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 GradStudies

## MEMORANDUM

ATTENTION Senate DATE 05 March 2014  
 FROM Wade Parkhouse, Dean of Graduate Studies No. GS2014.07  
 RE: Faculty of Applied Sciences


**For information:**

Acting under delegated authority at its meeting of 3 March 2014, SGSC approved the following curriculum revision:

**Effective: Fall 2014****Faculty of Applied Sciences**

- a) School of Engineering Science
1. Proposal for Engineering Science Graduate Student Co-op [GS2014.07]
  - i) New courses:
    - ENSC 701-3 Graduate Co-op Practicum I
    - ENSC 702-3 Graduate Co-op Practicum II
  - ii) Resultant calendar changes to course requirements for:
    - ENSC PhD
    - ENSC MASc
    - ENSC MEng
- b) School of Mechatronic Systems Engineering
1. Proposal for Mechatronic Systems Engineering Graduate Student Co-Op
  - i) New course:
    - MSE 793-3 Graduate Co-op Practicum
  - ii) Resultant calendar changes to course requirements for:
    - MSE PhD
    - MSE MASc

**GS2014.07**



FACULTY OF APPLIED SCIENCES

OFFICE OF THE DEAN

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MEMORANDUM

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ATTENTION Dr. Wade Parkhouse  
Dean, Graduate Studies

DATE February 12, 2014

FROM Dr. Uwe Glässer  
Faculty of Applied Sciences, Graduate  
Studies Committee

PAGES 1/1

RE: ENSC Graduate Co-op Program Proposal, MSE Graduate Co-op Program Proposal

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In February 2014, the Faculty of Applied Sciences Graduate Studies Committee has unanimously approved the attached Graduate Co-op Program proposals submitted by the School of Engineering Science and the School of Mechatronic Systems Engineering, respectively.

Would you please place these two proposals on the agenda for the next SGSC meeting?

cc: Dr. Kamal Gupta, Director, School of Engineering Science  
Dr. Farid Golnaraghi, Director, School of Mechatronic Systems Engineering

enclosures

# Proposal for Graduate Student Co-op Program

School of Mechatronic Systems Engineering  
Simon Fraser University

Ed Park

Fall 2013

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## Overview

The School of Mechatronic Systems Engineering in the Faculty of Applied Sciences (FAS) and the SFU Work Integrated Learning (WIL) propose the introduction of a graduate co-op program in Mechatronic Systems Engineering (MSE). This will be an optional co-operative education program providing experiential opportunities to supplement the students' academic curricula at SFU. The WIL office will provide management, staff, and infrastructure for students' career preparation (including training on topics such as resume and interview preparation, and workplace practices), job development and placement of students with companies performing work relevant to their degrees in MSE. A new co-op tuition fee model is being proposed by FAS and WIL, which will ensure that the program is self-sustainable, i.e., the tuition revenue will cover the entire cost of the co-op program (including staff salary and operating cost).

## Rationale

MSE has a relatively large graduate program, with over 90 graduate students. We provide rigorous training in cutting edge areas of MSE via coursework and thesis-based research. Upon graduation, many students seek jobs in industry, aiming to deploy these skills. Further, we have a large contingent of international students who have no Canadian industry experience. Many of our graduate students would benefit from the industry skills, experience, and networking that a co-op program can provide. A survey of graduate students conducted in Fall 2013 indicated overwhelming support for a graduate co-op program.

## Enrollment Data

Current headcount of graduate students in MSE:

MASc students: 35

PhD students: 56

Total: 91

## Survey of MSE Graduate Students

During the Fall semester, 2013, current graduate students in MSE were surveyed on their interest in co-operative Education, job types, salary expectations, and geographic locations. Forty one (41) graduate students responded, and all respondents (100%) indicated that they wanted to participate in co-op. A summary of the survey is presented in Appendix A.

Based on the survey and the number of co-op inquiries from current MSE grad students, we can anticipate a high level of demand for the new optional graduate co-op program. Some MSE graduate students are already working as interns at various companies as part of their MITACS or NSERC

sponsored research project. Please note that the participation rate of undergraduates in the School's co-op program is 100% as it is mandatory.

**Summary of Program Proposal**

Students in the MSE graduate program may take one semester of co-operative education practicum as an integral part of their studies. The practicum counts for 3 academic units and will appear on the student's transcript; however, the units are not included in the student's CGPA nor do they count toward the course requirements for the MASc or PhD degree. Students require pre-approval from both their senior supervisor and Graduate Program Chair in order to apply for a co-op practicum.

**Graduate Co-operative Education Program Funding**

The following enrolment plan outlines the expected participation, reaching an anticipated/conservative steady-steady enrollment of 20 students per year in the third year.

|   | 1 <sup>st</sup> year: 10 students | 2 <sup>nd</sup> year: 20 students | 3 <sup>rd</sup> year: 30 students |
|---|-----------------------------------|-----------------------------------|-----------------------------------|
| Practicum tuition revenue (\$1,400/co-op practicum) | \$14,000                          | \$28,000                          | \$42,000                          |

FAS will provide bridge funding (i.e. salary/benefits and operating) for a half time (0.5 FTE) APSA Grade 10 graduate co-op coordinator for the first three years of this program. The proposed tuition fee of \$1,400 per graduate co-op term is composed of \$700 registration/student preparation fee (non-refundable, if the student is accepted into the co-op program) and another \$700 placement fee due upon actual placement. Moving forward, this graduate co-op tuition fee structure forms the basis of a sustainable business model collaboratively developed by FAS and WIL.

**Office Space**

The Faculty of Applied Sciences will provide an office at the Surrey Campus for the new graduate- co-op co-ordinator.

**Student Graduation Times and Funding Impacts**

Students' graduation times may be affected by their participation in this program. However, the benefits for student include improved communication and technical skills as well as industrial knowledge that may enhance the students' effectiveness in their research programs. The direct negative effect will be an effective increase in the coursework (hence, decrease in research time) performed by these students, which is minimized by allowing only one semester practicum in their program. These effects will have to be monitored closely by the students' supervisory committee, in particular by the senior supervisor.

The funding offer of students who choose to participate in the co-op program will be amended to indicate that co-op salary will be in lieu of funding provided directly by the School (RA, TA, internal scholarship).

**APPENDIX A**

**MSE GRADUATE CO-OP SURVEY**

Q1 . PLEASE ENTER YOUR FIRST AND LAST NAME: ( Single Line Text )

Only the 5 most recent submissions are displayed. Click "More" to see all submissions.

More...

Q2 . Please select which program you are currently enrolled in: ( Radio Buttons )

|      |    |  |
|------|----|--|
| PhD  | 29 |  |
| MASc | 20 |  |

Q3 . Would you be interested in a co-op job at some point during your program? If so, please select the approximate MINIMUM monthly salary at which you would be interested in such a job (please note that this is in lieu of RA and TA). ( Radio Buttons )

|                   |    |  |
|-------------------|----|--|
| a) Not interested | 0  |  |
| b) \$2,000/mo     | 13 |  |
| c) \$2,500/mo     | 13 |  |
| d) \$3,000/mo     | 16 |  |
| e) \$3,500/mo     | 2  |  |
| f) \$4,000/mo     | 5  |  |

Q4 . Please select a preferred industry that you would be interested in working for in a co-op job (multiple answers possible): ( Checkboxes )

|  |    |  |
|--|----|--|
| a) Electrical and electronic products (e.g., electrical equipment, | 25 |  |
|--|----|--|

|   |    |  |
|---|----|--|
| communication equipment, consumer electronics, etc.)                              |    |  |
| b) Mechanical machinery (e.g., turbines/generators, HVAC, heavy machinery, etc.)  | 24 |  |
| c) Transportation (e.g., automotive, aerospace, etc.)                             | 26 |  |
| d) Scientific and professional equipment (e.g., laboratory and medical equipment) | 26 |  |
| e) Mining, oil and gas  | 19 |  |
| f) Utilities (e.g., electricity, gas, water, etc.)                                | 8  |  |
| g) Materials manufacturing  | 19 |  |
| h) Information technology and computing   | 11 |  |
| i) Engineering consulting   | 24 |  |
| j) All other industries   | 11 |  |

Q5 . Please select geographical locations in which you would be interested in a co-op job (multiple answers possible): ( Checkboxes )

a) Greater Vancouver 49



b) Other parts of Canada (e.g., Ontario and Alberta) 31



c) USA 31





## Calendar Changes Required by the Engineering Science Graduate Student Co-op Program

### 1. Engineering Science PhD Calendar Change

| Current   | Proposed   |
|---|--|
| <p><b>Course Requirements</b><br/> <i>The minimum requirement is 18 units beyond that of the MASc degree. Six of these units will be for prescribed courses in the specialization in which the student is enrolled. Alternatives can be substituted with the approval of the student's supervisory committee. At most six units may be senior undergraduate courses. At most six units may be directed studies. At least six units must be within engineering science, although ENSC 820-3 may not be used towards these six units. Additional courses may be required to correct deficiencies in the student's background.</i></p> | <p><b>Course Requirements</b><br/> <i>The minimum requirement is 18 units beyond that of the MASc degree. Six of these units will be for prescribed courses in the specialization in which the student is enrolled. Alternatives can be substituted with the approval of the student's supervisory committee. At most six units may be senior undergraduate courses. At most six units may be directed studies. <u>ENSC 701 - Graduate Co-op Practicum I (3) can be used towards the degree requirement. In that case, at most three units of directed studies can be taken.</u> At least six units must be within engineering science, although ENSC 820-3 may not be used towards these six units. Additional courses may be required to correct deficiencies in the student's background.</i></p> |

### 2. Engineering Science MASc Calendar Change

| Current  | Proposed  |
|--|---|
| <p><b>Course Requirements</b><br/> <i>Students complete a total of 30 units consisting of a minimum of 12 units of courses, and a thesis equal to 18 units. The courses will normally be selected, in consultation with the senior supervisor. ENSC 820 may not be used towards the MASc course requirements. At least six units must be ENSC graduate courses. At most three units may be directed studies.</i></p> | <p><b>Course Requirements</b><br/> <i>Students complete a total of 30 units consisting of a minimum of 12 units of courses, and a thesis equal to 18 units. The courses will normally be selected in consultation with the senior supervisor. ENSC 820 may not be used towards the MASc course requirements. At least six units must be ENSC graduate courses. At most three units may be directed studies <u>or ENSC 701 - Graduate Co-op Practicum I (3).</u></i></p> |

### 3. Engineering Science MEng Calendar Change

| Current  | Proposed   |
|--|--|
| <p><i>Elective Course Options</i></p> <p><i>Beyond the minimum requirements for regular ENSC graduate courses in each option above, the following courses can be used towards the remaining requirements:</i></p> <p><i>ENSC 891 - Directed Studies I (3)</i></p> <p><i>Up to two regular graduate courses from other academic units in the Faculty of Applied Sciences and Faculty of Sciences, subject to approval of the supervisor.</i></p> <p><i>International MEng students with Study Permit should register for at least two courses each term with a total of six or more units to maintain full-time status.</i></p> | <p><i>Elective Course Options</i></p> <p><i>Beyond the minimum requirements for regular ENSC graduate courses in each option above, the following courses can be used towards the remaining requirements:</i></p> <p><i>ENSC 891 - Directed Studies I (3)</i><br/> <u><i>ENSC 701 - Graduate Co-op Practicum I (3) and</i></u><br/> <u><i>ENSC 702 - Graduate Co-op Practicum II (3)</i></u></p> <p><i>Up to two regular graduate courses from other academic units in the Faculty of Applied Sciences and Faculty of Sciences, subject to approval of the supervisor.</i></p> <p><i>International MEng students with <u>a</u> Study Permit should register for at least two courses each term with a total of six or more units to maintain full-time status.</i></p> |

# New Graduate Course Proposal Form

## PROPOSED COURSE

|   |                                       |   |
|---|---------------------------------------|---|
| Subject (eg. MAPH) ENSC   | Number (eg. 810) 701                  | Units (eg. 4) 3   |
| Course Title (max 80 characters)<br>Graduate Co-op Practicum I  |                                       |   |
| Short Title (appears on transcripts, max 25 characters)<br>Grad Co-op I   |                                       |   |
| Course Description for SFU Calendar <input type="checkbox"/> see attached document <input type="checkbox"/> Learning outcomes identified<br>This course is the first term of work experience in the School of Engineering Science Co-operative Education Program for graduate students. A final report will be submitted and graded by the student's Senior supervisor. |                                       |   |
| Available Course Components: <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Laboratory <input checked="" type="checkbox"/> Practicum <input type="checkbox"/> Online <input type="checkbox"/> _____   |                                       |   |
| Grading Basis <input type="checkbox"/> Letter grades <input checked="" type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> In Progress/Complete  |                                       | This is a capstone course <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Prerequisites (if any) <input type="checkbox"/> see attached document (if more space is required)<br>The student must have finished at least two terms in the program with a minimum CGPA of 3.0 before taking this course. Approval of Senior Supervisor is needed.  |                                       |   |
| <input type="checkbox"/> This proposed course is combined with an undergrad course: Course number and units: _____  |                                       |   |
| Additional course requirements for graduate students <input type="checkbox"/> See attached document (if this space is insufficient)   |                                       |   |
| Campus at which course will be offered (check all that apply) <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Vancouver <input type="checkbox"/> Surrey <input type="checkbox"/> GNW <input type="checkbox"/> _____  |                                       |   |
| Estimated enrolment<br>45   | Date of initial offering<br>Fall 2014 | Course delivery (eg. 3 hrs/week for 13 weeks)<br>Co-op in industry                            |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Practicum work done in this class will involve children or vulnerable adults<br>(If the "Yes" box is checked, all students will require criminal record checks)   |                                       |   |
| Justification <input type="checkbox"/> See attached document (if more space is required)<br>Graduate co-op will give students valuable industrial experience, prompt new ideas for their research, and improve the financial support of students.   |                                       |   |

## RESOURCES

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

|  |
|--|
| Faculty member(s) who will normally teach this course <input type="checkbox"/> information about their competency to teach the course is appended<br>N/A |
| Number of additional faculty members required in order to offer this course<br>0   |
| Additional space required in order to offer this course <input type="checkbox"/> see attached document<br>N/A  |
| Additional specialized equipment required in order to offer this course <input type="checkbox"/> see attached document<br>N/A                            |
| Additional Library resources required (append details) <input type="checkbox"/> Annually \$ _____ <input type="checkbox"/> One-time \$ _____<br>N/A      |

**PROPOSED COURSE** from first page

|   |                             |                        |
|---|-----------------------------|------------------------|
| Program (eg. MAPH) <b>ENSC</b>  | Number (eg. 810) <b>701</b> | Units (eg. 4) <b>3</b> |
| Course title (max 80 characters)<br><b>Graduate Co-op Practicum I</b> |                             |                        |

**APPROVAL SIGNATURES**

When a department proposes a new course it must first be sent to the chairs of each faculty graduate program committee where there might be an overlap in course content. The chairs will indicate that overlap concerns have been dealt with by signing the appropriate space or via a separate memo or e-mail (attached to this form).

The new course proposal must also be sent to the Library for a report on library resources.

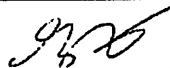
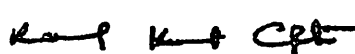
Once overlap concerns have been dealt with, signatures indicate approval by the department, home faculty and Senate Graduate Studies Committee.

**Other Faculties**

The signature(s) below indicate that the Dean(s) or designate of other Faculties affected by the proposed new course support(s) the approval of the new course.

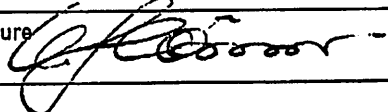
| Name of Faculty | Signature of Dean or Designate | Date |
|-----------------|--------------------------------|------|
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |

**Departmental Approval (non-departmentalized faculties need not sign)**

|   |  |                         |
|---|--|-------------------------|
| Department Graduate Program Committee<br><b>Jie Liang</b> | Signature   | Date <b>Feb 6, 2014</b> |
| Department Chair<br><b>Kamal Gupta</b>                    | Signature  | Date <b>Feb 6, 2014</b> |

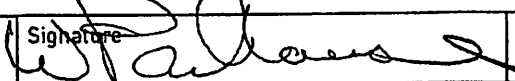
**Faculty Approval**

Faculty approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/Department commits to providing the required Library funds and any other necessary resources.

|  |  |                         |
|--|--|-------------------------|
| Faculty Graduate Program Committee<br><b>Uwe Glässer</b> | Signature  | Date <b>FEB 11/2014</b> |
|--|--|-------------------------|

**Senate Graduate Studies Committee Approval**

SGSC approval indicates that the Library report has been seen, and all resource issues dealt with. Once approved, new course proposals are sent to Senate for information.

|  |  |                          |
|--|--|--------------------------|
| Senate Graduate Studies Committee<br><b>Wade Parkhouse</b> | Signature  | Date <b>MAR - 5 2014</b> |
|--|--|--------------------------|

**CONTACT**

Upon approval of the course, the Office of the Dean of Graduate Studies will consult with the department or school regarding other course attributes that may be required to enable the proper entry of the new course in the student record system.

|  |                                  |                                     |
|--|----------------------------------|-------------------------------------|
| Department / School / Program<br><b>ENSC</b> | Contact name<br><b>Jie Liang</b> | Contact email<br><b>jiel@sfu.ca</b> |
|--|----------------------------------|-------------------------------------|

# New Graduate Course Proposal Form

## PROPOSED COURSE

|  |  |   |
|--|--|---|
| Subject (eg. MAPH) <b>ENSC</b>   | Number (eg. 810) <b>702</b>                  | Units (eg. 4) <b>3</b>  |
| Course Title (max 80 characters)<br><b>Graduate Co-op Practicum II</b>   |  |   |
| Short Title (appears on transcripts, max 25 characters)<br><b>Grad Co-op II</b>  |  |   |
| Course Description for SFU Calendar <input type="checkbox"/> see attached document <input type="checkbox"/> Learning outcomes identified<br>Following ENSC 701-3, this course is the second term of work experience in the School of Engineering Science Co-operative Education Program for graduate students. A final report will be submitted and graded by the student's Senior supervisor. |  |   |
| Available Course Components: <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Laboratory <input checked="" type="checkbox"/> Practicum <input type="checkbox"/> Online <input type="checkbox"/> _____  |  |   |
| Grading Basis <input type="checkbox"/> Letter grades <input checked="" type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> In Progress/Complete   |  | This is a capstone course <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Prerequisites (if any) <input type="checkbox"/> see attached document (if more space is required)<br><b>ENSC 701-3, a minimum CGPA of 3.0, and approval of Senior Supervisor.</b>  |  |   |
| <input type="checkbox"/> This proposed course is combined with an undergrad course: Course number and units: _____   |  |   |
| Additional course requirements for graduate students <input type="checkbox"/> See attached document (if this space is insufficient)  |  |   |
| Campus at which course will be offered (check all that apply) <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Vancouver <input type="checkbox"/> Surrey <input type="checkbox"/> GNW <input type="checkbox"/> _____   |  |   |
| Estimated enrolment<br><b>45</b>   | Date of initial offering<br><b>Fall 2014</b> | Course delivery (eg. 3 hrs/week for 13 weeks)<br><b>Co-op in industry</b>                     |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Practicum work done in this class will involve children or vulnerable adults<br>(If the "Yes" box is checked, all students will require criminal record checks)  |  |   |
| Justification <input type="checkbox"/> See attached document (if more space is required)<br><b>Graduate co-op will give students valuable industrial experience, prompt new ideas for their research, and improve the financial support of students.</b>   |  |   |

## RESOURCES

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

|   |
|---|
| Faculty member(s) who will normally teach this course <input type="checkbox"/> information about their competency to teach the course is appended<br><b>N/A</b> |
| Number of additional faculty members required in order to offer this course<br><b>0</b>   |
| Additional space required in order to offer this course <input type="checkbox"/> see attached document<br><b>N/A</b>  |
| Additional specialized equipment required in order to offer this course <input type="checkbox"/> see attached document<br><b>N/A</b>                            |
| Additional Library resources required (append details) <input type="checkbox"/> Annually \$ _____ <input type="checkbox"/> One-time \$ _____<br><b>N/A</b>      |

**PROPOSED COURSE** from first page

|  |                             |                        |
|--|-----------------------------|------------------------|
| Program (eg. MAPH) <b>ENSC</b>   | Number (eg. 810) <b>702</b> | Units (eg. 4) <b>3</b> |
| Course title (max 80 characters)<br><b>Graduate Co-op Practicum II</b> |                             |                        |

**APPROVAL SIGNATURES**

When a department proposes a new course it must first be sent to the chairs of each faculty graduate program committee where there might be an overlap in course content. The chairs will indicate that overlap concerns have been dealt with by signing the appropriate space or via a separate memo or e-mail (attached to this form).

The new course proposal must also be sent to the Library for a report on library resources.


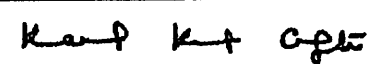
Once overlap concerns have been dealt with, signatures indicate approval by the department, home faculty and Senate Graduate Studies Committee.

**Other Faculties**

The signature(s) below indicate that the Dean(s) or designate of other Faculties affected by the proposed new course support(s) the approval of the new course.

| Name of Faculty | Signature of Dean or Designate | Date |
|-----------------|--------------------------------|------|
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |

**Departmental Approval** (non-departmentalized faculties need not sign)

|   |  |                         |
|---|--|-------------------------|
| Department Graduate Program Committee<br><b>Jie Liang</b> | Signature   | Date <b>Feb 6, 2014</b> |
| Department Chair<br><b>Kamal Gupta</b>                    | Signature  | Date <b>Feb 6, 2014</b> |

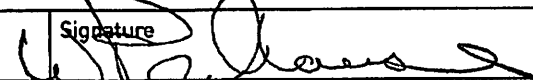
**Faculty Approval**

Faculty approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/Department commits to providing the required Library funds and any other necessary resources.

|  |  |                         |
|--|--|-------------------------|
| Faculty Graduate Program Committee<br><b>Uwe Glässer</b> | Signature  | Date <b>FEB 11/2014</b> |
|--|--|-------------------------|

**Senate Graduate Studies Committee Approval**

SGSC approval indicates that the Library report has been seen, and all resource issues dealt with. Once approved, new course proposals are sent to Senate for information.

|  |  |                          |
|--|--|--------------------------|
| Senate Graduate Studies Committee<br><b>Wade Parkhouse</b> | Signature  | Date <b>MAR - 5 2014</b> |
|--|--|--------------------------|

**CONTACT**

Upon approval of the course, the Office of the Dean of Graduate Studies will consult with the department or school regarding other course attributes that may be required to enable the proper entry of the new course in the student record system.

|  |                                  |                                     |
|--|----------------------------------|-------------------------------------|
| Department / School / Program<br><b>ENSC</b> | Contact name<br><b>Jie Liang</b> | Contact email<br><b>jiel@sfu.ca</b> |
|--|----------------------------------|-------------------------------------|

# **Proposal for Engineering Science Graduate Student Co-op Program**

Version 5

March 19, 2014

## **1. Overview**

The School of Engineering Science (ENSC) and the SFU Work Integrated Learning (WIL) office propose the introduction of an ENSC Graduate Student Co-op Program. This will be an optional co-operative education program that provides experiential opportunities to supplement the students' academic curricula at SFU. The WIL office will provide management, staff, infrastructure for students' career preparation (including training on topics such as resume and interview preparation, and workplace practices), job development, and placement of students with companies performing work relevant to their degrees. A new co-op tuition fee model is developed by the Faculty of Applied Science and WIL, which will ensure that the program is self-sustainable, i.e., the tuition revenue will cover the entire cost of the co-op program (including staff salary and operating cost).

## **2. Rationale**

The School of Engineering Science has a large, high-quality graduate program with about 150 graduate students. We provide rigorous training for our PhD and MASc students via coursework and research in cutting edge areas such as Biomedical Engineering, Communications, Networking, Signal Processing, Computer Engineering, Control, and Microelectronics. Most of them will work in industry after graduation. Therefore, the industrial experience, skills and networking provided by the graduate student co-op program is very helpful for our students, particularly for international students.

We recently revised our MEng program and began admitting full-time course-based and project-based MEng students in fall 2013. These students usually do not have prior working experience and will not receive extensive research training in the MEng program. Therefore the industrial experience gained from the graduate student co-op program is even more critical in order for them to find jobs after graduation.

In addition, there is a strong demand from industry for well-qualified graduate co-op students. These companies are located in Vancouver, the rest of Canada, the US, and other countries.

The graduate co-op program will also improve the average financial support of our graduate students, thereby enhancing the competitiveness of our school in attracting and retaining top-quality graduate students.

### 3. Head Count and Survey:

The current headcounts of graduate students in Engineering Science are as follows:

PhD students = 66

MASc students = 46

MEng students = 33 (including part-time MEng students with full-time jobs)

**Total students = 145**

The number of MEng students will increase significantly in the next 1-2 years, since we only began admitting full-time MEng students in fall 2013 (there are only about 10 new full-time MEng students in fall 2013).

Some of our graduate students have already had an opportunity to work as industrial interns through the MITACS Accelerate Internship program. Some of them have also worked as interns in various international companies and research institutes. We expect that this number will increase significantly after the launch of the graduate co-op program.

We conducted a survey of our existing graduate students to get their opinions and their expectations of the proposed graduate co-op program, as well as feedback on any previous co-op experience at SFU. The feedback is overwhelmingly supportive. We have received 75 submissions of the survey from about 120 full-time students (62.5% participation rate, excluding part-time MEng students). The results are included in the Appendix. Some highlights are:

1. 71 students (95%) are interested in the co-op program.
2. 38 students (51%) prefer to have two co-op terms during their program. 27 students (35%) prefer more than two co-ops.
3. The expected salary is around \$3,000/month.
4. 55 students (75%) are willing to work in the US, the same as the number of students who are willing to work in the rest of Canada.
5. 16 students (21%) have already had one or more co-op work terms at SFU.

### 4. Enrollment Projection and Tuition Fee Revenue:

Based on the survey results, if we assume that 62.5% of students will participate in the grad co-op program, each PhD or MEng student will have an average of two co-op terms, and each MASc student will have one co-op term during their studies. Given that the average length of study for PhD, MASc and MEng students is 5, 2.5 and 2 years, respectively, we expect that when the program reaches a stable state, the average number of co-op positions (including MITACS internships) each year will be approximately **45 (17 PhDs, 11 MASc's and 17 MEng's)**.

The current graduate co-op fee charged by the School of Computing Science is about \$720 per co-op term. However, this is not sustainable to cover the cost of the program. As a result, the Faculty of Applied Sciences and the Work Integrated Learning unit have collaboratively developed a new graduate co-op tuition fee and fee structure, which form the basis of a sustainable business model. Under the new model, the tuition fee will be \$1,400 per graduate co-op term, composed of \$700 registration and student preparation



fee (non-refundable, if the student is accepted into the co-op program) and another \$700 placement fee due upon actual placement.

The projected co-op enrollment and revenue are as follows, based on the new practicum tuition fee of \$1400 per co-op term. We assume that 1/5 of PhD/MASc positions are placed through the MITACS internship program, and students in the MITACS program do not pay the co-op tuition fee.

| Year                      | Y1       | Y2       | Y3       |
|---------------------------|----------|----------|----------|
| Total co-op enrollments   | 15       | 30       | 45       |
| Non-MITACS co-ops         | 12       | 24       | 36       |
| Practicum tuition revenue | \$16,800 | \$33,600 | \$50,400 |

## 5. Co-operative Education Program Funding

### 5.1 Staffing and Operating:

Graduate co-op students will be required to participate in the Co-operative Education career preparation program. Therefore support from co-op coordinators and clerks will be needed for the career preparation program, assistance with co-op work permits (for international students) and delivery of the graduate co-op program to students.

The Dean of the Faculty of Applied Science (FAS) has agreed to provide funding for 1.5 full-time co-op staff positions to support the grad co-op program for all three FAS schools, i.e., approximately a 0.5 position for each school.

The budget contribution from FAS Dean's Office for the ENSC share of the program cost will be (based on the \$65,889 salary of APSA Coordinator Gr. 10, Step 1):

#### Year 1: 0.17 position

Salary and benefits: \$13,617 per year (including 24% benefit)  
 Operating: \$5,000 per year  
 Sub-total: \$18,617 per year

#### Year 2: 0.33 position

Salary and benefits: \$27,233 per year (including 24% benefit)  
 Operating: \$10,000 per year  
 Sub-total: \$37,233 per year

#### Year 3: 0.5 position

Salary and benefits: \$40,850 per year (including 24% benefit)  
 Operating: \$15,000 per year  
 Sub-total: \$55,850 per year

It can be seen that the tuition revenue is approximately equal to the operating cost. Therefore the program is self-sustainable.

## **5.2 Office Space:**

No office is required for the next two years. However, if additional staff are needed in the future, another office will be required. The preferred location is in the Engineering Science Co-op Office. However, since the ENSC co-op office space is currently very tight, a temporary office in the ENSC faculty office area can be used.

## **6. Program Timeline**

The students may start their co-op terms in their third term of their graduate program, after they have received necessary technical training in our school.

## **7. Academic Program Details**

Two new graduate co-op courses will be created. They will appear on the student's transcript, but will not count towards the student's CGPA.

### **ENSC 701-3 Graduate Co-op Practicum I**

*This course is the first term of work experience in the School of Engineering Science Co-operative Education Program for graduate students. A final report will be submitted and graded by the student's senior supervisor.*

*Prerequisites: The student must have finished at least two terms in the program with a minimum CGPA of 3.0. The senior supervisor's approval is required.*

### **ENSC 702-3 Graduate Co-op Practicum II**

*This course is the second term of work experience in the School of Engineering Science Co-operative Education Program for graduate students. A final report will be submitted and graded by the student's senior supervisor.*

*Prerequisites: ENSC 701-3 and a minimum CGPA of 3.0. The senior supervisor's approval is required.*

## **8. Changes to Degree Requirements**

**PhD:** We propose the following modification to the PhD course requirements:

*Students must complete a minimum of 18 units beyond those taken in the MASc program. Six of these units will be for prescribed courses in the specialization in which the student is enrolled. Alternatives may be substituted with the approval of the student's supervisory committee. A maximum of six units may be senior undergraduate courses. At most six units may be directed studies. ENSC 701-3 can be used towards the degree requirement. In that case, a maximum of three units of directed studies can be taken. At least six units must be within engineering science ENSC 820-3 may not be*

*used towards these six units. Additional courses may be required to correct deficiencies in the student's background.*

**MASc:** We propose the following modification to the MASc course requirement:

*Students must complete a total of 30 units consisting of a minimum of 12 units of courses, and a thesis equal to 18 units. The courses will normally be selected in consultation with the senior supervisor. ENSC 820 may not be used towards the MASc course requirements. At least six units must be ENSC graduate courses. A maximum of three units may be directed studies or ENSC 701-3.*

**MEng:** We propose the following modifications to the MEng course requirement:

#### *Elective Course Options*

*Beyond the minimum requirements for regular ENSC graduate courses in each option above, the following courses may be used toward the remaining requirements:*

*ENSC 891 - Directed Studies I (3)  
ENSC 701-3 and ENSC 702-3*

*Up to two regular graduate courses from other academic units in the Faculty of Applied Sciences and Faculty of Sciences, subject to approval of the supervisor.*

## **9. Student Graduation Times and Funding Impacts**

MEng students will see minimal impact on graduation times given the course credits obtained via co-op courses. Any increase in time to completion is more than offset by the valuable work experience the students gain by participation in the co-op program.

MASc and PhD students' graduation times may be affected more than MEng students by their participation in this program, since they will spend less time on their research. However, they will receive some course credit and more funding support, receive training in communication and programming skills, and gain valuable industrial knowledge that could provide them with new research ideas, improve the effectiveness of their research, and help them to find jobs after graduations. Such a graduate co-op program is a standard practice in USA, at least in Electrical Engineering and Computer Science.

For PhD and MASc students working on MITACS Internships, the internship salaries are considered part of the RA support from the senior supervisor (because the MITACS Internship is considered a research grant for the supervisor).

For PhD and MASc students working in other industrial co-op position without the involvement of the senior supervisor (i.e. the students will apply for positions through the co-op office), the guaranteed annual RA support from the senior

supervisor will be reduced by 1/3 for each 4-month co-op. However, if the company is founded by the supervisor, and if the co-op project is closely related to the student's research, the co-op salary can be regarded as part of the RA support.

The annual guaranteed GF and TA support from the school for PhD and MASc students will remain the same if the student has one or two four-month co-op terms in an academic year. However, if a student works as a co-op student for the entire academic year, the school will not provide any TAs for the year, and the GF is also not guaranteed

## **10. Eligible and Ineligible Co-op Positions**

Eligible graduate co-op positions include the following:

1. MITACS Accelerate Internships.
2. MITACS International program, which supports short projects with industry and academic institutions within MITACS' Globalink partner countries (currently India, China, Brazil, Mexico, Turkey, Vietnam).
3. Domestic or international internships in the industry and other universities or institutes.

Students who already have full-time permanent jobs will not be allowed to work as graduate co-op student at their current workplace.

Working on campus with a faculty member is not considered a graduate co-op. This is different from our mandatory undergraduate co-op program, where some students have difficulties in obtaining industry positions, particularly when they have a low GPA. Since the graduate co-op program is optional, there is no need to work as a co-op for a faculty member. RAships or Directed Studies are more appropriate choices.

# Appendix

## ENSC Graduate Student Co-Op Program Survey

The School of Engineering Science is considering to introduce an optional graduate student co-op program. This survey is to gather the level of interests from the students and their expectations.

### Q1 . Please write your first and last names (optional): ( Single Line Text )

Only the 5 most recent submissions are displayed. Click "More" to see all submissions.

[More...](#)

### Q2 . Please select which program you are currently enrolled in: ( Radio Buttons )

|      |    |  |
|------|----|--|
| PhD  | 39 |  |
| MASc | 27 |  |
| MEng | 9  |  |

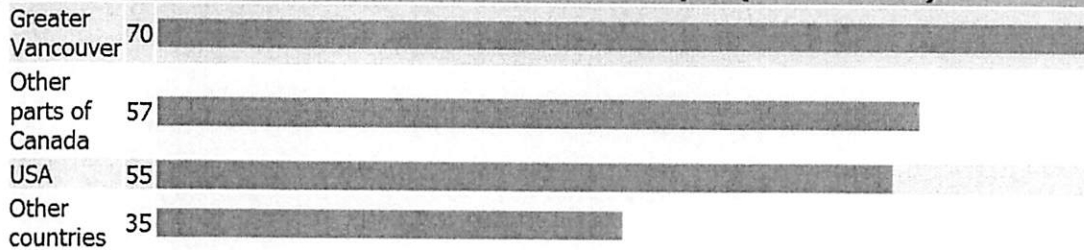
### Q3 . Would you be interested in working as a graduate co-op in a company (including MITACS internship) at certain point during your program? If yes, how many 4-month co-op terms do you want to have during your program? ( Radio Buttons )

|    |    |  |
|----|----|--|
| 0  | 4  |  |
| 1  | 6  |  |
| 2  | 38 |  |
| 3  | 14 |  |
| >3 | 13 |  |

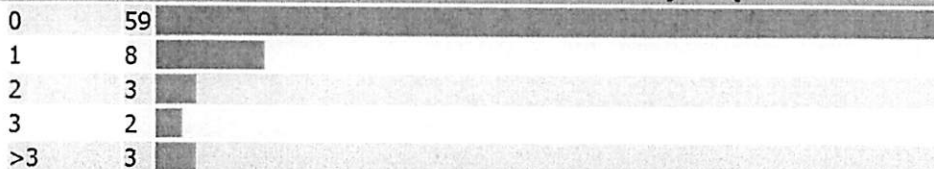
### Q4 . Please select the approximate MINIMUM monthly salary at which you would be interested in such a job: ( Radio Buttons )

|                         |    |  |
|-------------------------|----|--|
| Not interested in co-op | 2  |  |
| \$1000                  | 2  |  |
| \$1500                  | 6  |  |
| \$2000                  | 13 |  |
| \$2500                  | 14 |  |
| \$3000                  | 18 |  |
| \$3500                  | 11 |  |
| ≥\$4000                 | 9  |  |

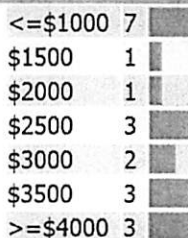
**Q5 . Please select geographical locations in which you would be interested in when applying a co-op job (multiple answers are allowed): ( Checkboxes )**



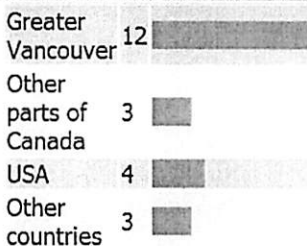
**Q6 . How many 4-month grad co-ops or interns have you already had at SFU (including MITACS interships and overseas interns)? ( Radio Buttons )**



**Q7 . If you worked as grad co-op at SFU before, what was your approximate minimal salary per month? ( Radio Buttons )**



**Q8 . If you worked as grad co-op before at SFU, where did you work (multiple answers are allowed)? ( Checkboxes )**



**Q9 . Additional comments: ( Single Line Text )**

It is very important for "international" students, for the reasons: 1) They get complementary experience which emphasizes on short-term productivity and commercial value. 2) They get supervision from a different boss. 3) money so they can have life.

I'm glad our school notices the group of people having hardtime finding a job. Especially for researchers, most openings are for computer engineers. So I hope this program can help researchers in other field toward industry.

Good idea

giving us an opportunity to gain some industrial experience and connections which will be beneficial for both Grad students and tha school. it helps students

to find a job after their graduation. It should be supported by supervisors and school strongly.

I think this will be a good program.

Based on Times magazine, surveys show that 60% of employers say applicants lack "communication and interpersonal" skills. Co-ops and internships are "unique" opportunities for students to enhance these skills along side valuable technical insights.

Grad Coop is an expected and welcome idea if it gives us an opportunity to gain valuable industrial experience and extra income during studies.

This is good to get some industry experience along with graduate work, so it applies some practical real world work with your education experience. This is especially good for foreign students who want work experience in Canada.

It is really helpful to keep SFU ENSC graduate student competitive if we have such grad co-op program. As far as I know, ECE at Uvic has grad co-op. So I think we should really have. I hope that grad co-op program will open shortly.

It is important that we introduce our graduate program to the industry by nominating our elite students for co-op positions. This is especially important when dealing with top 10 high tech companies. I am no longer a student, but have done graduate co-ops

I never worked grad co-op at SFU. I worked as TA at SFU.

Some of the full time MEngg students are from abroad with no relevant Canadian Work Experience. Therefore to have work experience according to Canadian requirements, Co-op for MEngg is a must. I would even suggest a compulsory project for MEngg student .

We really need this co-op program just like other department like computing science. We hope we can have this program as soon as possible.

It's great to have a co-op opportunity

My above salary figures are for a full-time co-op.

Co-op program is very important for M.Eng because without field experience there is no benefit of M.Eng program.

Have ability to allow credit for people already working while doing their thesis

Please make sure these coops include research areas such as MEMS in which finding a job is already really tough. CIrcuit designers or RF researches have a higher chance to find a coop/real job anyways. But it's a lot tougher for students in MEMS to do so.

An 8-month placement is probably more realistic than just 4-month

Valuable Learning Experience

Having grad co-op program would be very helpful for grad student. I wish we had this program sooner.

In Q4, could you consider the higher pays for students with higher dependent family members.

I highly support starting a graduate level co-op program at SFU

Much like the undergrad program, a graduate co-op program could be an invaluable resource for helping graduate students make industrial contacts and make the transition to industry (particularly in the local region, strengthening ties to industry).

If this program is designed to fund academic research with industry collaboration, then I support it. If this is a way for professor to absolve themselves of the responsibility of securing funding through indentured labour, then I don't support it.

As a MASc student with only a few (most likely very busy) terms left, grad co-op does not interest me. However, if I were to do a PhD, it may be a nice option especially during summer terms when work tends to slow down.





# New Graduate Course Proposal Form

## PROPOSED COURSE

|  |  |   |
|--|--|---|
| Subject (eg. MAPH) <b>MSE</b>  | Number (eg. 810) <b>793</b>                  | Units (eg. 4) <b>3</b>  |
| Course Title (max 80 characters)<br><b>Graduate Co-op Practicum</b>  |  |   |
| Short Title (appears on transcripts, max 25 characters)  |  |   |
| Course Description for SFU Calendar: <input type="checkbox"/> see attached document <input type="checkbox"/> Learning outcomes identified<br><b>This course is a four month internship in industry for graduate students. This course does not count towards the units required for a MSc or PhD degree.</b> |  |   |
| Available Course Components: <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Laboratory <input checked="" type="checkbox"/> Practicum <input type="checkbox"/> Online <input type="checkbox"/> _____  |  |   |
| Grading Basis <input type="checkbox"/> Letter grades <input checked="" type="checkbox"/> Satisfactory/Unsatisfactory <input checked="" type="checkbox"/> In Progress/Complete  |  | This is a capstone course <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Prerequisites (if any) <input type="checkbox"/> see attached document (if more space is required)<br><b>Approval of both senior supervisor and graduate program chair.</b>   |  |   |
| <input type="checkbox"/> This proposed course is combined with an undergrad course: Course number and units: _____   |  |   |
| Additional course requirements for graduate students <input type="checkbox"/> See attached document (if this space is insufficient)  |  |   |
| Campus at which course will be offered (check all that apply) <input type="checkbox"/> Burnaby <input type="checkbox"/> Vancouver <input type="checkbox"/> Surrey <input type="checkbox"/> GNW <input type="checkbox"/> _____  |  |   |
| Estimated enrolment<br><b>10 per term</b>  | Date of initial offering<br><b>Fall 2014</b> | Course delivery (eg. 3 hrs/week for 13 weeks)<br><b>Four months</b>                           |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Practicum work done in this class will involve children or vulnerable adults<br>(If the "Yes" box is checked, all students will require criminal record checks)  |  |   |
| Justification <input checked="" type="checkbox"/> See attached document (if more space is required)  |  |   |

## RESOURCES

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

|   |
|---|
| Faculty member(s) who will normally teach this course <input type="checkbox"/> information about their competency to teach the course is appended |
| Number of additional faculty members required in order to offer this course   |
| Additional space required in order to offer this course <input type="checkbox"/> see attached document  |
| Additional specialized equipment required in order to offer this course <input type="checkbox"/> see attached document                            |
| Additional Library resources required (append details) <input type="checkbox"/> Annually \$ _____ <input type="checkbox"/> One-time \$ _____      |

**PROPOSED COURSE** from first page

|  |                             |                        |
|--|-----------------------------|------------------------|
| Program (eg. MAPHI) <b>MSE</b>                                 | Number (eg. 810) <b>793</b> | Units (eg. 4) <b>3</b> |
| Course title (max 80 characters)<br><b>Graduate Internship</b> |                             |                        |

**APPROVAL SIGNATURES**

When a department proposes a new course it must first be sent to the chairs of each faculty graduate program committee where there might be an overlap in course content. The chairs will indicate that overlap concerns have been dealt with by signing the appropriate space or via a separate memo or e-mail (attached to this form).

The new course proposal must also be sent to the Library for a report on library resources.

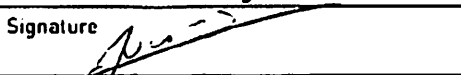

Once overlap concerns have been dealt with, signatures indicate approval by the department, home faculty and Senate Graduate Studies Committee.

**Other Faculties**

The signature(s) below indicate that the Dean(s) or designate of other Faculties affected by the proposed new course support(s) the approval of the new course.

| Name of Faculty | Signature of Dean or Designate | Date |
|-----------------|--------------------------------|------|
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |
|                 |                                |      |

**Departmental Approval (non-departmentalized faculties need not sign)**

|   |   |                              |
|---|---|------------------------------|
| Department Graduate Program Committee<br><b>Dr. Ed Park</b> | Signature<br> | Date<br><b>NOV. 27, 2013</b> |
| Department Chair<br><b>Dr. Farid Golnaraghi</b>             | Signature<br> | Date<br><b>11/29/13</b>      |

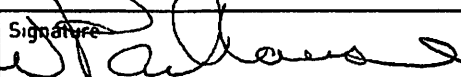
**Faculty Approval**

Faculty approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/Department commits to providing the required Library funds and any other necessary resources.

|  |   |                            |
|--|---|----------------------------|
| Faculty Graduate Program Committee<br><b>Dr. Rob Cameron</b> | Signature<br> | Date<br><b>FEB. 4/2014</b> |
|--|---|----------------------------|

**Senate Graduate Studies Committee Approval**

SGSC approval indicates that the Library report has been seen, and all resource issues dealt with. Once approved, new course proposals are sent to Senate for information.

|  |   |                             |
|--|---|-----------------------------|
| Senate Graduate Studies Committee<br><b>Wade Parkhouse</b> | Signature<br> | Date<br><b>MAR - 5 2014</b> |
|--|---|-----------------------------|

**CONTACT**

Upon approval of the course, the Office of the Dean of Graduate Studies will consult with the department or school regarding other course attributes that may be required to enable the proper entry of the new course in the student record system.

|                               |              |               |
|-------------------------------|--------------|---------------|
| Department / School / Program | Contact name | Contact email |
|-------------------------------|--------------|---------------|

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**Re: please use this. library report on co-op practicums**

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**From :** Nicole White <ngjertse@sfu.ca>

Mon, Feb 17, 2014 09:48 AM

**Subject :** Re: please use this. library report on co-op  
practicums**To :** Sheilagh MacDonald <sheilagh@sfu.ca>

Hi Sheilagh,

No, a report isn't needed. For these, it would be great to have the course numbers in advance so that we can add them to the list of courses which require no further action.

Thanks  
Nicole

Nicole White  
Head, Research Commons  
Simon Fraser University Library  
8888 University Drive, Burnaby BC V5A 1S6 Canada  
ngjertse@sfu.ca | ph: 778.782.3268  
<http://www.lib.sfu.ca/research-commons/>

----- Original Message -----

From: "Sheilagh MacDonald" &lt;sheilagh@sfu.ca&gt;

To: "Nicole White" &lt;nicole\_gjertsen@sfu.ca&gt;

Sent: Thursday, February 13, 2014 3:48:12 PM

Subject: please use this. library report on co-op practicums

Hi Nicole,  
do you need a report on new courses if they are co-op practicums?  
and interships?

--

Sheilagh MacDonald  
Secretary, Dean of Graduate Studies  
Office of Graduate Studies and Postdoctoral Fellows  
sheilagh@sfu.ca

**Calendar Changes Required by the Mechatronic Systems Engineering (MSE) Graduate Student Co-op Program**

**1. Mechatronic Systems Engineering Doctor of Philosophy Calendar Change**

| Current | Proposed   |
|---------|--|
| [None]  | <p>[The proposed changes below should be added between the "Thesis" and "Academic Requirements within Graduate General Regulations" categories in the Calendar]</p> <p><b><u>Graduate Co-operative Education</u></b></p> <p><u>Students in the PhD program may complete an optional one-term co-op practicum (MSE 793) of paid practical experience in an appropriate industrial setting, and complement their academic studies. The practicum will appear on the student's transcript, but does not count towards the student's CGPA and course requirements for the degree. Students require a pre-approval from both the senior supervisor and Graduate Program Chair in order to apply for the practicum. Arrangements for the practicum are made through the School's co-op coordinators and SFU Co-operative Education office.</u></p> |

**2. Mechatronic Systems Engineering Master of Applied Science Calendar Change**

| Current | Proposed  |
|---------|---|
| [None]  | <p>[The proposed changes below should be added between the "Thesis" and "Academic Requirements within Graduate General Regulations" categories in the Calendar]</p> <p><b><u>Graduate Co-operative Education</u></b></p> <p><u>Students in the MASc program may complete an optional one-term co-op practicum (MSE 793) of paid practical experience in an appropriate industrial setting, and complement their academic studies. The practicum will appear on the student's transcript, but does not count towards the student's</u></p> |

CGPA and course requirements for the degree. Students require a pre-approval from both the senior supervisor and Graduate Program Chair in order to apply for the practicum. Arrangements for the practicum are made through the School's co-op coordinators and SFU Co-operative Education office.