S.02-55
As amended by Senate July 8/02

SIMON FRASER UNIVERSITY

Senate Committee on University Priorities

Memorandum

TO: Senate

FROM: John Waterhouse
Chair, SCUP
Vice President, Academic

RE: Motions from the SFU at Surrey Short Term Academic Planning Committee

DATE: June 18, 2002

At its March 4, 2002 meeting, Senate discussed and approved the following motion in relation to the TechBC undergraduate programs:

"That Senate approve in principle the establishment of a program which will provide existing undergraduate students at the Technical University of British Columbia the opportunity to complete an appropriate SFU degree. This program is expected to be in effect for at least three years, and at most four, and will start on 1 September 2002. The detailed programmatic arrangements will be developed over the next few months and will be subject to the usual University approval processes."

In response to this motion, the SFU at Surrey Short Term Academic Planning (STP) Committee was established as a subcommittee of the Senate Committee on University Priorities (SCUP) in March, 2002. Specifically, the Committee was tasked to:

- Propose an interim administrative structure for the SFU at Surrey programs;
- Evaluate the academic merit of the existing TechBC undergraduate programs;
- Propose the names for the degrees to be awarded to those successfully completing the SFU at Surrey programs.

SCUP reviewed the Final Report of the STP Committee (copy attached) at its June 12, 2002 meeting. After consideration of the six recommendations put forward by the STP Committee, SCUP recommends to Senate six motions:

Motion 1:

That the SFU Surrey interim administrative structure be continued.

Motion 2:

That Information Technology and Interactive Arts be maintained as the names of the two program streams at the SFU Surrey campus.

Motion 3:

That the program name of "Program in Information Technology and Interactive Arts" be adopted for use as the name of the program offered at the SFU Surrey campus, and that the Cmpt & Cmns stream be renamed not to include the word Engineering

Motion 4:

That the Information Technology and Interactive Arts undergraduate streams as currently constituted be considered Bachelor degree level offerings and merit an SFU Bachelor's degree credential.

Motion 5:

Those students who were admitted to TechBC prior to 2002 and who successfully complete the program requirements in the Information Technology program stream will be awarded the BSc (Information Technology, TechBC).

Motion 6:

Those students who were admitted to TechBC prior to 2002 and who successfully complete the program requirements in the Interactive Arts program stream will be awarded the BSc (Interactive Arts, TechBC).

encl.

SCUP 02-95

SIMON FRASER UNIVERSITY

Final Report
SFU at Surrey Short Term Academic Planning Committee
June 5, 2002

Final Report
SFU at Surrey Short Term Academic Planning Committee
June 5, 2002

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Final Report
SFU at Surrey Short Term Academic Planning Committee
June 5, 2002

I. Mandate and Operation of the Committee

The SFU at Surrey Short Term Academic Planning Committee (STP) was established as a subcommittee of the Senate Committee on University Priorities (SCUP) in March, 2002. Specifically, the Committee was tasked to:

- Propose an interim administrative structure for the SFU at Surrey programs;
- Evaluate the academic merit of the existing TechBC undergraduate programs;
- Propose the names for the degrees to be awarded to those successfully completing the SFU at Surrey programs.

Membership of the Committee includes:

Chair:	Bill Krane, Associate Vice-President, Academic
Members:	Martin Gotfrit, Contemporary Arts Rob Cameron, Computing Science Jacques Vaisey, Engineering Science Drew Parker, Business Michael Monagan, Mathematics David Brokenshire, Tech BC Student Martin Knowles, SFU Student
Resource Persons:	Laurie Summers, Director, Academic Planning SFU at Surrey Startup Team Joanne Curry (Leader) Ron Marteniuk Tom Calvert KC Bell

A total of three formal meetings of the STP were held on April 24th, May 15th and May 30th respectively. Copies of the "Actions Arising Notes" from the three formal meetings of the Committee are contained in Appendix I.

It should be noted that all recommendations made by the STP are to be considered in effect until further notice or until such time as the SFU at Surrey Long Term Academic Planning Committee makes its recommendations available.

II. Summary of Recommendations

Recommendation 1:
That the SFU Surrey interim administrative structure, currently in operation, be continued.

Recommendation 2:
That Information Technology and Interactive Arts be maintained as the names of the two program streams at the SFU Surrey campus.

Recommendation 3:
That the program name of "Program in Information Technology and Interactive Arts" be adopted for use as the name of the two programs offered at the SFU Surrey campus.

Recommendation 4:

That the Information Technology and Interactive Arts undergraduate programs as currently constituted be considered as Bachelor degree level offerings and therefore merit a Bachelor's degree credential.

Recommendation 5:
To grandfather those students who have previously been enrolled in TechBC courses in the Information Technology Program during the past three years and award them the BSc in Information Technology degree credential and further to recommend that the SFU at Surrey Long-term Academic Planning Committee review this degree credential in the future.

Recommendation 6:
To grandfather the fourth year (with fourth year being defined as someone who has successfully completed 90 credits) Interactive Arts students and award them the BSc in Interactive Arts degree credential upon completion of their program requirements. Any second and third year students would be granted a BA in Interactive Arts credential upon completion of program requirements. However, for those students who **either** complete the existing IA program and a minor in Mathematics or Computing Science at SFU **or** who complete the existing IA program and take 30 additional modules from the ITEC curriculum (math, computing, electrical engineering) beyond what is in the IA program a BSc in Interactive Arts credential will be awarded upon completion of program requirements.

III. Administrative Structure

An interim administrative structure has been in operation at SFU Surrey since February 2002. Specifically, a Deans Coordinating Committee, consisting of the Deans of Applied Sciences, Arts and Business oversees the activities of the academic programs. A Program Director serves as the operational liaison between the two program areas, Information Technology and Interactive Arts, and the Coordinating Committee of Deans.

The Dean of Applied Sciences has signing authority for the programs and the faculty, staff and students are subject to the policies and procedures of the Faculty of Applied Sciences. A diagrammatic version of the interim administrative structure is provided in Appendix II.

The STP, as part of its mandate, was asked to review this interim structure and to either recommend changes to it or its continuance until such time as the Long Term Academic Planning Committee had presented its recommendations. In addition, the STP reviewed the program stream and the program names for the campus.

Recommendation 1:
That the SFU Surrey interim administrative structure, currently in operation, be continued.

Recommendation 2:
That Information Technology and Interactive Arts be maintained as the names of the two program streams at the SFU Surrey campus.

Recommendation 3:
That the program name of "Program in Information Technology and Interactive Arts" be adopted for use as the name of the two programs offered at the SFU Surrey campus.

IV. Academic Merit

The STP was asked to provide an evaluation of the academic merit of the Interactive Arts and Information Technology undergraduate programs. In order to assist with this evaluation, a review template was prepared (Appendix III) and the committee was divided into three working groups:

TechOne – Michael Monagan
Information Technology – Rob Cameron, Jacques Vaisey
Interactive Arts – Martin Gotfrit, Drew Parker, Martin Knowles

Each of the three working groups was asked to consider two key questions in relation to academic merit and to provide a detailed analysis of their assigned program piece. The two key questions posed were:

1. Would the programs, as outlined, meet Bachelor Degree level requirements?
2. Does the content and structure of each program provide the core knowledge and skill acquisition in the major program area?

Extensive discussion occurred around the analysis provided by each working group. The short timeframe in which this committee was to function as well as the fact that there was limited time and resources in which to recommend any significant changes to the content and structure of the programs prior to Fall 2002 provided a challenge for the review process.

A synopsis of the analysis of each group is provided below and the detailed evaluations are provided in Appendix IV.

TechOne

The TechOne Program provides an integrated, common first year experience in the areas of foundational skills, management, computing, mathematics, arts and other (includes History and Theory of Technology and Culture and Probability and Statistics). In total, there are 12 courses in the TechOne program each containing 3 modules. A 3- module course at TechBC is equivalent to a 3-credit course at SFU. The total credit load in TechOne is 36 credits which is a 6 credit overload in comparison to the 30-credit load common in most first year undergraduate SFU programs. The strong emphasis on team and communication skills in the TechOne program was seen to be a very positive aspect.

Particular concerns were noted around the existing Math admission requirements for the program and the subsequent level of Math content covered in the TechOne program. The current entry requirement for the TechBC program in mathematics is BC Principles of Mathematics 11. A consequence of this is that the ``calculus" in TechOne, only 2 modules, results in a weak mathematics foundation for the IT degree program and also presents a transfer credit transfer problem for IT students. It is recommended that SFU at Surrey move as quickly as possible to adopt a 6 module calculus sequence in TechOne in line with the calculus sequence at UBC, SFU, etc. This would require BC Principles of Mathematics 12 for entry into TechOne. NB: the new provincial guidelines for first year calculus (in draft) do allow us to include topics relevant to the IT program in the 6 module sequence, for example, differential equations and complex numbers.

Information Technology

The Information Technology (ITEC) program is designed to produce graduates in two areas of concentration: (a) computer and communications engineering, and (b) software engineering. The ITEC program shares a common first year with Interactive Arts (IART) program and students are required to take electives from the Interactive Arts and Management and Technology areas as well as series of five interdisciplinary project courses. The ITEC program is further distinguished from traditional computing and engineering programs by it heavy use of a web-based delivery model and by a partitioning of courses in 1-credit modules that can be taken independently. The program also emphasizes teamwork both on the part of students and instructors throughout the development and delivery of the curriculum, although some of these practices may change as the program scales in size.

Although the amount and level of detail provided to the committee in the course/module outlines did not allow for a thorough assessment, it is nevertheless possible to conclude that the topical coverage of the ITEC curriculum does appear to constitute a program of study in both hardware and software technology that meets provincial standards for a Bachelor's degree. However, in reviewing the curriculum as presented, several serious

issues did arise. The first concern centers around the broad topical coverage of a joint computing/engineering program, which may have required compromises in addressing the individual topics within the curriculum at an appropriate depth. Secondly, concerns exist about the prerequisite structure in the curriculum, especially in regards to the preparation in Mathematics. This lack may make it difficult to deliver some of the courses at the level described in the outlines.

Finally, there appears to be a great deal of overlap between many of the TechBC courses (some still to be developed) and existing courses in Computing and Engineering Science. The result is wasteful in terms of resources and is a recipe for confusion. See Section III of the IT Program Report (Appendix IV) for details on what overlaps with what.

In order to integrate the TechBC programs into the SFU mainstream in the long term, action must be taken in the following areas.

- The Science foundation in the IT-program should be increased, especially in Mathematics. Details are given in Section II of the IT Program Report (Appendix IV).
- Efforts should be made to exploit the similarities between many of the course offerings at SFU-Surrey and the main campus.

Interactive Arts

The descriptions for courses as well as the overall syllabus associated with Interactive Arts were examined. Based on this research, interviews with faculty and site visits, it is our opinion that the undergraduate program clearly merits a Bachelors degree.

The Program in Interactive Arts is both ambitious and unique. Though content comparison will reveal slightly similar programs, these other programs tend to have evolved from a more traditional academic unit such as fine arts, communications or computing science. As a new program in a new institution, Interactive Arts was able to more directly address the needs of students entering into what is often referred to as "the new economy". In addition to a distinctive syllabus, Interactive Arts is based upon current teaching philosophies and this "learner-centered" approach is supported by extensive use of web-based delivery, interaction and support.

Of the almost forty courses examined, only six bear some resemblance to Burnaby mountain (School for the Contemporary Arts) courses. Of these only three appear to be a direct overlap. The Interactive Arts stream is very complementary to existing areas of Contemporary Arts and the latter is looking forward with great anticipation to discussions on how the units can work together.

From observations at various open houses and course presentations, the work produced by the students appears very impressive. One of the committee members wrote:

"In evaluating a program as team and product-oriented as Interactive Arts, it is necessary to consider both the quality of the stated content of the program (i.e. course syllabi, online content, etc.) and the quality of the research produced by the people involved in the program. Many of the research projects exhibited at the ASI Exchange and at the TechBC Open House show a level of theoretical and technical sophistication well beyond what would be required of projects produced in a traditional BA/BFA program, often incorporating current research topics in computer graphics and human-computer interface (e.g. experience design, novel interaction methods, tangible interfaces, etc). While the IA program could be strengthened in the future by adding more mathematics and natural science components, the quality of the research and projects produced in the program compares well with the quality of research and projects produced by students in B.Sc. programs at SFU and other universities."

Martin Knowles

Recommendation 4:

That the Information Technology and Interactive Arts undergraduate programs as currently constituted be considered as Bachelor degree level offerings and therefore merit a Bachelor's degree credential.

V. Degree Credential

As a result of the program review and approval process carried out through the provincial Degree Program Review Committee and the Ministry of Advanced Education and Training, the TechBC programs were allowed to award the BSc in Information Technology and the BSc in Interactive Arts degree credentials.

The STP was asked to consider which SFU degree credential would be appropriate to award to the Information Technology and Interactive Arts Program Streams. This task proved to be a difficult undertaking as there were many strong and divergent opinions held by the committee members. There was a strong obligation to provide fair treatment for the existing students in the program but this had to be balanced with concerns around the awarding of an appropriate degree credential that would be reflective of existing SFU standards and practices. Unfortunately, the committee was unable to reach a unanimity on the awarding of the degree credentials. After extensive review and discussion of the program information and materials provided, the STP has put forward the following recommendations:

Recommendation 5:
To grandfather those students who have previously been enrolled in TechBC courses in the Information Technology Program during the past three years and award them the BSc in Information Technology degree credential and further to recommend that the SFU at Surrey Long-term Academic Planning Committee review this degree credential in the future.

Recommendation 6:
To grandfather the fourth year (with fourth year being defined as someone who has successfully completed 90 credits) Interactive Arts students and award them the BSc in Interactive Arts degree credential upon completion of their program requirements. Any second and third year students would be granted a BA in Interactive Arts credential upon completion of program requirements. However, for those students who **either** complete the existing IA program and a minor in Mathematics or Computing Science at SFU **or** who complete the existing IA program and take 30 additional modules from the ITEC curriculum (math, computing, electrical engineering) beyond what is in the IA program a BSc in Interactive Arts credential will be awarded upon completion of program requirements.

VI. Appendices

Appendix I – Actions Arising Notes

(April 24th, May 15th and May 30th Meetings)

SFU at Surrey Short Term Academic Planning Committee
Wednesday, April 24, 2002
Library Room 7301

Actions Arising

1. Status Report from the Surrey Start Up Team
   Item: J. Curry presented and reviewed SFU at Surrey Start-Up Status Report.
   Action Arising: None

2. Review of Mandate and Setting of Priorities
   Item: Mandate of Short Term Committee and the history behind its set up were reviewed. Noted that due date for final report is later than stated in the mandate. The final report will need to be completed by the end of May and presented to the June meeting of SCUP. Mandate, focus and relationship of Short Term Committee to Long Term Academic Planning Committee reviewed
   Action Arising: None

   Item: Current interim administrative structure reviewed including a flow diagram.
   Action Arising: As part of its mandate, the Committee has been asked to either endorse the current structure or to suggest an alternative. No final decisions reached, further discussion will be undertaken at a future meeting.
   Responsibility for Action: Short Term Planning Committee

   Item: Possible degree and program names for the Information Technology and Interactive Arts programs were discussed. No final decisions reached, further discussion will be undertaken at a future meeting.

   Item: As part of its mandate, the Committee has been asked to evaluate the Information Technology and Interactive Arts programs and their academic merit. No final decisions reached, further discussion will be undertaken at a future meeting.

   Action Arising: Committee to divide into three groups consisting of IT (R. Cameron, J. Vaisey, D. Brokenshire), IA (M. Gotfrit, M. Knowles, D. Parker) and TechOne (M. Monagan) to review the curricula.
   Responsibility for Action: Short Term Planning Committee

   Action Arising: A template to assist in the review and evaluation process of the two curricula will be developed and circulated to the Committee.
   Responsibility for Action: B. Krane, L. Summers

3. Review of Curriculum Information Materials
   Item: Binder of TechBC curriculum information reviewed by L. Summers.
   Action Arising: T. Calvert can arrange to meet with any committee members who require further information/clarification.

Action Arising: Committee members can request access to the TechBC Course Management System or Module Specification System via R. Marteniuk.
Action Arising: Committee members can consult with TechBC faculty members as well as faculty members from their Department as they review the curriculum materials.

4. Next Steps
   Item: Future meetings of the Committee were discussed.
   Action Arising: Future meetings of the Committee will be scheduled to occur the week of May 13th (1/2 day session) and the week of May 27th (2 hours).
   Responsibility for Action: B. Krane's Office.

   Item: The focus of the next meeting's agenda and final report format were discussed. Agreed that the report would probably include a description of the programs with some detail and the opinion/evaluation of the programs by the Short Term Planning Committee. Noted that the Committee could indicate that inadequate time prevented them from completing a more thorough review/analysis of the curriculum.
   Action Arising: Committee members asked to complete a draft report from each of their groups based on the template to be circulated.
   Responsibility for Action: Individual groups as assigned.

SFU at Surrey Short Term Academic Planning Committee
Wednesday, May 15, 2002
Strand Hall 3172

Actions Arising

Present: B. Krane (Chair), M. Gotfrit, R. Cameron, D. Parker, M. Monagan, D. Brokenshire, M. Knowles, L. Summers, J. Curry, R. Marteniuk, T. Calvert, K.C. Bell

Regrets: J. Vaisey

1. Motions Regarding TechBC
   Item: B. Krane presented for the information of the Committee the three motions regarding TechBC which were discussed and approved at the June 4th Senate meeting.
   Action Arising: None

2. Terms of Reference
   Item: B. Krane presented for the information of the Committee the terms of reference for the SFU at Surrey Short-term and Long-term Academic Planning Committees.
   Action Arising: None

3. Development of the TechBC Undergraduate Programs
   Item: L. Summers provided a verbal overview of the history behind the development of the TechBC Undergraduate Programs.
   Action Arising: None

4. Administrative Structure
   Item: B. Krane presented the Committee with a diagrammatic representation of the current interim administrative structure at the Surrey campus and asked them to make recommendations as to what would be the most appropriate structure to continue for the time being. It was agreed that one of the tasks of the Long-term Committee will be to devise an appropriate administrative and governance structure. Currently, the Program Director for the campus reports to the Council of Deans which includes the Deans of Applied Sciences, Arts and Business. The Dean of Applied Sciences has signing authority for the campus and the faculty, staff and students are subject to the policies and procedures of this Faculty.
   Action Arising: The reference to specific faculty groups will be removed from the diagram and replaced with "Interactive Arts Program" and "Information Technology Program." With this change, the interim administrative structure as outlined was accepted.
   Action Arising:

   Motion: Moved by: R. Cameron
   Seconded by: D. Parker

"that the Dean of Applied Sciences continue to have signing authority for the Surrey Campus and that faculty, staff and students are governed by the policies and procedures of the Faculty of Applied Sciences until further notice."

CARRIED

Action Arising: B. Krane to check with J. Osborne regarding the indemnification of the Short-term Academic Planning Committee members with respect to the decisions reached by them.

5. Program Names
Item: The Committee was asked to consider program names for the SFU at Surrey offerings.
Actions Arising:

Motion: Moved by: M. Gotfrit
Seconded by: D. Brokenshire

"to maintain use of the names of Information Technology and Interactive Arts for the two program streams at the SFU Surrey campus."

CARRIED

Motion: Moved by: M. Gotfrit
Seconded by: D. Brokenshire

"to adopt the program name of 'Program in Information Technology and Interactive Arts' for the collective programs offered at the SFU Surrey campus."

CARRIED

6. Reports from the Subgroups
Item: Each of the three subgroups, TechOne, Information Technology and Interactive Arts, were asked to present their report on the review and evaluation of the TechBC undergraduate programs. Discussion occurred around each report as well as how to present this information to SCUP and then Senate.
Action Arising: B. Krane and L. Summers will provide a draft report for review and discussion at the next meeting.

7. Degree Credential
Item: The Committee was asked to consider which SFU degree credential should be awarded to the Information Technology and Interactive Arts Program Streams.
Action Arising:

Motion: Moved by: D. Brokenshire
Seconded by: M. Gotfrit

"to grandfather those students who have previously been enrolled in TechBC courses in the Information Technology Program during the past three years and award them

the BSc in Information Technology degree credential and recommend that the SFU at Surrey Long-term Academic Planning Committee review this degree credential in the future."

Motion: Moved by: R. Cameron

"to table the motion regarding the BSc in Information Technology."

MOTION DEFEATED

6 IN FAVOR
1 OPPOSED

ORIGINAL MOTION CARRIED

Motion: Moved by: D. Brokenshire
Seconded by: M. Gotfrit

"to grandfather those students who have previously been enrolled in TechBC courses in the Interactive Arts Program during the past three years and award them the BSc in Interactive Arts degree credential and recommend that the SFU at Surrey Long-term Academic Planning Committee review this degree credential in the future."

Motion: Moved by: M. Monagan
Seconded by: M. Knowles

"to table the motion regarding the BSc in Interactive Arts."

5 IN FAVOR
2 OPPOSED

MOTION CARRIED

REVISED
SFU at Surrey Short Term Academic Planning Committee
Thursday, May 30, 2002
3171 Strand Hall

Actions Arising

Present: B. Krane (Chair), M. Gotfrit, R. Cameron, D. Parker, M. Monagan, D. Brokenshire, M. Knowles, J. Vaisey, L. Summers, J. Curry, R. Marteniuk, T. Calvert, K.C. Bell

1. Degree Credential for Interactive Arts Program

Item: The Committee was asked to recommend a degree credential for the Interactive Arts Program.
Action Arising:

Motion: Moved by: D. Brokenshire
Seconded by: M. Gotfrit
"to grandfather those students who have previously been enrolled in TechBC courses in the Interactive Arts Program during the past three years and award them the BSc in Interactive Arts degree credential and recommend that the SFU at Surrey Long-term Academic Planning Committee review this degree credential in the future."

Amendment to the Motion: Moved by: M. Monagan
Seconded by: J. Vaisey
"to grant a BA in Interactive Arts credential upon completion of program requirements to those students who have previously been enrolled in TechBC courses in the Interactive Arts Program during the past three years. However, for those students who **either** complete the existing IA program and a minor in Mathematics or Computing Science at SFU **or** who complete the existing IA program and take 30 additional modules from the ITEC curriculum (math, computing, electrical engineering) beyond what is in the IA program a BSc in Interactive Arts credential will be awarded upon completion of program requirements."

Vote on Amended Motion:

4 IN FAVOUR
4 OPPOSED
AMENDMENT DEFEATED

Amendment to the Motion: Moved by: J. Vaisey
Seconded by: M. Monagan
"to grandfather the fourth year (with fourth year being defined as someone who has successfully completed 90 credits) Interactive Arts students and award them the BSc in Interactive Arts degree credential upon completion of their program requirements. Any second and third year students would be granted a BA in Interactive Arts credential upon

completion of program requirements. However, for those students who **either** complete the existing IA program and a minor in Mathematics or Computing Science at SFU **or** who complete the existing IA program and take 30 additional modules from the ITEC curriculum (math, computing, electrical engineering) beyond what is in the IA program a BSc in Interactive Arts credential will be awarded upon completion of program requirements."

5 IN FAVOUR
3 OPPOSED
AMENDMENT CARRIED

Amended Motion: Moved by: D. Brokenshire
Seconded by: M. Gotfrit

"to grandfather the fourth year (with fourth year being defined as someone who has successfully completed 90 credits) Interactive Arts students and award them the BSc in Interactive Arts degree credential upon completion of their program requirements. Any second and third year students would be granted a BA in Interactive Arts credential upon completion of program requirements. However, for those students who **either** complete the existing IA program and a minor in Mathematics or Computing Science at SFU **or** who complete the existing IA program and take 30 additional modules from the ITEC curriculum (math, computing, electrical engineering) beyond what is in the IA program a BSc in Interactive Arts credential will be awarded upon completion of program requirements."

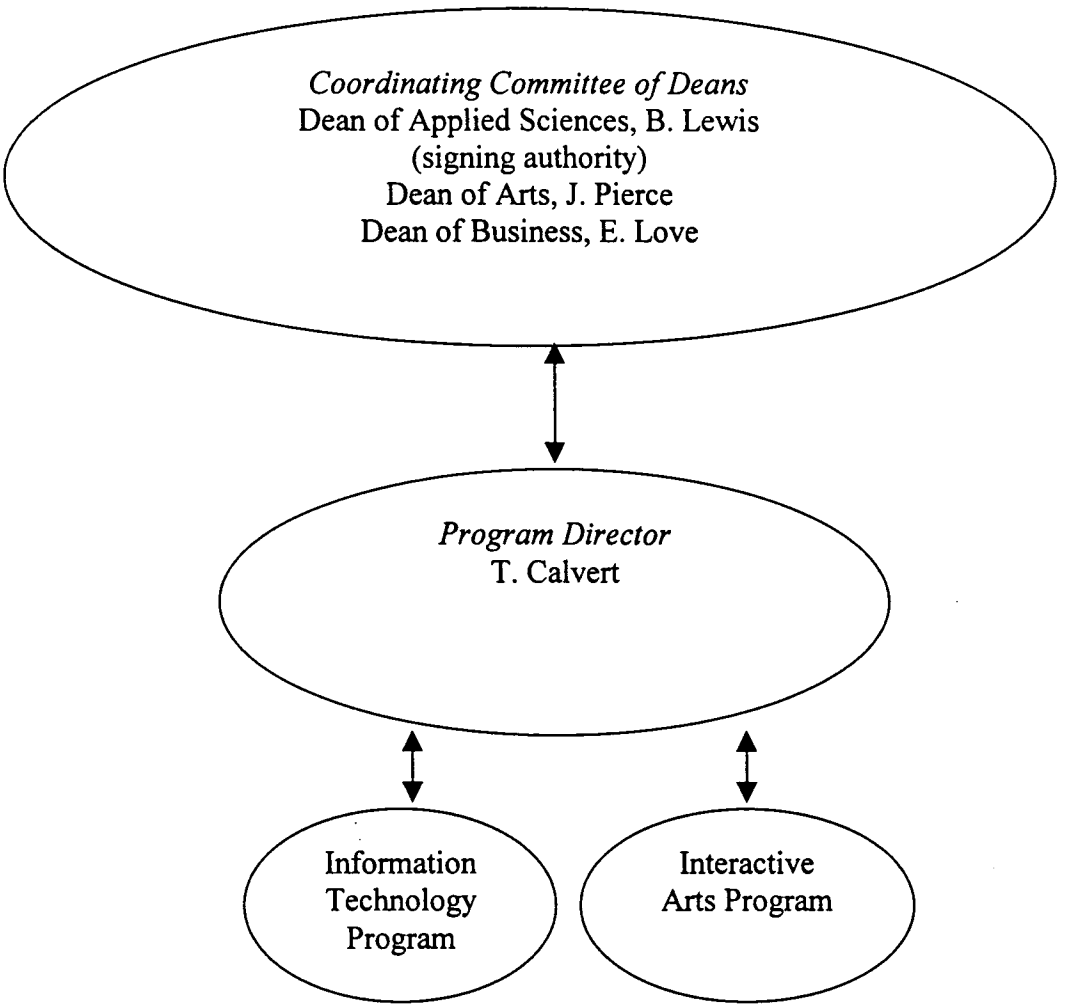
5 IN FAVOUR
3 OPPOSED
MOTION CARRIED

2. Final Report to SCUP

Item: The Committee reviewed the draft version of the final report as distributed. The proposed format of the report was approved. For those members of the Committee who opposed the previous motions, it was agreed that they would be entitled to append their minority report to the appendices of the final report.
Action Arising: Subcommittee members were asked to submit their respective final summaries for the Academic Merit section of the report as well as their full report for the appendices by no later than 8:00 am Monday morning. A draft version of the report will be circulated to all members of the Committee by late Monday/early Tuesday with the request that any comments and edits be returned by 8:00 am Wednesday in order for the report to be available for distribution to SCUP that same day.

Appendix II – Interim Administrative Structure

SFU at Surrey Administrative Structure
As of June, 2002



Appendix III – Short Term Planning Process Template

Short Term Planning Process Template

The Short Term Academic Planning Committee, as part of its mandate, has been asked to provide an evaluation of the academic merit of two of the existing TechBC undergraduate programs and to propose appropriate degree credentials for those students completing the programs. In order to accomplish this task, the Committee has been asked to review existing documentation and information in relation to the Interactive Arts and Information Technology Programs.

In order to accomplish its evaluation, the Committee is asked to consider the following key questions as it reviews the materials provided:

1. Would the programs, as outlined, meet Bachelor Degree level requirements?
2. Does the content and structure of each program provide the core knowledge and skill acquisition in the major program area?
3. In recognition of the content and level of the program what would be the appropriate degree credential to be awarded?

Specific points of review should include:

1. Philosophy of the Program
   Reference material: Tab 3 Excerpt from the Full Program Proposal for the BSc Degree, April 1999
   Reference material: Graduate Profile, excerpt from the Undergraduate Program Planning Document, January 2001

   - *What is the focus of the overall program?*
   - *Why has it been created?*
   - *What are the expected outcomes for its graduates?*

2. *Program Area Overviews*
   Reference material: Tab 2, Bachelor of Science Degree Program Overviews

   - *What is the general intent of the specific program?*
   - *What is the general intent of each year of the program?*

3. *Learning Outcomes - General*
   Reference material: General Learning Outcomes, excerpt from the Undergraduate Program Planning Document, January 2001

   - *What will the student gain from this program in terms of skills, knowledge, attitudes or other attributes?*
   - *Will these outcomes warrant a Bachelor's level degree credential?*

4. *Learning Outcomes – Program Area*
   Reference material: Program Area Learning Outcomes, excerpt from the Undergraduate Program Planning Document, January 2001

   - *What program area specific skills, knowledge, attitudes and other attributes will the student gain from this course of study?*
   - *Will the specific outcomes as outlined provide the student with a core expertise in this program area?*

5. *Program Structure*
   Reference material: Tab 4, Course Diagrams for IA and IT
   Reference material: Tab 14, Pre and Co-requisites, IA and IT, TechOne – TechFour
   Reference material: Tab 16, Elective Pathways

   - *Will the courses and modules provide the student with a sequential program that leads to the introduction, development and refinement of the general and program area specific learning outcomes as previously described?*
   - *Do the courses and curriculum requirements contribute to the intended outcomes of the program?*
   - *Is the overall credit load appropriate for a Bachelor's level credential?*
   - *Are there sufficient required core program credits to award a credential in the particular program area?*

6. *Admission Requirements*
   Reference material: Tab 6, Undergraduate Admission Requirements

   - *In comparison with other post secondary institutions in the Province, is the level of secondary preparation appropriate for entrance to a Bachelor's level degree program?*
   - *Are the admission requirements at an appropriate level and of suitable content to enable the students to succeed in the program as structured?*

7. *Program Content*

   Reference material: Tabs 7 – 13, IA and IT Course/Module Outlines, TechOne through TechFour

   - *Does the content provide the student with the ability to acquire the core knowledge necessary to achieve the intended learning outcomes in the program?*
   - *Do the required learning activities and assessments provide the student with the ability to acquire the core knowledge and skills necessary to achieve the intended learning outcomes in the program?*

Appendix IV – Subcommittee Reports
(TechOne, Information Technology, Interactive Arts)

TechOne Report – M. Monagan

There are 12 courses in the TechOne program each containing 3 modules. A 3 module course at TechBC is equivalent to a 3 credit course at SFU. So this is 36 credits, heavier than ``normal 30 credit" load at SFU. I've divided up the TechOne program into groupings.

FOUNDATIONAL SKILLS.
100-3 Process Elements I
101-3 Process Elements II
The focus of the first module in each is on writing and oral presentation.
The focus of the second in each is on working in teams.
The focus of the third in on research skills; e.g. finding information.

MANAGEMENT
130-3 Business in the Global Economy I (looks at different businesses)
131-3 Business in the Global Economy II (asks if you have what it takes to run a business and develops a business plan.

COMPUTING
150-3 Introduction to Computer Systems (an overview)
151-3 Introduction to Programming (in Java)

MATHEMATICS
143-3 Fundamentals of Mathematics
144-3 Linear Algebra and Calculus

ARTS
120-3 Systems of Visual Representation
121-3 New Media Images

OTHER
110-3 History and Theory of Technology and Culture
142-3 Probability and Statistics

o TechOne integrates all students into a common first year. One reason for this was to allow students to decide which of the streams to take after the first year. Another is to reduce cost. However, trying to satisfy everyone (i.e. IA, IT, IM) has led to a ``packed" first year with no room for electives.

o The second semester is much more difficult than the first. The first Business, Computing, and Arts courses are "overview" courses. The meat is in the second course.

o The Math entry requirement is BC Grade 11 math not 12 so as to encourage management technology and interactive arts students to enter the program. Consequently

the Fundamentals of Mathematics course is the equivalent of BC Math 12. At SFU this is Precalculus and science students do not get credit for it. There is a lack of calculus.

o The Probability and Statistics course is not the same as SFU's STAT 270 Probability and Statistics course since only BC Math 11 is assumed. It is really a methods course which uses the statistical software package MINITAB. It is appropriate. TechBC personnel have suggested moving it to the second year and to refocus it away from a methods courses for the management technology option to a mathematical course.

o The Linear Algebra and Calculus course is a compression of three courses at SFU/UBC/colleges, namely differential calculus, integral calculus and linear algebra. TechBC students will not get transfer credit for these courses at SFU/UBC or colleges in BC.

o There is a very strong team aspect throughout the entire degree.

o There is serious attempt to address these requirements from industry:

- employees must be able to communicate effectively (oral and written)
- employees must be able to work in a team.

MATHEMATICS

Some of the Mathematics is specialized. I was told that the overall program was previously criticized for having a weak mathematical content and that the "applied mathematics courses"were artificially constructed by pulling out pieces of mathematics that are needed for other courses.

Tech 143 Fundamentals of Mathematics (requires BC Math 11)
Algebra
Trigonometry (includes one week of complex numbers)
Discrete Mathematics

Tech 144 Linear Algebra and Calculus
Linear Algebra (vectors, matrices, linear systems)
Differential Calculus (Math 151 at SFU)
Integral Calculus (Math 152 at SFU)

Tech 200 Applied Mathematics I
Laplace Transforms (without first doing differential equations?)
Stochastic Processes

Tech 201 Applied Mathematics II (includes Fourier transforms)
Linear Transformations
Advanced Linear Algebra

Tech 300 Applied Mathematics III (is a first course in discrete math)
Logic Sets and Functions
Relations and Graphs

NB: in an early TechOne there were two different mathematics courses 140-3 Linear Systems, 141-3 Dynamic Systems. In the latter course, there was one module on differential equations followed by one module on Laplace transforms.

o Tech 300 is a lower division course (level wise). The course description suggests it is also a computing course because of the focus on algorithms and implementing them.

o Not counting the fundamentals of mathematics course, which SFU does not give credit for, nor the probability and statistics course, the mathematics content of the IT program is 3+2+2+2 = 9 modules = 9 credits. For comparison, the computing major requirement at SFU requires 9 MATH + 6 MACM credits and the electronics engineering requirement requires 18 MATH credits.

o Both computing and engineering require STAT 270-3 Probability and Statistics which, despite the same title, has a stronger mathematical foundation than TECH 142-3 Probability and Statistics.

o From reading the exams I have the impression that a lot of material is covered and thus these courses are definitely not easy. On the other hand, in all of the exams, not one proof asked for: thus the focus is on calculation and application.

o There will be a major course transfer problem. None of the mathematics courses can be directly transferred. A student might get credit for MATH 232-3 Linear Algebra at SFU if he has done TECH 144 and 201. But if a TechBC student wished to transfer to SFU computing or engineering or mathematics, s/he would not get transfer credit for MATH 151 and 152 and this would prevent him/her from taking most courses in computing and engineering.

PRECEDENT

It was suggested that the IT and IA programs be designated as Science degrees and that there was precedent for this at SFU in the BSc in kinesiology. Fine, but then we want to see if there is a natural science and/or mathematical science component in the BSc in kinesiology. I wish here to point to the "science"in the BSc major in kinesiology to see the justification for this being a BSc degree. The lower division requirements for a BSc in kinesiology include:

6 mathematics credits (MATH 151-3, MATH 152-3)
8 physics credits (PHYS 120-3, 121-3, 131-2),
10 chemistry credits (CHEM 121-4, 122-2, 281-4),
4 biology credits (BISC 101-4),
4 cellular/molecular biology credits (MBB 221-4)
3 statistics (STAT 201-3)

12 kinesiology credits (KIN 142-3, 201-3, 205-3, 207-3)

Not counting the KIN courses, this is 35 credits, which is a lot of "science" courses. Many of the kinesiology courses are courses in biomechanics and in physiology of the human body which appear to me to be "science" courses as are the biology courses. I think it is very easy to defend kinesiology being a "science" degree. In contrast, the science content of the IA program is very little.

IT Program

The core of the IT program is these courses

200-2 Applied Math I
201-2 Applied Math II
300-2 Applied Math III (put here because it's lower division)

230-3 Electronic Circuits (needs linear systems + Laplace transforms)
231-3 Digital Circuit Design
232-3 Data Processing and Communications
233-3 Signal Analysis and Communications (Fourier transforms)

250-3 Algorithms + Data Structures
251-2 Software Engineering
270-2 User Interface Design
271-3 Computer Graphics

301-2 System Design Processes and Methods
302-2 Embedded Systems (microprocessors and programming)
303-3 Digital Communications (Reed Solomon codes)
304-2 Computer Animation
305-3 Object Oriented Analysis and Design
306-3 Operating Systems
307-3 Network Systems
308-3 DSP Systems Design
309-3 Database Systems

I'm not listing the TechFour courses because there are no detailed course outlines available and they've never been offered. Here is a comparison of the IT (both themes) science content with our (SFU's) BSc in Computing Science degree. I've tried to separate the computing hardware courses (counted as a computing course here) from the engineering courses (counted as other science courses).

	Lower Division Computing	Math/Stat Lower Division	Other Science	Upper Division Computing	Other Science	Total LD	Science UD
TechBC(SE)	13	12	10	32	2	35	34
TechBC(CE)	13	12	10	21	13	35	34
SFU(CMPT)	18	18	0	36	0	36	36
SFU(MATH)	10	26	6	3	27	42	30

Notes:
I've not counted Tech 143 Fundamentals of Mathematics.
I've not counted CMPT 320 - it's not a science course.
I've counted Tech 300 Applied Math III as lower division.
I've counted Tech 271 Graphics as upper division.

While the total number of "(applied) science" credits is comparable the SFU degree has more computing courses because the IT program also contains hardware/engineering courses.

RECOMMENDATIONS.

I think the case for a BSc in IA is not only weak, it is so weak as to be unjustifiable. What makes most sense to me is a BA (Interactive Arts).

Three reasons
1: Too little science. I count 15 credits in the mathematical sciences (Tech 142, 144, 150, 151, 250) and zero in the natural sciences. The IA program does not include as a subset a minor in any science. In particular there is zero upper division science.

2: The faculty in IA do not have a science background. Of the 15 faculty in IA, only 2 have PhDs - the other 13 have Masters. In contrast: of the 12 faculty in IT, 10 have PhDs and 2 Masters. Of the 15 faculty in IA, only one, Steve DiPola, has a computing background (his degree is Master of Arts though) - the rest have no science background (based on their degrees). The IA core program naturally reflects this.

3: The title of the program is "Interactive Arts" which simply reflects what the program is. There is, however, considerable science in the IT program. If we count credits, the gap between the TechBC IT programs and the SFU BSc degree is small in total number of credits. There is a gap in computing (software) credits. Note: 30 upper division credits is the norm at SFU (e.g. math, physics), i.e. the SFU requirements in computing science are particularly strong. Note: it is impossible at this point to assess 4th year courses.

Problems (for IT theme 2).
o The mathematics is weak: not enough calculus.

o The mathematics needed for the engineering is not the same as computing.
o The (upper division) theory (in computing) is missing.
o Programming language/compilers is missing.
o Numerical analysis/scientific computing is missing.
On the other hand,
o Operating systems/data base systems/software engineering are there.
o Computer graphics is strong.
o The hardware component is strong.

I think a BSc (Information Technology) is not only okay now, but we should keep it long term - by addressing the weaknesses. The specific criticisms I've listed could be addressed if the BSc title is to be retained long term by (1) requiring BC Math 12 on entry for IT students and adopting a normal calculus/linear algebra sequence (2) introducing courses in some of the I believe this will happen naturally anyway.

What recommendation can I make about TechOne? When it's too late to change it for September 2002!

o The mathematics courses are problematic because they cannot be transferred and students with BC Math 12 are doing mathematics they already know and students with BC Math 11 will struggle with the pace. I propose two streams for students entering in September 2002. One for those with BC Math 12 and one for those with BC Math 11. For those with BC Math 11, keep the courses Tech 143/144 as is. For those with BC Math 12, give them a calculus sequence adapted for the IT program - e.g. include one module on differential equations (Tech 141.2 Differential Equations).

Revised Recommendations – M. Monagan

RECOMMENDATIONS
Michael Monagan (Updated May 29th, 2002)

...

I think the case for a BSc in IA is *very* weak. What makes most sense to me is a BA (Interactive Arts).

Three reasons

1: Too little science. I count 15 credits in the mathematical sciences
(Tech 142 (weak), 144, 150, 151, 250) and zero in the natural sciences.
The IA program does not include as a subset a minor in any science.
In particular there is no upper division science.

2: The faculty in IA do not have a science background. Of the 15 faculty in IA, only 2 have PhDs - the other 13 have Masters. (These numbers were taken from the web page approx May 15th). In contrast: of the 12 faculty in IT, 10 have PhDs and 2 Masters.
Of the 15 faculty in IA, only one, Steve DiPola, has a computing background (his degree is Master of Arts though) - the rest have no science background (based on their degrees titles). The IA core program naturally reflects this.

3: The title of the program is "Interactive Arts" which simply reflects what the program is. There is, however, considerable science in the IT program.

...

I have had time (2 weeks) to reflect on these comments above and receive input from TechBC faculty.

o 2 is inaccurate: at least 6 (40%) of the IA faculty have a strong technical background despite their degree title.

o 1 is inaccurate - IA 203 Animation was given as a computer graphics course and the 18 credits of electives in the IA program have to be chosen from ITEC and INTD, hence many students have additional ITEC credits.

Also, the IA program is not static. There is a push from faculty (J. Tomlie and S. DiPola) to increase the mathematical and technical content of the degree.

Nevertheless, in looking through the on-line course descriptions I did not find a strong science component -- very little mathematics, weak computing, and no strong computer graphics component.

Hence I remain convinced that this really is a BA program, with components of digital arts and fine arts. I know that some students wanted to get a BSc.

Recommendation 1:
That SFU award a BA (Interactive Arts) for the existing program.

Recommendation 2:
That SFU award a BSc (Interactive Arts) for students who complete the existing IA program and a minor(i) in mathematics or computing science(ii) at SFU.

Recommendation 3:
That SFU award a BSc (Interactive Arts) for students who complete the existing IA program and take 30(iii) additional modules from ITEC (math, computing, ee) beyond what is in the IA program requirements.

Recommendation 4:
That if a BSc (Interactive Arts) is to be kept long term that a strong mathematics and computing (computer graphics) foundation needs to be put in place.

(i) The suggestion of a math minor comes from the general science major which requires first year physics, chemistry, biology and math (hence at least 30 lower division credits) plus two minors, at least one must be from the science faculty and the other can be from science or an approved list (hence at least 30 upper division credits) The requirements for a minor in math at SFU are 11 lower division math credits and 15 upper division math credits. IA students have completed 3 lower division already hence they would need to complete 23 credits which will be 8 courses at SFU. This could be done in three semesters easily, but to do it in two semesters, it would help if TechBC students receive a regular calculus sequence (Math 151 and Math 152 at SFU).

(ii) A computing minor makes sense but it would require more credits (math credits) and because of the enrolment restrictions in computing science, it would take students longer to get through.

(iii) The current IA program has 18 science credits as follows:
(This is my count and Rob Woodbury's count)

TECH 142, 144, 150, 151, 203, 250.
A BSc science major at SFU has to have 28 upper division "science" credits. Lower division credits of explicit programs all run at 30+, hence most programs have 60+ science credits e.g. Math major (72 of which 8 are computing). I'm suggesting 48 in total (Rod Woodbury suggested 45) as a compromise. It means IA students have to do 30 more from ITEC. NB: IA students who have taken their 18 electives from ITEC will have 36 credits towards this 48 total.

Information Technology Program Report – R. Cameron, J. Vaisey

Review of Academic Merit - Information Technology Stream

Synopsis

The Information Technology (ITEC) program is designed to produce graduates in two areas of concentration: (a) computer and communications engineering, and (b) software engineering. The ITEC program shares a common first year with Interactive Arts (IART) program and students are required to take electives from the Interactive Arts and Management and Technology areas as well as series of five interdisciplinary project courses. The ITEC program is further distinguished from traditional computing and engineering programs by it heavy use on a web-based delivery model and by a partitioning of courses in 1 credit modules that can be taken independently. The program also emphasizes teamwork both on the part of students and instructors throughout the development and delivery of the curriculum, although some of these practices may change as the program scales in size.

Although the amount and level of detail provided to the committee in the course/module outlines did not allow for a thorough assessment, it is nevertheless possible to conclude that the topical coverage of the ITEC curriculum does appear to constitute a program of study in both hardware and software technology that meets provincial standards for a Bachelor's degree. However, in reviewing the curriculum as presented, several serious issues did arise. The first concern centers around the broad topical coverage of a joint computing/engineering program, which may have required compromises in addressing the individual topics within the curriculum at an appropriate depth. Secondly, concerns exist about the prerequisite structure in the curriculum, especially in regards to the preparation in Mathematics. This lack may make it difficult to deliver some of the courses at the level described in the outlines.

Finally, there appears to be a great deal of overlap between many of the TechBC courses (some still to be developed) and existing courses in Computing and Engineering Science. The result is wasteful in terms of resources and is a recipe for confusion. See Section III for details on what overlaps with what.

Recommendation:

In order to integrate the TechBC programs into the SFU mainstream, action must be taken in the following areas.

- The Science foundation in the IT-program should be increased, especially in Mathematics. Details are given in Section II.
- Efforts should be made to exploit the similarities between many of the course offerings at SFU-Surrey and the main campus.

Detailed Evaluation
I. Introduction

The Information Technology (ITEC) program developed at the former Technical University of British Columbia is a four-year degree program that combines the study of software and hardware technologies in a largely integrated curriculum. The program is designed to produce graduates in two areas of concentration: (a) computer and communications engineering, and (b) software engineering, while maintaining a common core consisting of approximately 85% of the overall curriculum. In the context of existing academic units at SFU, its ambition might be compared to a joint program combining features of both the software engineering specialization of the School of Computing Science and the computer engineering option of the School of Engineering Science.

The ITEC program also shares a common first year with the Interactive Arts (IART) program as well as a series of five interdisciplinary project (INTD) courses that allow students of both programs to work together in years two, three and four of the program. The program includes an interdisciplinary project in fourth year and students of each program are required to take electives from offerings of the other.

In assessing the academic merit of the ITEC program, one cannot help but be impressed by the ambitious overall goals of the program and the considerable progress that has been made in achieving many of the goals. However, these ambitious goals give rise to two general concerns that must be examined carefully. The first is that the broad topical coverage of a joint computing/engineering program may require compromises in addressing the individual topics within the curriculum at appropriate depth. What compromises have been made and how may they be academically justified? The second general concern is with feasibility of implementation of an ambitious curriculum program coupled with multidimensional innovation in pedagogy. Can a viable program be mounted and sustained in the context of available resources?

Overall, the ITEC curriculum does appear to constitute, in its topical coverage, a broad program of study in both hardware and software technology that meets provincial standards for a Bachelor's degree. However, the reviewers were left with serious concerns regarding possible differences between the broad descriptions in the course outlines and what is actually taught. In many cases, the course outlines are quite ambitious and promise to teach material in a very compressed time period and without the prerequisites that would normally be expected for such a course.

II. Mathematics and Formal Theory

Perhaps the most serious issue with respect to the academic merit of the ITEC curriculum is its treatment of mathematics and formal theory. The first sign of concern is that students may be admitted without Math 12, and indeed with a grade as low as 70% in Math 11. To be fair, a first semester course in foundations of mathematics (TECH 143) appears to compensate for the lack of Math 12, preparing students for calculus and discrete mathematics. But beyond TECH 143, only 12 additional credit hours of

mathematics are required. By way of comparison, at least 30 credits of mathematics are required of computer engineering students and many Engineering Science courses build strongly on this foundation. Similarly, computing science majors normally take at least 24 credits of mathematics and formal theory.

Further analysis of the particular coursework taken by ITEC students raises additional concerns. Although TECH 142-3 provides three credits worth of statistics, this work is not remotely at the level of the STAT 270 course taken by engineering students and more closely resembles BUEC 232, a business perspective on elementary statistics. TECH 144-3 purports to cover both differential and integral calculus together with linear algebra in a single 3-credit course, while SFU students are challenged by the corresponding 9 credits in MATH 151, MATH 152 and MATH 232. Beyond this, the ITEC curriculum provides 6 additional credits of work in a smattering of topics through its Applied Math I, II and III sequence. But these topics provide neither an adequate coverage of the continuous mathematics necessary for engineering science nor of the discrete mathematics necessary for computing science.

The following is one suggestion that could be implemented quickly to address this concern for incoming students. This particular suggestion would increase the Science foundation credits from 18 to 29.

1. For the IT program provide a calculus sequence (6 modules) in TechOne with selected topics chosen specifically for the IT program, e.g. differential equations (three weeks?), which, by the way, is now going to be in the new "BC calculus core", and complex numbers (one week?), which, will be in the list of additional topics. The main reason for the stronger calculus sequence is to provide a foundation for the electronics courses, signal processing courses, and computing courses in Computer Graphics and Geometric Modelling. Also Scientific Computing, should such a course be added in the future. The second reason is to give TechBC students the prerequisites to take courses at SFU. A third reason is that ``the Calculus", a crowning achievement in mathematics with wide application should be taught to all students.
2. Convert Tech 142 Probability and Statistics, which is a methods course into a mathematical course with a stronger focus on probabilty which would better prepare students for courses in analysis of algorithms, codes and simulation. It understand that TechBC is already considering modifications to this course.
3. Add one computing theory course at the 300 level. For example, either CMPT 307 (the design and analysis of algorithms), CMPT 379 (parsing theory and compiler design) or MACM 316 (numerical analysis). These suggestions are driven by the need for a course with a strong theoretical/mathematical focus and to better prepare those students who might want to go on to graduate school in Computer Science.
4. Move discrete mathematics earlier in the curriculum and add a second discrete mathematics course. One possibility that would make lay the foundation for the mathematics that is needed in the Computer Security, Computer Simulation, and Network Systems courses would be Tech 301.1 integer and modular arithmetic (Z

and Zm) (with one application e.g. linear congruential pseudo random number generators or RSA public key cryptography) 301.2 polynomial rings and finite fields (R[x] and GF(q))(with one coding theory application e.g. Reed Solomon Codes) This would cover the basic mathematics needed for hash functions, crytography, codes, pseudo random number generators, etc. that arises in the above courses. It should be taught with proof being a central component, which would address another weakness in the current program, namely a lack of mathematical rigor and proof.

III. Overlap Between IT and CMPT/ENSC

The following table maps TECH and ITEC courses to those CMPT and ENSC courses that have significant overlap. Although there may be a small number of topics included in ITEC courses that are not presently covered in CMPT or ENSC courses, those topics certainly would be considered within the domain of interest of the two Schools.

ITEC Course		Theme	CMPT/ENSC Overlap
TECH 150-3	Introduction to Computer Systems	CCE, SWE	CMPT 001
TECH 151-3	Introduction to Programming	CCE, SWE	CMPT 101
ITEC 230-3	Electronic Circuits	CCE, SWE	ENSC 220
ITEC 231-2	Digital Systems Design	CCE, SWE	CMPT 150
ITEC 232-2	Data Processing and Communications	CCE, SWE	ENSC xxx
ITEC 233-3	Signal Processing and Communications	CCE, SWE	ENSC 380
ITEC 250-3	Algorithms and Data Structures	CCE, SWE	CMPT 201
ITEC 251-2	Software Engineering	CCE, SWE	CMPT 275
ITEC 270-2	User Interface Design	CCE, SWE	CMPT 363
ITEC 271-3	Introduction to Computer Graphics	CCE, SWE	CMPT 361
ITEC 301-2	System Design Processes and Methods	CCE, SWE	CMPT 301
ITEC 302-2	Embedded Systems	CCE	ENSC 351
ITEC 303-3	Digital Communication Systems	CCE	ENSC 327/428

ITEC Course		Theme	CMPT/ENSC Overlap
ITEC 304-3	Computer Animation	SWE	CMPT 466
ITEC 305-3	Object-Oriented Analysis and Design	SWE	CMPT 370
ITEC 306-3	Operating Systems I	CCE, SWE	CMPT 300
ITEC 307-3	Networks Systems	CCE, SWE	ENSC 428
ITEC 308-3	DSP Systems Design	CCE	ENSC 429
ITEC 309-3	Database Systems	SWE	CMPT 354
ITEC 400-3	Testing and Verification	CCE, SWE	ENSC 481
ITEC 401-3	Advanced Topics in Computing	CCE	CMPT 479
ITEC 402-3	VLSI Design	CCE	ENSC 450
ITEC 403-3	Geometric Modelling	SWE	CMPT 461
ITEC 404-3	Computer Security	SWE	CMPT 471
ITEC 405-3	Multimedia Systems	CCE	CMPT 365/ENSC 424
ITEC 406-3	High Performance Computer Architecture	CCE	CMPT 250/400
ITEC 407-3	Computer Simulation	SWE	CMPT 305
ITEC 408-3	Web Centred Technologies	SWE	CMPT 470

IV. Offering the Program

In order to have a credible program it is obviously key that each senior course have at least one "champion" in the faculty complement and that there be a broader network of support in related areas. In examining the Information Technology curriculum, however, questions arose regarding the degree of match between the areas of faculty expertise and the requirements of the approved program, which is a combination of computer and communications engineering and software engineering. In some cases, courses seem to have been refocussed considerably from the initial design to match faculty expertise, with a possible loss of cohesion in the overall program structure. In others, extremely weak course outlines have been prepared that raise serious questions about their level of preparation (the outlines for four courses, ITEC 400, 402, 405 and 407, were not even available at the time of review).

The ability to offer the ITEC program can certainly be improved through appropriate hiring (and it is known that several searches are currently beginning); however, it is possible that these problems could be alleviated more effectively through cooperation with exisiting programs at SFU. As can be seen from the table above, a large fraction of the ITEC courses have "equivalents" in Computer Science and Engineering Science, with

associated "champions" already in place. It would make sense to exploit these synergies rather than to ignore them - especially in the case of senior-level courses with relatively small enrollments. As a specific example, ITEC 405 (Multimedia Systems) has not yet been developed; however, it is likely to overlap substantially with CMPT 365 and ENSC 424. Does it make sense for SFU@Surrey to develop this course - and hire someone to teach it?

V. Minority Opinion of Degree Title
(Rob Cameron and Jacques Vaisey)

Although the committee a whole passed the plan to give a B.Sc. (Information Technology) degree to the ITEC students, a minority of the committee (Cameron and Vaisey) felt that a different degree name would have been more appropriate. Our rationale is expressed below.

A full assessment of academic merit must be conducted in the context of a proposed degree title. Three possible degree titles have been suggested for the ITEC program: Bachelor of Science, Bachelor of Technology and Bachelor of Informatics. Bachelor of Science was the initial degree title that was to be awarded by the former university. However, it is also a degree title already in use at SFU for the strong and widely regarded program offered by the School of Computing Science (BSc-CMPT). Bachelor of Technology is not in use at SFU, but is a generally recognized credential for technology-oriented programs within B.C. Bachelor of Informatics is a new degree title currently under planning consideration by the Faculty of Applied Sciences for new interdisciplinary programs involving information technology and its application.

The degree titles Bachelor of Arts, Bachelor of Business Administration, and Bachelor of Applied Sciences are also offered at SFU for programs in the information technology area. The Bachelor of Arts is available in conjunction with the computing science major program with an additional concentration in the Faculty of Arts (BA-CMPT). The Bachelor of Business Administration is available in conjunction with a joint business-computing major in information systems (BBA-IS). The Bachelor of Applied Sciences is available through the computer engineering option of the School of Engineering Science (BASc-CE). Although none of these degree titles is proposed for the ITEC curriculum, the existing programs in these areas do provide valuable data points with respect to degree titles and information technology curricula.

Within the SFU context, the Bachelor of Technology and the Bachelor of Informatics are relatively unconstrained. For the ITEC (information technology) curriculum alone, the Bachelor of Technology makes the best fit. It also represents one choice as a focus for future development of the program. On the other hand, in the context of its relationship to the IART program and the interdisciplinary focus of the SFU @ Surrey program as a whole, the Bachelor of Informatics may be more appropriate. It also represents a choice as a focus for future development of program curricula, and one that is consistent with existing plans.

Given a general conclusion of academic merit of the ITEC curriculum, and the apparent fitness of the curriculum to either the Bachelor of Technology or Bachelor of Informatics designations within the SFU context, either degree title is appropriate. The lack of constraint with respect to existing SFU standards also provides for considerable freedom with respect to future program development.

The Bachelor of Science is another matter. AT SFU and its peer institutions there are strong and well-established expectations for science-oriented curricula in computing and engineering. These are also clear in general curriculum recommendations of international societies such as the ACM and IEEE. Fundamentally, these science-oriented curricula require a strong component of mathematics and formal theory. On the engineering side, they additionally require considerable material from the natural sciences. The ITEC curriculum has very little of the requisite science base beyond what might be termed applications of mathematics.

Indeed, the course credits in mathematics and formal theory found in the ITEC program and comparable SFU programs may be plotted along the following spectrum.

ITEC < BA-CMPT < BBA-IS < BSc-CMPT < BASc-ENSC

For a science-based joint program in computing and engineering, the coursework in mathematics and formal theory ought to lie somewhere between the BSc-CMPT and BASc-ENSC points on this spectrum (although some would argue that positioning beyond the BASc-ENSC is required). If proposed in the abstract, without an existing base of students, the ITEC program would clearly not merit consideration for the BSc degree in light of existing SFU standards.

Student Expectations

Expectations of existing ITEC students with respect to degree titles have been made clear: there is a particular affinity for the Bachelor of Science and a particular antipathy towards the Bachelor of Technology.

However, there are also expectations of thousands of existing and former students of the SFU computing science program about the meaning of an SFU BSc in the area of computing technology. Institutions earn their reputations based on the academic standards they maintain. The accomplishments of graduates are recognized in this light. Certainly, the expectation of computing alumni and current students is that SFU standards with respect to the BSc in computing be maintained.

Existing ITEC students in fact entered a program working towards a credential-institution combination that might have been denoted BSc (Tech BC) in the usual academic notation. Generally, this would have been treated as an unknown combination for both future employment and post-graduate study. Although recognition of accomplishment concomitant with graduation from an approved degree-granting institution could be assumed, the initial program graduates could normally be expected to be subject to more detailed scrutiny than those from well-established programs of widely known institutions.

On the other hand, the initial cohorts graduating from such a program would have a relatively rare opportunity: the ability, through their accomplishments, to take a lead role in establishing the reputation of their baccalaureate program and its credential.

Awarding of a credential-institution combination such as BTech (SFU) would also be unknown. In fact, the expectation of technological orientation would seem to match that of BSc (Tech BC) quite well. A somewhat stronger assumption of credibility might be made based on SFU's reputation. That reputation would also suggest a somewhat more academic treatment than the BTech (BCIT), as appropriate. But again, the initial graduates with such a credential would have the opportunity to lead the way in establishing its reputation through their own accomplishments.

The Bachelor of Informatics might possibly be denoted B Infor (SFU). Again this would represent a relatively unknown credential with the opportunity for its first graduates to help in shaping the reputation. With a longer-term goal of creating a number of innovative programs involving computing and its applications, there may be a greater long-term benefit to the initial graduates with this credential.

In contrast, the credential-institution combination BSc (SFU) is well known. Awarding this credential to students of the ITEC program would confuse their accomplishment with that of existing SFU graduates working in the information technology sector. Furthermore, ITEC students would no longer have the opportunity to lead in the establishment of the credential's recognition and reputation.

Additional Concerns Information Technology Curriculum

M. Monagan

I'd like to express, in concrete terms, the concerns I and Rob Cameron made about the lack of mathematics/theory in the IT program. Rob's main criticism is that for the degree BSc (Information Technology) to have a strong science component, the foundation must be strong. The foundation for the computing part of the degree is mathematics and theoretical computer science. The foundation for the engineering part of the degree is physics (electronics) and mathematics (signal processing). As I read the IT program, the foundational science courses there are:

Math	143-3 Linear Algebra and Calculus,
	200-2, 201-2, 300-2, Applied Math I, II, III
Cmpt	306-3 Operating Systems
Elec	230-3 Electronics, 233-3 Signal processing

This is 18 credits. The corresponding foundation for the BSc in computing science at SFU is:

Math	151-3, 152-3 Calculus I, II, 232-3 Linear Algebra
Macm	101-3, 201-3 Discrete Math I, II, 316-3 Numerical Analysis
Stat	270-3 Probability and Statistics
Cmpt	300-3 Operating Systems, 307-3 Analysis of Algorithms

Note, the Cmpt course 306-3 is a theory of operating systems course. It is not a survey of operating systems course. A survey course might take a look at Windows and Unix. It is also not a practical course where one would try to build an operating system. It really is like the theory course, Cmpt 300 at SFU.

This is 27 credits. Rob argued that the foundation for an interdisciplinary degree should be at least as large as the minimum of the two. I agree.

The following is one suggestion that could be implemented quickly to address this concern for incoming students and existing students. This particular suggestion would increase the science foundation credits from 18 to 29.

1: For the IT program provide a calculus sequence (6 modules) in TechOne with selected topics chosen specifically for the IT program, e.g. differential equations (three weeks?), which, by the way, is now going to be in the new "BC calculus core", and complex numbers (one week?), which, will be in the list of additional topics.

The main reason for the stronger calculus sequence is to provide a foundation for the electronics courses, signal processing courses, and computing courses in Computer Graphics and Geometric Modelling. Also Scientific Computing, should such a course be added in the future. The second reason is to give TechBC students the prerequisites to take courses at SFU. A third reason is that ``the Calculus", a crowning achievement in mathematics with wide application should be taught to all students.

2: Convert Tech 142 Probability and Statistics, which is a methods course into a mathematical course with a stronger focus on probabilty which would better prepare students for courses in analysis of algorithms, codes and simulation. I understand that TechBC is already considering this.

3: Add one computing theory course at the 300 level, e.g.:

1. the design and analysis of algorithms (CMPT 307 at SFU) or,
2. parsing theory and compiler design (CMPT 379 at SFU) or,
3. numerical analysis (MACM 316 at SFU).

Note 1: the course must have a strong theoretical/mathematical focus.

Note 2: students could take the course at SFU.

Remark 1: students who want to go on to graduate school in computing will need this; if they don't have this, and they do get accepted, they are likely to end up being asked to do several makeup courses in precisely these core subject areas.

Remark 2: suggestion 2, which should involve the writing of a compiler for a simple language (from scratch), would address another weakness in the current program: there are too few larger *programming projects*??

4: Add a second discrete mathematics course. One possibility that would lay the foundation for the mathematics that is needed in the Computer Security, Computer Simulation, and Network Systems courses would be:

Tech 301.1 integer and modular arithmetic (Z and Zm) (with one application e.g. linear congruential pseudo random number generators or RSA public key cryptography)

Tech 301.2 polynomial rings and finite fields (R[x] and GF(q)) (with one coding theory application e.g. Reed Solomon Codes)

This would cover the basic mathematics needed for hash functions, crytography, codes, pseudo random number generators, etc. that arises in the above courses. It should be taught with proof being a central component. This would address another weakness in the current program, namely, lack of mathematical rigor and proof.

Interactive Arts Program Report – M. Gotfrit, D. Parker, M. Knowles

Initial Review - Program in Information Technology & Interactive Arts

Summary

The descriptions for courses as well as the overall syllabus associated with Interactive Arts were examined. Based on this research, interviews with faculty and site visits, it is our opinion that the undergraduate program clearly merits a Bachelors degree.

Program Description

The Program in Information Technology & Interactive Arts (PITIA) is both ambitious and unique. Though content comparison will reveal slightly similar programs, these other programs tend to have evolved from a more traditional academic unit such as fine arts, communications or computing science. As a new program in a new institution, PITIA was able to more directly address the needs of students entering into what is often referred to as "the new economy". In addition to a distinctive syllabus, PITIA is based upon current teaching philosophies and this "learner-centered" approach is supported by extensive use of web-based delivery, interaction and support.

Overlap

Of the almost forty courses examined, only six bear some resemblance to Burnaby mountain (School for the Contemporary Arts) courses. Of these only three appear to be a direct overlap. The Interactive Arts stream is very complementary to existing areas of Contemporary Arts and the latter is looking forward with great anticipation to discussions on how the units can work together.

Student Work

From observations at various open houses and course presentations, the work produced by the students appears very impressive. One of the committee members wrote:

> In evaluating a program as team and product-oriented as Interactive Arts, it is necessary to consider both the quality of the stated content of the program (i.e. course syllabi, online content, etc.) and the quality of the research produced by the people involved in the program. Many of the research projects exhibited at the ASI Exchange and at the TechBC Open House show a level of theoretical and technical sophistication well beyond what would be required of projects produced in a traditional BA/BFA program, often incorporating current research topics in computer graphics and human-computer interface (e.g. experience design, novel interaction methods, tangible interfaces, etc). While the IA program could be strengthened in the future by adding more mathematics and natural science components, the quality of the research and projects produced in the program compares well with the quality of research and projects produced by students in B.Sc. programs at SFU and other universities.
>
> Martin Knowles

Degree Name
When discussing the degree name, there are several points we see that need to be considered:

- The Interactive Arts stream is a unique mix of both art and science. The B.Sc. (Interactive Arts) title reflects this novel approach.

- Other respected universities offer B.Sc. degrees in areas similar to PITIA - such as American University's B.Sc. (Multimedia Design and Development) or MIT's Master of Science in Multimedia.

- The current students entered into study as long as three years ago with the promise of either a B.Sc. (Information Technology) or a B.Sc. (Interactive Arts). As the calendar at time of entry can be viewed as something of a contract, there are grave concerns about the legal aspects of changing the degree name for existing students.

- The PITIA is not a static program. As it is continues to develop and evolve there are many opportunities to alter the science content to more closely conform to the expectations of concerned science faculty.

- We have serious fears about retention of current students if the degree name is changed part way through their studies. There is much documented communication from students, faculty and parents to support this concern.

Conclusion
The Interactive Arts stream is Bachelor degree level program. We recommend that current students be granted a B.Sc. (Interactive Arts) in the same spirit of "grand-fathering" that prompted the proposal for a B.Sc. (Information Technology).

Sub Committee members
Professor Martin Gotfrit
Professor Drew Parker
Martin Knowles, Computing Science student