMPT 432-3 Real-time Systems
CMPT 433-3 Embedded Systems
CMPT 470-3 Web-based Information Systems

18 units

Fundamentals Requirements

Students complete all of

CMPT 105W-3/ENSC 105W-3 Process, Form, and Convention in professional Genres

CMPT 106-3/ENSC 106-3 Applied Science, Technology and Society

CMPT 307-3 Data Structures and Algorithms

MACM 101-3 Discrete Mathematics I

MACM 201-3 Discrete Mathematics II

MATH 151-3 Calculus I

MATH 232-3 Elementary Linear Algebra

CMPT 322W-3 Professional Responsibility and Ethics

and one of

STAT 101-3 Introduction to Statistics

STAT 270-3 Introduction to Probability and Statistics

24 units

The remainder of this section of the Calendar should remain unchanged.

Calendar change for Mechatronic Systems Engineering (MSE) Program

1. Proposed 1st year Systems One replacing Tech One for Mechatronic Systems Engineering (MSE) Program¹

From:	To:
<p><i>Term One (Fall)</i></p> <p>CMPT 128-3 Introduction to Computing Science and Programming for Engineers MATH 151-3 Calculus I PHYS 140-4 Studio Physics – Mechanics and Modern Physics TECH 106-3 Spatial Thinking and Communicating TECH 114-3 Technology in Everyday Contexts</p> <p>and one of</p> <p>CHEM 120-3 General Chemistry I CHEM 121-4 General Chemistry and Laboratory I 19 or 20 units</p>	<p><i>Term One (Fall)</i></p> <p>CMPT 128-3 Introduction to Computing Science and Programming for Engineers MATH 151-3 Calculus I PHYS 140-4 Studio Physics – Mechanics and Modern Physics <u>ENSC 104-3 Engineering Graphics and Design</u> <u>Cmpl I-3 first complementary elective</u></p> <p>and one of</p> <p>CHEM 120-3 General Chemistry I CHEM 121-4 General Chemistry and Laboratory I 19 or 20 units</p>
<p><i>Term Two (Spring)</i></p> <p>Cmpl I-3 first complementary elective ENSC 182-3 Mechatronics Design I MATH 152-3 Calculus II MATH 232-3 Elementary Linear Algebra PHYS 141-4 Studio Physics – Optics, Electricity and Magnetism* TECH 101-3W Communication, Teamwork and Collaborative Process 19 units</p>	<p><i>Term Two (Spring)</i></p> <p><u>ENSC 106-3 Applied Science, Technology and Society*</u> <u>ENSC 105W-3 Process, Form, and Convention in Professional Genres</u> ENSC 182-3 Mechatronics Design I MATH 152-3 Calculus II MATH 232-3 Elementary Linear Algebra PHYS 141-4 Studio Physics – Optics, Electricity and Magnetism 19 units</p>

¹ SFU Calendar 2009/2010 Page 88 Faculty of Applied Sciences