S.02-51

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate

From: Allan MacKinnon, Chair
Senate Committee on Undergraduate Studies

Subject: School of Engineering Science
Changes to BASc and BASc (Honors) Programs
(SCUS Reference 02-3 (rev. 3)

Date: May 15, 2002

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of May 14, 2002 gives rise to the following motion:

"That Senate approve and recommend approval to the Board of Governors of the proposal from the School of Engineering Science to refine the existing BASc program to provide both a general and an honors degree as set forth in S. 02 -51 , effective September 2002. Furthermore, Senate affirms that the designation BASc (Honors) may be used by those who have graduated from the BASc program prior to Fall 2002, provided that both a CGPA and a UDGPA of at least 3.0 were obtained on graduation"

Rationale

The current Engineering Science program is an elite program that is effectively an honors program without a corresponding general degree program. The changes outlined in the attached document would designate the current program as an honors program, and create a general degree program.

These changes will allow the School of Engineering Science to award an appropriate degree to those students who complete the required number of credit hours but fall short of the high gpa requirement. Currently, students in the program who do not meet the 3.0 gpa requirement or do not complete the undergraduate thesis do not receive a BASc, despite considerable investment in their academic work.

After discussion of the proposal at the March 12, 2002 and May 14, 2002 meetings of SCUS, committee members were supportive of the changes outlined in the proposal, for the reasons given therein. It was determined that no new library resources are needed in support of this proposal. The Senate Committee on University Priorities has also reviewed the proposal and provided feedback to SCUS. The feedback from SCUP has been incorporated into the attached proposal.

CA.SFU.FAS.UCC/Papers:2002-1F

BASc and BASc (Honors) Programs

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Revision F - May 14, 2002

1. Introduction

This document proposes refining the existing BASc program to provide both a general and an honors degree. The current program requires a 3.0 GPA and an undergraduate thesis. In essence, it is an honors program requiring only a slight change in GPA requirements for consistency with University standard for Honors. The general degree option removes the 3.0 GPA requirement and replaces the undergraduate thesis with a final year project.

The proposed programs for the BASc and BASc (Honors) have each been designed in accord with the requirements of the Canadian Engineering Accreditation Board.

In order to protect the accomplishment of existing BASc graduates, this proposal includes a motion permitting use of the BASc (Honors) designation for graduates prior to Fall 2002 who achieved a CPGA and UDGPA of at least 3.0.

Revision E of this document incorporates changes in wording made at the direction of Senate Committee on University Planning during its meeting of April 17, 2002, while Revision F contains changes approved by Senate Committee on Undergraduate Studies at its Meeting of May 14, 2002.

Rationale

The current Engineering Science program is effectively an honors program without a corresponding general degree program. The proposal adds the appropriate honors designation for the current program and introduces a complementary general degree program based on a final project rather than the undergraduate thesis.

The Engineering Science program was originally designed as an elite program for a small number of students. One reason for this was to provide the best basis for establishing the program and securing its reputation. Following this approach, Engineering Science has indeed grown to become widely known and highly regarded.

The program has for some time had strong student demand as well as industry demand for additional graduates. Degree options at both the general and honors levels will allow the program to move beyond its elite status to meet these demands.

The lack of a general degree program has also created severe difficulties for students whose performance is not at the honors level, but nevertheless is well above the requirement for satisfactory completion of comparable engineering programs within Canada. At present, many B- students are left without an attractive degree option after an investment of 120 credits or more in an Engineering Science program. The introduction of both general and honors degrees remedies this problem.

The general degree program will also provide the School with increased flexiblity in meeting growth demands that may be associated with the "Double The Opportunity" initiative.

2. Change in Description and Prerequisites for ENSC 305.

Item	Current	Proposed
Title	ENSC 305-1 Project Documentation and Group Dynamics	ENSC 305-1 Project Documentation and Group Dynamics
Description	This course is integrated with an ENSC project course (typically ENSC 340 or 370) and covers the writing of various project documents including proposals, functional specifications, design specifications, progress reports, and user's manuals. The course also examines the issues of creative thinking, group dynamics, team leadership, dispute resolution and collaborative writing.	This course is integrated with an ENSC project course (either ENSC 340-4 or ENSC 440-4) that provides practical experience with the design process for development projects. Topics include project management, team writing, project documentation (proposals, functional and design specifications, progress reports, and users manuals), group dynamics, and dispute resolution. (1-0-0).
Prerequisites	Corequisite: ENSC 340 or an alternative approved project course.	Corequisite: ENSC 340 or ENSC 440.

Rationale

This updates the description for the course and allows it to be run in conjunction with either the ENSC 340 or ENSC 440 courses, with ENSC 440 being the "capstone" version of ENSC 340 for students in the general degree program.

3. Change in Credit Hours, Description and Prerequisites for ENSC 340.

Item	Current	Proposed
Title	ENSC 340-3 Engineering Science Project	ENSC 340-4 Engineering Science Project
Description	This course is based around a group project that consists of building and testing a hardware implementation of a working system. The course also includes material on how to design for safety and project management.	This course is based around a group project that consists of researching, designing, building, and testing the hardware implementation of a working system. The course also includes material on how to design for safety, engineering standards, and human factors. (1-0-4).
Prerequisites	Prerequisite: ENSC 151 or CMPT 290, ENSC 222 or ENSC 225 and ENSC 351 or ENSC 385. Students with credit for ENSC 370 cannot take ENSC 340 for further credit. Corequisite: ENSC 305.	Prerequisite: ENSC 151, ENSC 225, and ENSC 351. Corequisite: ENSC 305. Students with credit for ENSC 440 cannot take ENSC 340 for further credit.

Rationale

The change in credit hours recognizes the work typically required in the course. Other changes reflect the split of the existing ENSC 340 into the ENSC 340/440 pair.

4. New course ENSC 440-4.

ENSC 440-4 Capstone Engineering Science Project is introduced as the "capstone" version of ENSC 340 for BASc students in the general degree program.

Item	Proposed
Title	ENSC 440-4 Capstone Engineering Science Project
Description	This capstone design course is based around a group project that consists of researching, designing, building, and testing the hardware implementation of a working system. The course also includes material on how to design for safety, engineering standards, and human factors. (1-0-4).
Prerequisites	Prerequisite: ENSC 151, ENSC 225, ENSC 351, and any two courses from ENSC 325, ENSC 327, ENSC 383 and ENSC 387. Corequisite: ENSC 305. Students with credit for ENSC 340 cannot take ENSC 440 for further credit.

Rationale

With the proposed removal of the undergraduate thesis from the general BASc degree, the curriculum will lack the necessary capstone project course specified by accredition requirements for engineering programs in Canada. ENSC 440-4 is thus introduced as the capstone project course.

Note. In essence, ENSC 340 is split into two versions, ENSC 340 for Honors students and ENSC 440 for students in the general degree program. Additional prerequisites are added to ensure that the project may be carried out at the more advanced level required for a capstone course satisfying accreditation requirements.

5. Program Changes

Section	Current	Proposed
Faculty of Applied Sciences - Undergraduate Degrees Offered	Bachelor of Applied Science Bachelor of Arts (Honors) Bachelor of Arts Bachelor of General Studies Bachelor of Science (Honors) Bachelor of Science Bachelor of Science (Kinesiology) (Honors) Bachelor of Science (Kinesiology)	Bachelor of Applied Science (Honors) Bachelor of Applied Science Bachelor of Arts (Honors) Bachelor of Arts Bachelor of General Studies Bachelor of Science (Honors) Bachelor of Science Bachelor of Science (Kinesiology) (Honors) Bachelor of Science (Kinesiology)
School of Engineering Science - Programs Offered - Engineering Science Program	This program leads to the degree of bachelor of applied science (BASc).	This program leads to a BASc or BASc (Honors) degree.
School of Engineering Science - Transfer to Engineering Science	A limited number of places are available for students who wish to transfer into engineering science from other departments and institutions. Successful applicants have usually attained a CGPA of 3.5 or equivalent in a full course load of relevant courses prior to entry.	A limited number of places are available for students who wish to transfer into engineering science from other departments and institutions. Successful applicants have usually attained a CGPA of 3.25 or equivalent in a full course load of relevant courses prior to entry.
School of Engineering Science - Admission	Admission is limited to 80 students.	Admission is limited.

School of Engineering Science - BASc Program	Engineering science students develop skills in systems design along with a high level of scientific knowledge. The program is demanding and is aimed at the superior student. The goal of the program is to produce well educated, innovative engineer/scientists who have entrepreneurial skills and attitudes and who are oriented to the new technologies. Entry to the program is on a competitive basis. Students admitted to the first year of engineering science must achieve a cumulative grade point average of at least 2.75 (first year) to remain in the program. Students completing their second or subsequent year must maintain a cumulative grade point average of at least 3.0 (B) to remain in the program. Note that a first year CGPA below 3.0 is not included in the calculation. The program may be completed in four and two thirds years which includes eight semesters of course work, and two semesters for thesis completion. Some courses may also be taken in these final two semesters if required. Students undertake a basic core of pure, applied and engineering sciences followed by studies in a specialized option.	Engineering science students develop skills in systems design along with a high level of scientific knowledge. The program is demanding and is aimed at the superior student. The goal of the program is to produce well educated, innovative engineer/scientists who have entrepreneurial skills and attitudes and who are oriented to the new technologies. Entry to the program is on a competitive basis. Students must maintain both a cumulative grade point average (CGPA) and an upper division grade point average (UDGPA) of at least 3.0 to remain in the honors program. The honors program requires an undergraduate thesis. The general degree program substitutes a final year project for the undergraduate thesis and requires a CGPA and UDGPA each of at least 2.4 for continuation. If either GPA falls below 2.4, the student is placed on probationary standing with the school. Courses available to probationary students may be limited. Each semester, probationary students are required to consult an advisor prior to course registration. Reinstatement from probationary standing occurs when both CGPA and UDGPA return to 2.4 or better. Continuation of probationary standing requires a semester GPA of at least 2.4. Students undertake a basic core of pure, applied and engineering sciences followed by studies in a specialized option.The program may be completed in four years for a general BASc, which includes eight semesters of course work. A BASc (Honors) typically requires an additional two semesters for thesis completion.
	In all ENSC courses, computers emphasize learning, conceptualization, design and analysis. Built into the program are courses on social impacts of technology, finance, management, design methods and entrepreneurship intended to complement scientific studies. A special, integrated communications course taken throughout the **eight academic semesters** ensures that all engineering science graduates have the communication skills necessary to be effective engineers.	In all ENSC courses, computers emphasize learning, conceptualization, design and analysis. Built into the program are courses on social impacts of technology, finance, management, design methods and entrepreneurship intended to complement scientific studies. A special, integrated communications course taken throughout the **program** ensures that all engineering science graduates have the communication skills necessary to be effective engineers.
School of Engineering Science - Industrial Experience	Every student must complete a cooperative education program of at least three work semesters (not including ENSC 194) and a thesis project. After the first year, students typically alternate between academic and work semesters. This results in a combination of work in an industrial or research setting with study in one of the four engineering options. Toward the end of academic studies and under the direction of a practising engineer or scientist, students work on a major project in an industry or research setting. This forms the basis for thesis work. A thesis proposal is typically submitted in the ninth semester and all thesis requirements are completed by the end of the tenth semester. Students may also participate in additional work semesters for further valuable experience and the chance to investigate career choices. The engineering science cooperative education program is administered through the School of Engineering Science by the school's coop coordinators whose responsibility it is to find and maintain appropriate work placements.	Every student must complete a cooperative education program of at least three work semesters (not including ENSC 194). After the first year, students typically alternate between academic and work semesters. This results in a combination of work in an industrial or research setting with study in one of the four engineering options. Students may also participate in additional work semesters for further valuable experience and the chance to investigate career choices. The engineering science cooperative education program is administered through the School of Engineering Science by the school's coop coordinators whose responsibility it is to find and maintain appropriate work placements. Toward the end of academic studies and under the direction of a practising engineer or scientist, honors students work on a major project in an industry or research setting. This forms the basis for the honors thesis. A thesis proposal is typically submitted in the ninth semester and all thesis requirements are completed by the end of the tenth semester.

School of Engineering Science - BASc Program - BASc Requirements	All requirements of one of the four options (a minimum of 156-157 credit hours) must be completed. Each option provides a mix of basic science, general studies, engineering science, specialized engineering and science, plus project and laboratory work.	All requirements of one of the four options must be completed. Each option provides a mix of basic science, general studies, engineering science, specialized engineering and science, plus project and laboratory work. For an honors degree in conjunction with any option, a third-year project (ENSC 340-3) and an undergraduate thesis (ENSC 498-3 and ENSC 499-9) must be completed. For a general degree in conjunction with any option other than Engineering Physics, a capstone project course (ENSC 440-4) must be completed. The Engineering Physics option is only available with the Honors degree.
	A graduation GPA of at least 3.0 calculated either on all the required courses taken, or on the upper division credits only, is required.	Graduation with BASc (Honors) requires both a cumulative grade point average (CGPA) and an upper division grade point average (UDGPA) of at least 3.0. Graduation in the general BASc program requires both a CGPA and a UDGPA of at least 2.4.
	ENSC 498, taken in the ninth semester, provides supervised study and practical work in research, development or advanced engineering. A project thesis based on this activity is submitted, and the thesis work presented, to at least the industrial and academic supervisory committee for approval.	*Delete.*

Rationale

The above changes provide the wording for the BASc and BASc (Honors) options. See also the rationale provided in the Introduction to this document.

The specific limitation to 80 students is deleted in favor of a general statement of limited admission, in recognition that program spaces will depend on available funding and that funding may become available through provincial government initiatives.

6. Electronics Engineering Option

The following changes are made to the Electronics Engineering option.

Courses and Typical Schedule	Courses and Typical Schedule The courses and typical schedule for both the general degree and the honors degree are listed below. The notation (G) is used for requirements applying to the general degree only, while the notation (H) is used for requirements applying to the honors degree only.
Semester Six (Fall) Cmpl I-3 first complementary elective[1] ENSC 305-1 Project Documentation and Team Dynamics* ENSC 325-4 Microelectronics II* ENSC 327-4 Communication Systems* ENSC 340-3 Engineering Science Project* ENSC 383-4 Feedback Control Systems* 19 credit hours	**Semester Six (Fall)** Cmpl I-3 first complementary elective[1] (G) ENSC 305-1 Project Documentation and Team Dynamics* (H) ENSC 325-4 Microelectronics II* ENSC 327-4 Communication Systems* ENSC 340-4 Engineering Science Project* (H) ENSC 383-4 Feedback Control Systems* Scie I-3 science elective[3] (G) 18 credit hours (G); 17 credit hours (H)
Semester Seven (Spring) Ensc I-4 first Engineering Science elective[2] ENSC 406-2 Social Responsibility and Professional Practice* MACM 316-3 Numerical Analysis I Scie I-3 first science elective[3] Tech I-3 first technical (computing science, science or math) elective[3] Tech II-3 second technical (computing science, science or math) elective[3] 18 credit hours	**Semester Seven (Spring)** Cmpl I-3 first complementary elective[1] (H) ENSC 305-1 Project Documentation and Team Dynamics* (G) ENSC 440-4 Capstone Engineering Science Project (G) Ensc I-4 first Engineering Science elective[2] Ensc II-4 second Engineering Science elective[2] ENSC 406-2 Social Responsibility and Professional Practice* MACM 316-3 Numerical Analysis I Tech I-3 technical (computing science, science or math) elective[3] (H) 18 credit hours (G); 19 credit hours (H)
Semester Eight (Fall) Cmpl II-3 second complementary studies elective[1] Scie II-3 second science elective[3] Ensc II-4 second Engineering Science elective[2] Ensc III-4 third Engineering Science elective[2] Ensc IV-4 fourth Engineering Science elective[2] 18 credit hours	**Semester Eight (Fall)** Cmpl II-3 second complementary studies elective[1] Ensc III-4 third Engineering Science elective[2] Ensc IV-4 fourth Engineering Science elective[2] Ensc V-4 fifth Engineering Science elective[2] (G) Scie I-3 science elective[3] (H) Tech I-3 technical (computing science, science or math) elective[3] (G) Tech II-3 or Ensc V-4 [2] (H) 18 credit hours (G); 18 credit hours (H)
Other Requirements ENSC 498-3 Engineering Science Thesis Proposal ENSC 499-9 Undergraduate Thesis Total 155 Credit Hours	**Other Requirements** ENSC 498-3 Engineering Science Thesis Proposal (H) ENSC 499-9 Undergraduate Thesis (H) Total 142 credits (G); 154 credits (H)
Note: In the typical schedule shown above, students will start their thesis work (ENSC 498 and 499) between semesters seven and eight. Theses can be done on or off campus, either integrated with an optional (or mandatory) work term or as independent work with appropriate supervision.	**Note:** In the typical schedule shown above, honors students will start their thesis work (ENSC 498 and 499) between semesters seven and eight. This work can be done on or off campus, either integrated with an optional (or mandatory) work term or as independent work with appropriate supervision.

Rationale

The thesis and third year project course are eliminated for the general degree, being replaced by the capstone project course introduced instead in semester seven. An additional ENSC elective replaces the second technical elective (Tech II-3) in order to maintain the required Engineering Science credit hours for accreditation. A Science elective is dropped to keep the credit hours per term at the 18 credit average. Semester schedules are adjusted accordingly.

7. Computer Engineering Option

The following changes are made to the Computer Engineering option.

Courses and Typical Schedule	Courses and Typical Schedule The courses and typical schedule for both the general degree and the honors degree are listed below. The notation (G) is used for requirements applying to the general degree only, while the notation (H) is used for requirements applying to the honors degree only.
Semester Six (Fall) ENSC 305-1 Project Documentation and Team Dynamics* ENSC 325-4 Microelectronics II* ENSC 327-4 Communication Systems* ENSC 340-3 Engineering Science Project* ENSC 383-4 Feedback Control Systems* Scie I-3 first science elective[3] 19 credit hours	**Semester Six (Fall)** Cmpl I-3 first complementary elective[1] (G) ENSC 305-1 Project Documentation and Team Dynamics* (H) ENSC 325-4 Microelectronics II* ENSC 327-4 Communication Systems* ENSC 340-4 Engineering Science Project* (H) ENSC 383-4 Feedback Control Systems* Scie I-3 first science elective[3] (G) 18 credit hours (G); 17 credit hours (H)
Semester Seven (Spring) Cmpl I-3 first complementary elective[1] CMPT 300-3 Operating Systems I Ensc I-4 first Engineering Science elective[2] ENSC 406-2 Social Responsibility and Professional Practice* MACM 316-3 Numerical Analysis I Scie II-3 second science elective[3] 18 credit hours	**Semester Seven (Spring)** Cmpl I-3 first complementary elective[1] (H) CMPT 300-3 Operating Systems I ENSC 305-1 Project Documentation and Team Dynamics* (G) ENSC 440-4 Capstone Engineering Science Project (G) Ensc I-4 first Engineering Science elective[2] ENSC 406-2 Social Responsibility and Professional Practice* MACM 316-3 Numerical Analysis I Scie I-3 first science elective[3] (H) 17 credit hours (G); 18 credit hours (H)
Semester Eight (Fall) Cmpl II-3 second complementary studies elective[1] Scie II-3 third science elective[3] Ensc II-4 second Engineering Science elective[2] ENSC 450-4 VLSI Systems Design Scie IV-3 fourth science elective[3] 18 credit hours	**Semester Eight (Fall)** Cmpl II-3 second complementary studies elective[1] Ensc II-4 second Engineering Science elective[2] ENSC 450-4 VLSI Systems Design Scie II-3 second science elective[3] Scie III-3 third science elective[3] 17 credit hours (G); 17 credit hours (H)
Other Requirements ENSC 498-3 Engineering Science Thesis Proposal ENSC 499-9 Undergraduate Thesis Total 155 Credit Hours	**Other Requirements** ENSC 498-3 Engineering Science Thesis Proposal (H) ENSC 499-9 Undergraduate Thesis (H) Total 140 credits (G); 152 credits (H)
Note: In the typical schedule shown above, students will start their thesis work (ENSC 498 and 499) between semesters seven and eight. Theses can be done on or off campus, either integrated with an optional (or mandatory) work term or as independent work with appropriate supervision.	**Note:** In the typical schedule shown above, honors students will start their thesis work (ENSC 498 and 499) between semesters seven and eight. This work can be done on or off campus, either integrated with an optional (or mandatory) work term or as independent work with appropriate supervision.

Rationale

The thesis and third year project course are eliminated for the general degree, being replaced by the capstone project course introduced instead in semester seven. A Science elective is dropped to keep the credit hours per term near the 18 credit average. Semester schedules are adjusted accordingly.

8. Engineering Physics Option

The following changes are made to the Engineering Physics option.

Courses and Typical Schedule	Courses and Typical Schedule The courses and typical schedule for the honors degree are listed below. The Engineering Physics option is not available through the general degree.
Semester Six (Fall) Cmpl II-3 second complementary elective[1] ENSC 305-1 Project Documentation and Team Dynamics* ENSC 325-4 Microelectronics II* ENSC 327-4 Communication Systems* ENSC 340-3 Engineering Science Project* ENSC 383-4 Feedback Control Systems* 19 credit hours	**Semester Six (Fall)** ENSC 305-1 Project Documentation and Team Dynamics* ENSC 325-4 Microelectronics II* ENSC 327-4 Communication Systems* ENSC 340-4 Engineering Science Project* ENSC 383-4 Feedback Control Systems* 17 credit hours
Semester Seven (Spring) Ensc I-4 first Engineering Science elective[2] Ensc II-4 second Engineering Science elective[2] ENSC 406-2 Social Responsibility and Professional Practice* PHYS 344-3 Thermal Physics PHYS 365-3 Semiconductor Device Physics PHYS 385-3 Quantum Physics [18] credit hours	**Semester Seven (Spring)** Cmpl II-3 second complementary elective[1] Ensc I-4 first Engineering Science elective[2] ENSC 406-2 Social Responsibility and Professional Practice* PHYS 344-3 Thermal Physics PHYS 365-3 Semiconductor Device Physics PHYS 385-3 Quantum Physics 18 credit hours
Semester Eight (Fall) [Ensc II-4 second Engineering Science elective[2]] Ensc III-4 third Engineering Science elective[2] PHYS 332-3 Intermediate Laboratory PHYS 384-3 Methods of Theoretical Physics PHYS 445-3 Statistical Physics PHYS 355-3 Optics 16 credit hours	**Semester Eight (Fall)** Ensc II-4 second Engineering Science elective[2] Ensc III-4 third Engineering Science elective[2] PHYS 332-3 Intermediate Laboratory PHYS 384-3 Methods of Theoretical Physics PHYS 355-3 Optics Phys 4XX-3 physics elective 20 credit hours
Other Requirements ENSC 498-3 Engineering Science Thesis Proposal ENSC 499-9 Undergraduate Thesis Total 155 Credit Hours	**Other Requirements** ENSC 498-3 Engineering Science Thesis Proposal ENSC 499-9 Undergraduate Thesis Total 156 credits

Rationale

The Engineering Physics program is maintained as an honors program. With the increase in credit value for the third-year project course, a complementary studies elective is moved from semester six to seven and an engineering science elective is moved from semester seven to eight. A Physics elective replaces PHYS 445-3 to provide students with more choice.

Some errors in the current calendar entry are shown in square brackets and are corrected.

9. Systems Option

The following changes are made to the Systems option.

Courses and Typical Schedule	Courses and Typical Schedule The courses and typical schedule for both the general degree and the honors degree are listed below. The notation (G) is used for requirements applying to the general degree only, while the notation (H) is used for requirements applying to the honors degree only.
Semester Six (Fall) Cmpl I-3 first complementary elective[1] ENSC 305-1 Project Documentation and Team Dynamics* ENSC 325-4 Microelectronics II* ENSC 340-3 Engineering Science Project* ENSC 383-4 Feedback Control Systems* ENSC 387-4 Introduction to Electromechanical Sensors and Actuators* 19 credit hours	**Semester Six (Fall)** Cmpl I-3 first complementary elective[1] (G) ENSC 305-1 Project Documentation and Team Dynamics* (H) ENSC 325-4 Microelectronics II* ENSC 340-4 Engineering Science Project* (H) ENSC 383-4 Feedback Control Systems* ENSC 387-4 Introduction to Electromechanical Sensors and Actuators* Scie I-3 science elective[3] (G) 18 credit hours (G); 17 credit hours (H)
Semester Seven (Spring) Ensc I-4 first Engineering Science elective[2] ENSC 406-2 Social Responsibility and Professional Practice* ENSC 483-4 Modern Control Systems* Scie I-3 first science elective[3] MACM 316-3 Numerical Analysis I 16 credit hours	**Semester Seven (Spring)** Cmpl I-3 first complementary elective[1] (H) ENSC 305-1 Project Documentation and Team Dynamics* (G) ENSC 440-4 Capstone Engineering Science Project (G) Ensc I-4 first Engineering Science elective[2] ENSC 406-2 Social Responsibility and Professional Practice* ENSC 483-4 Modern Control Systems* MACM 316-3 Numerical Analysis I 18 credit hours (G); 16 credit hours (H)
Semester Eight (Fall) Cmpl II-3 second complementary studies elective[1] ENSC 488-4 Introduction to Robotics* ENSC 489-4 Computer Aided Design and Manufacturing* Ensc II-4 second Engineering Science elective[2] Scie II-3 second science elective[3] 18 credit hours	**Semester Eight (Fall)** Cmpl II-3 second complementary studies elective[1] ENSC 488-4 Introduction to Robotics* ENSC 489-4 Computer Aided Design and Manufacturing* Ensc II-4 second Engineering Science elective[2] Scie I-3 science elective[3] (H) 15 credit hours (G); 18 credit hours (H)
Other Requirements ENSC 498-3 Engineering Science Thesis Proposal ENSC 499-9 Undergraduate Thesis Total 155 Credit Hours	**Other Requirements** ENSC 498-3 Engineering Science Thesis Proposal (H) ENSC 499-9 Undergraduate Thesis (H) Total 141 credits (G); 153 credits (H)
Note: In the typical schedule shown above, students will start their thesis work (ENSC 498 and 499) between semesters seven and eight. Theses can be done on or off campus, either integrated with an optional (or mandatory) work term or as independent work with appropriate supervision.	**Note:** In the typical schedule shown above, honors students will start their thesis work (ENSC 498 and 499) between semesters seven and eight. This work can be done on or off campus, either integrated with an optional (or mandatory) work term or as independent work with appropriate supervision.

Rationale

The thesis and third year project course are eliminated for the general degree, being replaced by the capstone project course introduced instead in semester seven. A Science elective is dropped to keep the credit hours per term near the 17 credit average. Semester schedules are adjusted accordingly.

10. BASc (Honors) for Existing Graduates

The following motion for consideration by Senate is proposed.

Whereas the accomplishment of existing graduates of the BASc program is generally equivalent to that expected under the new BASc (Honors) designation, Senate affirms that the designation BASc (Honors) may be used by those who have graduated from the BASc program prior to Fall 2002, provided that both a CGPA and a UDGPA of at least 3.0 were obtained on graduation.

11. Minor in Computer and Electronics Design

The graduation GPA requirement is changed for consistency with the new general degree requirements (last paragraph of Program Requirements).

Current	Proposed
The engineering science graduation GPA in the above courses must be a B (3.0) or better. If it drops below 3.0, you may be required to withdraw from the program.	The engineering science graduation GPA in the above courses must be 2.4 or better. If it drops below 2.4, you may be required to withdraw from the program.

Electronics Engineering Option - footnotes

* should be taken at this point in the program; consequences of deviations from this schedule are the responsibility of the student.

1 must be an approved course. A pre-approved list of complementary studies courses is available from the School of Engineering Science.

2 chosen from ENSC 424, 425, 426, 427, 428, 429, 450, 481, 483, 488, 489, 495. With permission of the undergraduate curriculum committee chair, students may replace one of their engineering science electives by either a directed study or a special project laboratory course. Special Topics courses that have been approved by the undergraduate curriculum committee chair and the director may be counted here.

3 must be an approved course; consult pre-approved electives list available from the school. Under special circumstances, approval for other courses from the undergraduate curriculum committee chair may be granted.

Computer Engineering Option - footnotes

* should be taken in the designated semester; consequences of deviating from this schedule are the responsibility of the student.

1 must be an approved course. A pre-approved list of complementary studies courses is available from the School of Engineering Science.

2 chosen from ENSC 424, 425, 426, 427, 428, 429, 481, 483, 488, 489, 495. With permission of the undergraduate curriculum committee chair, students may replace one of their engineering science electives by either a directed study or a special project laboratory course. Special Topics courses that have been approved by the undergraduate curriculum committee chair and the director may be counted here.

3 must be an approved course; consult pre-approved electives list available from the school. Under special circumstances, approval for other courses from the undergraduate curriculum committee chair may be granted.

Engineering Physics (Electronics) Option - footnotes

* should be taken in the designated semester; consequences of deviating from this schedule are the responsibility of the student.

1 must be an approved course. A pre-approved list of complementary studies courses is available from the School of Engineering Science.

2 chosen from ENSC 424, 425, 426, 427, 428, 429, 450, 481, 483, 488, 489, 495. With permission of the undergraduate curriculum committee chair, students may replace one of their engineering science electives by either a directed study or a special project laboratory course. Special Topics courses that have been approved by the undergraduate curriculum committee chair and the director may be counted here.

3 must be an approved course; consult pre-approved electives list available from the school. Under special circumstances, approval for other courses from the undergraduate curriculum committee chair may be granted.

Systems Option - footnotes

* should be taken in the designated semester; consequences of deviating from this schedule are the responsibility of the student.

1 must be an approved course. A pre-approved list of complementary studies courses is available from the School of Engineering Science.

2 chosen from ENSC 424, 425, 426, 427, 428, 429, 450, 481, 495. With permission of the undergraduate curriculum committee chair, students may replace one of their engineering science electives by either a directed study or a special project laboratory course. Special Topics courses that have been approved by the undergraduate curriculum committee chair and the director may be counted here.

3 must be an approved course; consult pre-approved electives list available from the school. Under special circumstances, approval for other courses from the undergraduate curriculum committee chair may be granted.