

**Vancouver Senate**

**THE SEVENTH REGULAR MEETING OF THE VANCOUVER  
SENATE FOR THE 2014/2015 ACADEMIC YEAR**

**WEDNESDAY, 18 MARCH 2015**

**6:00 P.M.**

**ROOM 182, IRVING K. BARBER LEARNING CENTRE, 1961 EAST MALL**

- 1. Minutes of the Meeting of 18 February 2015 – Mr. Christopher Roach**  
(approval) (docket pages 3-24)
- 2. Business Arising from the Minutes – Mr. Christopher Roach**
  - a. Admissions Committee - Correction to Enrolment Targets
  - b. Curriculum Committee – Changes to Minor in Science/ Minor in Honours Mathematics
  - c. Other Business – Request for Report from Vice-President, Development & Alumni Engagement on Centennial Activities
- 3. Presentation of Certificates of Appreciation for Student Representatives from 2014-2015 – Dr David H. Farrar** (information)
- 4. Report from the Provost – Dr David H. Farrar**
  - a. Establishment of the David R. Cheriton Chair in Computer Science (approval)  
(docket pages 25-28)
  - b. Introduction of new Associate Vice-President Equity (information)
- 5. Academic Policy Committee – Dr Paul Harrison**
  - a. Disestablishment of the College of Health Disciplines (approval) (docket pages 29-58)
  - b. Establishment of the Institute for the Oceans and Fisheries and Disestablishment of the Fisheries Centre (approval) (docket pages 59-65)
  - c. Establishment of the Institute for Critical Indigenous Studies (approval) (docket pages 66-76)

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**6. Admissions Committee – Dr Robert Sparks**

Suspension of Admission: Bachelor of Dental Science in Dental Hygiene, Degree Completion Option Category 2, (approval) (docket pages 77-85)

**7. Admissions & Curriculum Committees – Dr Robert Sparks/Dr Peter Marshall**

- a. New Degree Program: Master of Engineering Leadership in Dependable Software Systems (approval) (docket pages 86-127)
- b. New Degree Program: Master of Engineering Leadership in Green Bioproducts (approval) (docket pages 128-173)
- c. New Degree Program: Master of Engineering Leadership in Integrated Water Management (approval) (docket pages 174-218)
- d. New Degree Program: Master of Engineering Leadership in Urban Systems (approval) (docket pages 219-264)
- e. New Degree Program: Master of Health Leadership and Policy in Seniors Care (approval) (docket pages 265-312)

**8. Curriculum Committee – Dr Peter Marshall**

Curriculum proposals from the Faculties of Graduate and Postdoctoral Studies (Arts), Land and Food Systems, and Medicine (approval) (docket pages 313-332)

**9. Student Awards Committee – Mr Graham Beales**

- a. New and Revised Awards (approval) (docket pages 333-343)

**10. Other Business**

Section 16 (b) of the *Rules and Procedures of the Vancouver Senate* states that meetings will adjourn no later than 8:30 p.m. Regrets: Telephone 604.822.5239 or e-mail: [facsec@mail.ubc.ca](mailto:facsec@mail.ubc.ca)

*UBC Senates and Council of Senate website: <http://www.senate.ubc.ca>*



# VANCOUVER SENATE

## MINUTES OF 18 FEBRUARY 2015

**DRAFT**

### Attendance

**Present:** Prof. A. Gupta (Chair), Dr K. Ross (Secretary), Mr T. Ahmed, Dr R. Anstee, Dr S. Avramidis, Mr A. Bailey, Dr K. Baimbridge, Mr G. Beales Mr C. Chan, Ms C. Chan, Dr P. Choi, Dr A. Collier, Dean M. Coughtrie, Prof. B. Craig, Dr A. Dulay, Dr W. Dunford, Dr D. Farrar, Dr S. Forwell, Dean B. Frank, Dr J. Gilbert, Chancellor L. Gordon, Mr S. Haffey, Dr P. Harrison, Dr J. Innes, Mrs C. Jaeger, Ms J. Jagdeo, Ms N. Karimi, Dr P. Keown, Ms A. Kessler, Dr B. Lalli, Mr C. Leonoff, Dr P. Loewen, Mr K. Madill Ms M. Maleki, Dr C. Marshall, Mr B. McNulty, Dr P. Meehan, Mr D. Munro, Dr I. Parent, Dean M. Parlange, Dr N. Perry, Dr J. Plessis, Dean S. Porter, Dr A. Riseman, Dr L. Rucker, Dean C. Shuler, Dr R. Sparks, Dr R. Tees, Dr K. Theime, Dr S. Thorne, Ms S. Vorha, Dr L. Walker, Mr E. Zhao,

**Regrets:** Dr P. Adebar, Dean G. Averill, Ms E. Biddlecombe, Dean M. Bobinski, Dr L. Burr, Ms M. Chartrand, Ms A. Daulat, Ms B. Grshkovitch, Dr D. Gillen, Dr C. Godwin, Dr B. Goold, Dr F. Granot, Ms S. Gurm, Dean R. Helsley, Dr A. Ivanov, Dr S. Knight, Mr H. Leong, Dr P. Marshall, Dr L. Nasmith, Dr C. Naus, Dr C. Nislow, Dean S. Peacock, Dr G. Peterson, Mr C. Roach, Dr C. Ruitenber, Dr B. Sawatzky, Dr T. Schneider, Dr S. Singh, Ms S. Sterling, Dean G. Stuart, Dr R. Topping, Mr J. Wiebe, Dr R. Wilson, Dr D. Witt, Dean R. Yada

**Recording Secretary:** Mr C. Eaton.

### Call to Order

The Chair of Senate, Professor Arvind Gupta, called the sixth regular meeting of the Vancouver Senate for the 2014/2015 academic year to order at 6:05 pm.

### Senate Membership

The Registrar, Dr Kate Ross, declared the seat of Professor Isabel Grant, Faculty Representative for the Faculty of Law, vacant due to her resignation from Senate.

### Minutes of the Previous Meeting

Graham Beales  
Richard Tees

}

*That the Minutes of the Meeting of 21 January 2015 be adopted as corrected.*

Correction: Dr Tees' comments on the motion presented under Other Business are recorded as "Senator Tees reminded Senators that in November, the Nominating Committee recommended that a standing committee not be struck on athletics and recreation."

Approved as  
corrected

### Remarks from the Chair

The President advised that since the previous Senate, he had been to Ottawa twice to meet with federal officials in advance of the April budget and to discuss post-secondary education policies. He had also met with the Minister of Advanced Education, the Honourable Andrew Wilkinson, who toured the Okanagan campus. The President noted that the Minister continued to emphasize his desire to work closely on shared priorities between UBC and the Ministry.

Professor Gupta noted that he continued to work on budgetary matters, with specific reference to the importance of ensuring a balanced consolidated budget, while also keeping in mind our cash budget. He noted that UBC had been running a deficit in the consolidated budget earlier in the year and this has now been brought into line. We are in a consultation process on this year's budget, and have had a number of meetings with the executive, Board, Senate and various academic leaders around campus.

UBC is in the final stages of submitting our first Canada First Research Excellence Fund (CFREF) proposals for round one, where roughly \$300 million in federal funding is available; round two will be a further \$900 million.

With regards to teaching and learning, the President advised that the administration is interested in how we can help grow our activities outside of the classroom. He suggested that this was an area with broad support and agreement for UBC to bolster his activities, so he hoped we could quickly develop a plan to move forward.

The President noted that a consultation process was underway for revisions for Policy 81. The Faculty Association and the administration have reset their conversation and new language has come forward that the President described as resulting from a collegial and consultative process.

Professor Gupta noted UBC's recent successes for donor activities, including the \$30 million commitment from Peter Allard for UBC Law, which at its last meeting the Senate approved to be renamed as the Peter A. Allard School of Law in his honour.

The President noted that UBC was actively engaged in resolving the problems of changes to the Temporary Foreign Working program for the recruitment of faculty: while postdoctoral researchers were considered by that change, issues were created for filling faculty positions. He expressed hope that the federal government would promulgate adjusted rules to give UBC and other universities the flexibility needed to attract excellent researchers from around the world.

The University has been in many discussions regarding transit and the upcoming plebiscite. UBC will be reflecting the importance of transit in our position and why it is important to have better connections to the University from around the region. Although not ideal, the plan will improve transit to UBC and is much better than the alternative. It is important for us to encourage our stakeholders to learn about the issue and make up their mind on this matter.

Voting opens March 16<sup>th</sup> which will allow university and college students to participate as they will still be in classes.

Senator Bailey noted that the President said that he would be meeting with a variety of groups on budget matters and asked how the administration would engage with students on the budget.

With consent of Senate, Vice-President Students, Louise Cowin spoke, noting that similar matters were raised by the AMS with regards to tuition consultation, and there was a request made at the Board table to include students in conversations. Another aspect is the central budget, and historically the vice-presidents students and finance have met with AMS and GSS leaders to help them understand the budget, and we could extend that to student senators and governors as well.

Senator Tees noted that there were students on the Council Budget Committee who participated in advising and assisting the President in the preparation of the budget.

Senator Baimbridge asked how UBC was officially represented to Translink.

The President noted that we were in Electoral Area A, are represented at Translink by our Metro Vancouver (Greater Vancouver Regional District) Director, presently Ms Maria Harris.

### Candidates for Degrees

Aaron Bailey	}	<i>That the candidates for degrees, as recommended by the faculties, be granted the degrees for which they were recommended, effective February 2015, and that a committee comprised of the Registrar, the dean of the relevant faculty, and the Chair of Senate be empowered to make any necessary adjustments.</i>
Sally Thorne		

*NB: 2/3rds Required*

Approved

### Candidates for the Degree of Master of Digital Media

Richard Anstee	}	<i>That the candidates for the degree of Master of Digital Media, as recommended by the Faculty of Graduate and Postdoctoral Studies, be granted the degree effective upon the concurrence of Simon Fraser University, Emily Carr University of Art + Design, and the British Columbia Institute of Technology; and that a committee comprised of</i>
Paul Keown		

*the Registrar, the Dean of the Faculty, and the Chair of the Senate be empowered to make any necessary adjustments.*

*NB: 2/3rds Required*

Approved

## **Admissions Committee**

The Senate Admissions Committee Chair, Dr Robert Sparks, presented.

### **ENROLMENT TARGETS 2015-2016**

*See Appendix A: Enrolment Targets*

Robert Sparks	}	<i>That Senate approve the 2015/2016 enrolment targets, as per section 27(2)(r) of the University Act, as outlined in Tables 1 and 4 of the attached report.</i>
Susan Forwell		

With consent of Senate, Dr Redish spoke to the report.

Dr Redish noted that this report was the culmination of a process starting the previous October, where she and the Provost met with the deans to discuss goals and capacity in their programs. Following those meetings, the programs draft their enrolment plans which are then taken to a committee of associate deans to discuss equilibria between the faculties and then to the Senate Admissions Committee.

Senator Kessler asked why Science had such a low percentage of international students compared to other faculties.

Senator Harrison replied that it was partly due to demand being higher for Commerce and Applied Science programs internationally.

In response to a question from Senator Kessler, Dr Redish noted that the 80% retention rate was a conservative estimate.

Senator Bailey asked why the Bachelor of Science in Wood Products Processing program was proposing a growth in international students when in the past it has been comparable to other programs.

Dr Redish noted that Forestry had many small programs and under that context small changes in numbers can have large effects on percentages.

Dr Innes advised that Forestry still had excess capacity and that the proportion of international students proposed reflects the status and reputation of the Faculty globally as one we are the best forestry program in the world.

Senator Vohra asked if the growth rate for professors would grow proportionately with student growth.

Dr Redish replied that we are growing numbers as we can. We have moved to have more teaching faculty but this was an ongoing interest for UBC.

Senator Vohra asked if there was a hard cap on the number of international students.

Dr Redish replied that this would be program dependent.

Senator Maleki asked about our teaching capacity with student growth and our desire to increase student/faculty interactions.

Senator Sparks advised that this was a point of discussion with SAC and the associate deans. Different approaches have been taken in different faculties. It's not just the teaching capacity but our holistic capacity to accommodate students. There is not one ratio for UBC.

Senator Baimbridge asked how the Medicine undergraduate proposal was calculated on table 1, noting that this was roughly double present number of undergraduate students.

Dr Redish advised that she would review this discrepancy and report back to Senate.

Senator Anstee noted that two programs still in development were listed for Vantage.

Dr Redish agreed noting that they were before committees now and that they understood that those proposals would be subject to program approval.

Senator Bailey asked how UBC paid for unfunded domestic students.

Dr Redish advised that we covered the additional costs ourselves out of general revenues.

Approved

#### **BACHELOR OF EDUCATION, ELEMENTARY TEACHER EDUCATION – CHANGES IN ADMISSION REQUIREMENTS**

Robert Sparks  
Blye Frank

}

*That Senate approve changes to admission requirements for applicants to the Bachelor of*

*Education, Elementary Teacher Education  
program, effective for entry to the 2016 Winter  
Session and thereafter.*

Senator Sparks noted that experiments had been done looking at 30 credits, and this was found to yield insufficient data and so the faculty was moving back to 60 credits as this was a better measure.

Senator Beales noted that the rationale presented in the proposal was not compelling but that Senator Sparks had explained the rationale.

Approved

**Admission & Curriculum Committees**

The Vice-Chair of the Senate Curriculum Committee, Mrs Carol Jaeger, presented.

*See Appendix B: Masters of Engineering Leadership Programs and Courses*

**APPLIED PROFESSIONAL MASTER'S PROGRAMS – SUBJECT CODE AND PLATFORM COURSES**

Carol Jaeger	}	<i>That the new courses and associated APPP course</i>
Aaron Bailey		<i>code brought forward by the Faculty of Applied</i>
		<i>Science be approved.</i>

Mrs Jaeger explained that the Faculty of Applied Science had been working on these proposals for the past 14 months. The platform, delivered in collaboration with Commerce, would work with a variety of technical pillars developed for specific industries. She introduced Associate Dean Elizabeth Croft, who with consent of Senate spoke to the proposal.

Senator Kessler noted that the program was proposed as a cohort model and that the Applied Science Professional Planform (APPP) courses would not be available to other students.

Dr Croft confirmed that the APPP courses were restricted but that the pillar courses were open to other graduate students.

Senator Jaeger added that it would be difficult to integrate students into the cohort classes.

Approved



**MASTER OF ENGINEERING LEADERSHIP IN ADVANCED MATERIALS MANUFACTURING (M.E.L.A.A.M).**

Carol Jaeger	}	<i>That the Master of Engineering Leadership in Advanced Materials Manufacturing program and its associated new courses be approved.</i>
Christopher Marshall		

Senator Munro noted that space was being developed for the new programs but no details were given.

Dr Croft advised that APSC needed new space as they grew their programs but in the interim the Faculty was looking at renting existing space on campus.

Senator Roach asked what the structure was behind the scene to ensure success.

Dr Croft replied that each program would have a departmental home so that it would have appropriate support as well as faculty support.

Senator Loewen asked for details on the relationship between these programs and the existing MENG and MASC programs.

Dr Croft replied that the pillar courses would already be available to other graduate students, but the difference would be the platform courses where students would be in cohort programs

Senator Forwell noted that there was a capstone experience and some work experience, some with credit and some without.

Dr Croft replied that all of the programs and 30 credits it total, but on top of that they had an opportunity for non-additive credit co-op in the summer. She described this as a supportive opportunity for students.

Dr Jaeger said that each pillar decided which activity would be of the most use for their students. For people in industry already, a co-op may be a project within their own organization.

The Chancellor asked what mix there would be between domestic and international students.

Dr Croft replied that the Faculty's other graduate professional graduate programs were 50/50 and they expected this for these programs.

Approved

**MASTER OF ENGINEERING LEADERSHIP IN CLEAN ENERGY ENGINEERING (M.E.L.C.E.E.N.)**

Carol Jaeger	}	<i>That the new Master of Engineering Leadership in Clean Energy Engineering (M.E.L.C.E.E.N.)</i>
Christopher Marshall		

*program and its associated new and revised courses be approved.*

Approved

**MASTER OF ENGINEERING LEADERSHIP IN NAVAL ARCHITECTURE AND MARINE ENGINEERING (M.E.L.N.A.M.E.)**

Carol Jaeger	}	<i>That the new Master of Engineering Leadership in Naval Architecture and Marine Engineering (M.E.L.N.A.M.E.) program be approved.</i>
Christopher Marshall		

Approved

**Curriculum Committee**

The Vice-Chair of the Senate Curriculum Committee, Mrs Carol Jaeger, presented.

**FEBRUARY CURRICULUM REPORT**

*See Appendix C: Curriculum Report*

Carol Jaeger	}	<i>That the new courses, revised courses, new program option, revised programs, and revised parchments brought forward by the faculties of Applied Science, Arts, Dentistry, Education, Graduate and Postdoctoral Studies (Applied Science, Arts, Education, and Forestry), and Science be approved.</i>
Kenneth Baimbrige		

Senator Beales noticed that honours was misspelt.

*By general consent, “honors” was amended to read “honours” throughout.*

Senator Beales asked if the Minor in Honours Mathematics was being changed, as he noted that there was a credit exclusion being proposed that would potentially make it impossible for Mechanical or Engineering Physics students to complete.

Mrs Jaeger noted that the Minor in Science was under the auspices of the Faculty of Science and had to meet their requirements.

Senator Anstee suggested that some issues may exist for students who would be interested in the minor.

*By general consent, the issue of the credit exclusion list and its ramifications for the Minor in Honours Mathematics program was referred to the Senate Curriculum Committee for review.*

Approved as  
amended

## NEW CERTIFICATES

Senator Jaeger informed Senate that pursuant to the Policy on Certificate Programs, the following new certificates had been approved by the Senate Curriculum Committee:

Graduate Certificate in Global Surgical Care  
Graduate Certificate in High Performance Coaching and Technical Leadership

## Nominating Committee

The Committee Chair, Dr Richard Tees, presented.

## ADJUSTMENTS TO COMMITTEE AND COUNCIL OF SENATES APPOINTMENTS

Richard Tees	}	<i>That Ms Sonam Vohra be appointed to the Senate Admissions Committee until 31 March 2015 and thereafter until replaced, to replace Ms Collyn Chan;</i>
William Dunford		

*That Ms Anne Kessler be appointed to the Senate Teaching and Learning Committee until 31 March 2015 and thereafter until replaced, to replace Ms Nina Karimi;*

*That Dr Sally Thorne and Dr John Gilbert be elected to the Council of Senates; and*

*That Dr Lawrence Walker, Dr Susan Forwell, Dr Paul Keown, and Dean Ricky Yada be appointed to Vancouver Senate Committees One, Two, Three, and Five respectively for the purpose of their appointment to the Council of Senates.*

Senator Baimbridge asked for details for the appointments being made to the numbered committees.

Senator Tees replied, advising that this was a mechanism to increase representation on the Council of Senates from each Senate given the limitations presented by the *University Act*. Essentially, these committees exist to allow for their members to serve on the Council of Senates.

Approved

#### ADJUSTMENTS TO COMMITTEE COMPOSITION

Richard Tees	}	<i>That the composition of the Senate Ad Hoc Committee on Flexible learning Committee be amended to add:</i> <ul style="list-style-type: none"><li>• <i>Director, Flexible Learning Special Projects, Office of the Academic Vice-President (ex officio) (non-voting)</i></li></ul>
Carol Jaeger		

Approved

#### Student Awards Committee

The Committee Chair, Mr Graham Beales, presented.

#### FEBRUARY AWARDS REPORT

*See Appendix D: Awards Report*

Graham Beales	}	<i>That Senate accept the awards as listed and forward them to the Board of Governors for approval; and that letters of thanks be sent to the donors.</i>
Aaron Bailey		

Mr Beales noted that \$37 600 in new awards were being recommended this month

Approved

#### Reports from the Registrar

##### 2015/2016 ACADEMIC YEAR

Dr Ross presented the draft academic year to Senate, drawing their attention to the term dates for Winter and Summer Sessions.

Senator Kessler informed Senate that the student senators were discussing the idea of a fall reading week and would be bringing that forward.

Senator Dunford suggested that we eliminated the midterm break and extend the winter holiday break.

The Registrar advised that both suggestions would be taken under consideration.

## **Report from the University Librarian**

### **ANNUAL REPORT TO SENATE**

The Librarian presented. She thanked Dr Farrar, the Senate Library Committee, and the library staff.

Senator Dunfrod asked if there was one set of journal subscriptions for each campus.

The Librarian replied that we had separate budgets for each campus but the subscription budget was university-wide.

Senator Riseman asked if we could stream the video collections for revenue.

The Librarian replied that this was doubtful for copyright reasons.

Senator Munro noted that librarians had a lot of student contact and asked if librarians could be trained more on student mental health and support services.

Dr Parent replied that the librarians did see students often and had many interactions where students opened up more than they may with faculty; as a result the Library did plan to enhance its student support training in the future.

### **Other Business**

Senator Baimbridge asked if we could have a presentation at the next Senate on UBC centennial preparations.

The President replied that, her schedule permitting, he would ask Vice-President Miles to present at the next Senate.

### **IN CAMERA – Tributes Committee**

### **HONORARY DEGREES**

### **Adjournment**

There being no further business, the meeting was adjourned at 7:54 pm.

<b>Winter Session</b>							
<b>Faculty</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>	<b>2016/17</b>	<b>2017/18</b>
Applied Science	3,392	3,480	3,386	3,310	3,185	3,038	2,906
Arts	7,546	7,639	7,450	7,271	7,643	7,663	7,704
Commerce	2,312	2,376	2,348	2,346	2,216	2,174	2,152
Dentistry	348	340	338	318	316	313	317
Education	1,774	1,729	1,798	1,871	1,930	1,914	1,908
Forestry	454	434	468	519	532	554	575
Law	540	528	535	523	531	533	534
Land and Food Systems	916	953	922	926	959	958	959
Medicine	2,318	2,393	2,485	2,595	2,558	2,556	2,564
Pharmacy	704	773	847	923	938	939	942
Science	5,446	5,638	5,623	5,580	5,664	5,589	5,563
Non Degree & Residents	962	858	883	853	867	867	867
<b>Grand Total (Winter)</b>	<b>26,713</b>	<b>27,142</b>	<b>27,083</b>	<b>27,034</b>	<b>27,338</b>	<b>27,099</b>	<b>26,991</b>
Summer FTEs	3,326	3,311	3,274	3,288	3,288	3,288	3,288
<b>Grand Total (Winter + Su</b>	<b>30,039</b>	<b>30,453</b>	<b>30,357</b>	<b>30,322</b>	<b>30,626</b>	<b>30,387</b>	<b>30,279</b>
<b>Funded*</b>	<b>29,214</b>	<b>29,323</b>	<b>29,437</b>	<b>29,551</b>	<b>29,561</b>	<b>29,561</b>	<b>29,561</b>
<b>Unfunded</b>	<b>825</b>	<b>1,130</b>	<b>920</b>	<b>771</b>	<b>1,065</b>	<b>826</b>	<b>718</b>

\* Total Funded numbers for 15/16 and beyond could be impacted by the BC Jobs and Skills Plan

\*\* 2016/17 includes Vantage flow to Applied Science, Arts, and Science

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## **Appendix B: Masters of Engineering Leadership Programs and Courses**

### **FACULTY OF APPLIED SCIENCE**

*New programs, course code, and courses:*

Applied Professional Master's Program Platform;  
APPP (Applied Science Professional  
Program Platform) Course Code;  
APPP 501 (1.5) Project Management and Leadership;  
APPP 502 (1.5) Sustainability and Leadership;  
APPP 503 (1.5) Organizational Leadership;  
APPP 504 (3) Business Acumen for Technical Leaders;  
APPP 506 (3) Capstone Project  
Master of Engineering Leadership in Advanced Materials Manufacturing;  
MTRL 512 (3) Material Optimization for the Manufacture of Structural Metallic Components;  
MTRL 515 (3) Advanced Simulation and Modelling Tools for Materials Manufacturing;  
MTRL 517 (3) Case Studies in advanced Materials Manufacturing  
Master of Engineering Leadership in Clean Energy Engineering;  
CEEN 503 (2) Sustainable Energy Systems;  
CEEN 504 (2) Energy Storage and Transmission;  
CEEN 523 (3) Energy and the Environment;  
CEEN 525 (2) Energy Policy;  
CEEN 550 (3) Energy Efficiency and Conservation  
Master of Engineering Leadership in Naval Architecture and Marine Engineering



## **Appendix C: Curriculum Report**

### **FACULTY OF APPLIED SCIENCE**

*New courses; new program option; and revised parchment:*

APSC 377 (3) Nuclear Weapons and Arms Control;  
CHBE 201 (3) Integrated Technical Communication;  
ELEC 281 (3) Technical Communication;  
CPEN 281 (3) Technical Communication;  
MTRL 264 (3) Transport Phenomena II – Heat Transport;  
APSC>Bachelor of Applied Science>Minor in Science; Electrical and Computer Engineering  
Parchment (Master of Engineering)

### **FACULTY OF ARTS**

*New and revised courses; and new minor program option:*

HIST 408 (3) U.S. Foreign Relations from Independence to World War II;  
ANTH 210 (3) Eating Culture;  
ANTH 423 (3) Ethnography of East Africa and the Swahili Coast;  
Minor in Education (Arts>Bachelor of Arts>Program Requirements; Arts>Bachelor of Fine  
Arts>Introduction; Vancouver School of Economics>Bachelor of International  
Economics>Degree Requirements; Arts>Bachelor of Media Studies>Minor Programs; School of  
Music>Bachelor of Music>Degree Requirements);  
ENGL 140 (3) Challenging Language Myths;  
FNEL 180 (3) Introduction to Endangered Language Documentation and Revitalization;  
FNEL 282 (3) The Structures of Endangered Languages: Conservation and Revitalization;  
FNEL 380 (3) Technologies for Endangered Language Documentation and Revitalization;  
LING 140 (3) Challenging Language Myths;  
PSYC 335 (3) Gambling and Decision Making

### **FACULTY OF DENTISTRY**

*Revised program:*

Dentistry>Doctor of Dental Medicine>Academic Regulations>Attendance

### **FACULTY OF EDUCATION**

*New courses:*

ECED 400 (4) Introduction to Early Childhood Education and Care;  
ECED 401 (3) Supporting young Children's Health and Well-Being in Early Childhood Settings;  
ECED 442 (3) Supporting Indigenous Infants and Young Children within the Context of Their  
Communities

### **FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES**

*New and revised courses; revised programs; and revised parchments:*

## **Applied Science**

EECE 587 (3) Radio-Frequency Integrated Circuits;  
EECE 593 (3) Active Silicon Photonics Design; Electrical and Computer Engineering  
Parchments (Master of Applied Science; Doctor of Philosophy);  
LARC 553 (3) Green Network Planning;  
LARC 590 (3) Graduate Project Part I;  
SALA>Master of Landscape Architecture>Degree Requirements

## **Arts**

JRNL 527 (3) Internship

## **Education**

LLED 559 (3) Early Literacies with Digital Technologies and Media;  
G+PS>Degree Programs>Media and Technology Studies Education;  
KIN 515 (3) Gap Analysis

## **Forestry**

G+PS>Degree Programs>Forestry>Master of International Forestry>Program Requirements

## **FACULTY OF SCIENCE**

*New and revised courses:*

CHEM 208 (3) Coordination Chemistry;  
CHEM 211 (4) Introduction to Chemical Analysis;  
CHEM 218 (3) Fundamentals of Reactivity in Inorganic Chemistry;  
CHEM 245 (1) Intermediate Synthetic Chemistry Laboratory;  
CHEM 300 (3) Communicating Chemistry;  
CHEM 318 (3) Principles of Catalysis; CHEM 319 (1) Practical Skills for Chemical Research;  
CHEM 327 (3) Introduction to Materials Chemistry;  
CHEM 329 (1) Research Ethics and Data Analysis Skills;  
CHEM 419 (1) Establishing a Career in Chemical Research

## **Appendix D: Awards Report**

### *New Awards:*

**ABORIGINAL Student Award in Forestry** – Three awards of \$3,000 each are offered annually to Aboriginal undergraduate students in the Faculty of Forestry who are in good academic standing. Preference is given to students who have demonstrated a strong commitment to their studies and/or who have had to overcome significant adversity in the pursuit of their university education. These awards are made possible through the support of a private foundation with the intent of increasing the number of Aboriginal forestry professionals. The awards are made on the recommendation of the Faculty of Forestry, in consultation with the First Nations House of Learning. (First Award Available in the 2015/2016 Winter Session)

**Professor Bonnie J. CRAIG Award in Dentistry** – A \$1,000 award is offered annually by the Faculty of Dentistry in recognition of Professor Bonnie J. Craig and her extraordinary dedication and teaching within the Dental Hygiene Program. The award is offered to a second or third year student enrolled in the Dental Hygiene Degree Program who demonstrates leadership within their class. The award is made on the recommendation of the Faculty of Dentistry. (First Award Available in the 2015/2016 Winter Session)

**DEPARTMENT of Statistics Award in Data Science** – A \$1,000 award is offered annually to an undergraduate or graduate student who has demonstrated initiative, creativity and other outstanding contributions in the field of data science. The award is made on the recommendation of the Department of Statistics in the Faculty of Science and, in the case of a graduate student, in consultation with the Faculty of Graduate and Postdoctoral Studies. (First Award Available in the 2014/2015 Winter Session)

**Christina and Alan EASTWOOD Scholarship in Land and Food Systems** – A \$1,000 scholarship has been made available through an endowment established by Christina and Alan Eastwood for a student in the 3<sup>rd</sup> year of undergraduate studies in Land and Food Systems with an interest in sustainable food systems. Christina and Alan are now retired from careers as a medical technologist and an economist respectively, and have decades of experience in growing food organically for themselves and friends. They have long recognized the need for a more organic, less toxic, commercial food system. They hope this award will encourage young people to pursue sustainable alternatives to conventional agriculture. The award is made on the recommendation of the Faculty of Land and Food Systems. (First Award Available in the 2015/16 Winter Session)

**FOUR YEAR FELLOWSHIPS (4YF) Tuition Award** – Recipients of Four Year Fellowships (4YF) may, depending on other funding held by the student, receive a 4YF-funded tuition award. The awards are made on the recommendation of the recipient's graduate program in consultation with the Faculty of Graduate and Postdoctoral Studies. (First Award Available in the 2015 Summer Session)

**FUTURE ACHIEVERS International UBC Entrance Scholarship** – A scholarship of \$2,600 is made available through an endowment established by Professors Yves and Cynthia Bled to an international student entering UBC in their first year who demonstrates a combination of

exceptional academic achievement and extracurricular involvement. Preference is given to members of Future Achievers International, and recipients are encouraged to act as campus ambassadors for the program. Future Achievers International supports, stimulates, and reinforces young future leaders around the world by supporting scholarships and programming that encourage thinking that changes the world. The award is made on the recommendation of the International Student Initiative Office. (First Award Available in the 2015/16 Winter Session)

**GIRODAY Family Scholarship in Law** – A \$3,000 scholarship is offered annually by the Giroday family to a UBC Faculty of Law student in the JD program with high academic achievement in litigation or high achievement in one of the competitive moots. Shirley E. Giroday (JD, 1955), her late husband Michael R. Giroday (JD, 1957), and their sons Patrick J Giroday (LLB, 1987) and M. Ian Giroday (LLB, 1987) are all graduates of UBC's Faculty of Law with careers in litigation. The awards are made on the recommendation of the Faculty of Law. (First Award Available in the 2015/16 Winter Session)

**Dr. Pommy HALLEN Bursary in Dentistry** – A \$1,000 bursary is offered annually by Dr. Pommy S. Hallen to a student in the Faculty of Dentistry in the third or fourth year of the undergraduate program. Dr. Pommy Hallen is a local endodontist and an alumnus of UBC Dentistry, who wishes to support dental students in financial need. Adjudication is made by Enrolment Services. (First Award Available in the 2015/2016 Winter Session)

**INTERNATIONAL LEADER OF TOMORROW Bursary - living costs** – Bursaries ranging in value up to the full cost of the student's living costs are offered upon recommendation by the International Student Initiative to continuing international undergraduate students who were previously awarded the International Leader of Tomorrow Award and continue to demonstrate financial need but do not meet the Senate's academic criteria for a continuing award. The value of each bursary will depend on the applicant's financial circumstances. The bursary may be renewed for up to three additional years of undergraduate study or to degree completion, whichever is less, provided the recipient remains an international student on a valid Canadian study permit. Bursary recipients will have their situations reviewed annually by their Faculty as well as Enrolment Services regarding both academic progress and financial need.

**INTERNATIONAL LEADER OF TOMORROW Bursary - tuition** – Bursaries ranging in value up to the full annual cost of the student's academic program tuition and fees are offered upon recommendation by the International Student Initiative to continuing international undergraduate students who were previously awarded the International Leader of Tomorrow Award and continue to demonstrate financial need but do not meet the Senate's academic criteria for a continuing award. The value of each bursary will depend on the applicant's financial circumstances. The bursary may be renewed for up to three additional years of undergraduate study or to degree completion, whichever is less, provided the recipient remains an international student on a valid Canadian study permit. Bursary recipients will have their situations reviewed annually by their Faculty as well as Enrolment Services regarding both academic progress and financial need.

**Cody LLED Graduate Student Emergency Award** – An annual emergency award fund totalling \$5,000 is available, through an anonymous gift to graduate students of the Faculty of

Education's Language and Literacy Education Department (LLED). The fund was established to assist graduate students who are faced with an unexpected financial challenge of a serious nature which impacts their well-being and/or their ability to continue in the program. Candidates must demonstrate that all other possible sources of support have been explored before an application will be considered. All requests are determined on a case-by-case basis and require the recommendation by the Department Head of LLED in consultation with the Head's Advisory Committee, with input from other faculty as needed. Awards are made on the recommendation of the Department of Language and Literacy Education. (First Award Available in the 2014/2015 Winter Session)

**Dr. Michael MACENTEE Bursary in Dentistry** – A \$1,000 bursary is offered annually by UBC Dentistry in honour of Professor Dr. Michael I. MacEntee, who chaired the Division of Prosthodontics at UBC and established the ELDERS (Elders' Link with Dental Education, Research and Service) Group, thereby advancing the teaching and research mission of UBC with a focus on the oral health needs of elders. The bursary is offered to a student in the Faculty of Dentistry in the first, second or third year of the undergraduate program. Adjudication is made by Enrolment Services. (First Award Available in the 2015/2016 Winter Session)

**Mary OH Memorial Entrance Bursary in Law** – A \$1,000 bursary is offered annually to a UBC Faculty of Law student entering their first year of the JD program. The bursary is in memory of Mary Oh, a former UBC student. Adjudication is made by Enrolment Services. (First Award Available in the 2015/2016 Winter Session)

**Raja ROSENBLUTH Award for Women in Biological Sciences** – A \$5,000 award is offered annually by Raja Rosenbluth for a female graduate student studying in the field of Biological Sciences. This award is in honour of Raja Rosenbluth's long career in the area of Biological Sciences, and recognizes her research, mentorship and guidance of many graduate students with whom she worked. For many years, Raja was one of the very few women in the field of genetics, and it is to be hoped that the recipient of this award will blaze new trails in the area of Biological Sciences. The term "Biological Sciences" is intentionally broad to include diverse areas within the Faculty of Science comprising but not limited to: Biology, Biochemistry Genetics, Genomics, Molecular Biology, Bioinformation, Ecology and Zoology. This award is for a female graduate student who has shown success in her previous studies and where such an award will significantly help her to pursue her career in the Biological Sciences. The awards are made on the recommendation of the Faculty of Science, in consultation with the Faculty of Graduate and Postdoctoral Studies. (First Award Available in the 2015/2016 Winter Session)

**UBC LAW RUGBY Award** – Two \$1,000 awards are offered annually by alumni and supporters of the UBC Faculty of Law's rugby club. These awards are offered to students entering their second or third year of the JD program who have shown significant leadership as members of the club. Preference will be given to students who have demonstrated outstanding academic achievement. The awards are made on the recommendation of the Faculty of Law. Students must apply for this award. (First Award Available in the 2015/2016 Winter Session)

**G. Gary RUNKA Award in Agricultural Soil Science** – A \$1,000 award has been made available through an endowment established by family, professional colleagues and friends of Gary Runka for an undergraduate or graduate student in the Faculty of Land and Food Systems.

The recipient must be in good academic standing and engaged in field studies of soils or land use and their interpretation for the wide range of land and water uses that impact agriculture. Preference will be given to a candidate whose field project focuses on biophysical information and land capability/suitability interpretation, mentoring and field knowledge transfer amongst professionals in the soil sciences and/or enhances the contribution of agriculture to building sustainable rural communities. This award is intended to honour G. Gary Runka [BSc. Ag (Soils), 1961] whose contribution to land inventory, agriculture, natural resource management and land use planning helped shape BC land use policy over five decades. Gary was dedicated to the use of field knowledge as the basis for understanding and resolving land and water use issues. The award is made on the recommendation of the Faculty of Land and Food Systems and, in the case of a graduate student, in consultation with the Faculty of Graduate and Postdoctoral Studies. (First Award Available in the 2015/16 Winter Session)

**STEVENS Bursary** – A \$1,000 bursary is offered annually by Patricia Stevens to an undergraduate student who has completed their first year of studies, with preference given to students in the Sciences. Patricia Stevens established this bursary to honor the Stevens family, particularly Joan and Lloyd Stevens who strongly encouraged and supported their two children – Gary and Patricia – to attend university, understanding the importance and value of an education throughout one's life. Without their assistance, both financial and emotional, their children would not have been able to attend post-secondary education. Joan and Lloyd met in Prince Rupert, where they lived and raised their children. Lloyd had a commercial refrigeration business and Joan ran its business office. On retirement, they moved to Oliver in the sunny Okanagan. Although neither had attended university, both felt strongly that their children should. Always supportive of community, Joan and Lloyd gave back in many ways. In keeping with family tradition, this bursary is offered to assist an undergraduate student in need of financial assistance. Adjudication is made by Enrolment Services. (First Award Available in the 2015/2016 Winter Session)

**David TARRANT Academic Achievement Award** – An award up to \$1,250 has been made available through an endowment established by the University's Friends of the UBC Botanical Garden, friends and colleagues in honour of David Tarrant and his many contributions to the University's Botanical Garden. The award will be provided to the student in the highest academic standing in the Horticultural Training Program. Awards are made on the recommendation of the Program Director and Director of the UBC Botanical Garden and Centre for Plant Research. (First Award Available in the 2015/16 Winter Session)

**David TARRANT Most Improved Award** – An award up to \$750 has been made available through an endowment established by the University's Friends of the UBC Botanical Garden, friends and colleagues in honour of David Tarrant and his many contributions to the University's Botanical Garden. The award will be provided to the student demonstrating the most improvement throughout the duration of the Horticultural Training Program. Awards are made on the recommendation of the Program Director and Director of the UBC Botanical Garden and Centre for Plant Research. (First Award Available in the 2015/16 Winter Session)

**Dr. Joanne WALTON Award in Dentistry** – A \$1,000 award is offered annually by the Faculty of Dentistry in honor of Dr. Joanne Walton, whose extraordinary dedication to teaching and research has been instrumental in the continued success and mission of UBC Dentistry. The

award is offered to a third or fourth year DMD student who shows academic excellence and a proficiency in the area of prosthodontics. The award is made on the recommendation of the Faculty of Dentistry. (First Award Available in the 2015/2016 Winter Session)

**Donald WEHRUNG International Student Bursary - living costs** – Bursaries ranging in value up to the full annual cost of the student's living costs are offered upon recommendation by the International Student Initiative to continuing international undergraduate students who were previously awarded the Donald Wehrung International Student Award and continue to demonstrate financial need but do not meet the Senate's academic criteria for a continuing award. The value of each bursary will depend on the applicant's financial circumstances. The bursary may be renewed for up to three additional years of undergraduate study or to degree completion, whichever is less, provided the recipient remains an international student on a valid Canadian study permit. Bursary recipients will have their situations reviewed annually by their Faculty as well as Enrolment Services regarding both academic progress and financial need.

**Donald WEHRUNG International Student Bursary - tuition** – Bursaries ranging in value up to the full annual cost of the student's academic program tuition and fees are offered upon recommendation by the International Student Initiative to continuing international undergraduate students who were previously awarded the Donald Wehrung International Student Award and continue to demonstrate financial need but do not meet the Senate's academic criteria for a continuing award. The value of each bursary will depend on the applicant's financial circumstances. The bursary may be renewed for up to three additional years of undergraduate study or to degree completion, whichever is less, provided the recipient remains an international student on a valid Canadian study permit. Bursary recipients will have their situations reviewed annually by their Faculty as well as Enrolment Services regarding both academic progress and financial need.

*Previously-Approved Awards with Changes in Terms or Funding Source:*

**#7964 Old Boy/Girl Network Bursary** – Bursaries totaling \$2,950 have been made available through an endowment established by a number of MBA alumni to support students in the MBA or MScB Business Administration programs who are single parents, recognizing the difficulties of being single parents and students. If no suitable candidates are found, the award will be held over and utilized in a subsequent year.

*Why and how amended: Change recommended by Enrolment Services to ensure an eligible candidate for this award. The award hasn't been awarded since 2007 due to specific year of study being part of the criteria for the award. The recommended change is to open the award up to single parents in any year of their MBA or MSC studies, thus making the award awardable.*

**#6456 Four Year Fellowships (4YF) For Doctoral Students** – Fellowships, whose value may be up to \$18,000 (adjusted for inflation) plus tuition per year, are offered by UBC to full-time doctoral students for up to four years of their doctoral program. Continued Fellowship support is subject to satisfactory academic progress. Students who receive Tri-Agency or other prestigious external awards must accept those awards. The awards are made on the recommendation of the

recipient's graduate program in consultation with the Faculty of Graduate and Postdoctoral Studies.

*Why and how amended: The revised wording reflects changes in the 4YF program since it was first established in 2009 Summer Session. Graduate and Postdoctoral studies currently assign both stipend and tuition funding under a single award number (#6456) for the 4YF program. To provide students with a clearer understanding of their funding and to separate the two funding streams administratively, the Faculty would like to use the existing 4YF award (#6456) for the stipend funding only, and use the new award for the tuition portion of the fellowship.*





## Memorandum

Date	27 February 2015
To	Vancouver Senate
From	David H. Farrar, Provost & Vice President Academic
Subject	Establishment of the David R. Cheriton Chair in Computer Science

With the support of the Faculty of Science and Department of Computer Science, I recommend the following:

***Motion:***

*That Senate approve the establishment of a new Chair within the Department of Computer Science within the Faculty of Science, under the name "David R. Cheriton Chair in Computer Science".*

Details regarding this proposal can be found in the attached memorandum.

Respectfully submitted,

Dr. David H. Farrar  
Provost & Vice President Academic



**a place of mind**  
THE UNIVERSITY OF BRITISH COLUMBIA

Provost and Vice President Academic  
Walter C. Koerner Library  
1958 Main Mall  
Vancouver, BC Canada V6T 1Z2

Phone 604 822 4948  
Fax 604 822 3134

## MEMORANDUM

February 20, 2015

To: Deans, Principal College of Health Disciplines, Executive Director  
Continuing Studies, University Librarian, Vice-Presidents, AVP's and  
Directors (in Provost's Portfolio)

Copy: Assistants of above

To whom it may concern

I will be away from campus from February 23 to March 1, 2015.

From February 23 to 26, 2015 I have designated Dr. Angela Redish, Vice-Provost and AVP Enrolment and Academic Facilities and from February 27 to March 1, 2015 I have designated Dr. Hugh Brock, Interim Vice-Provost Academic Affairs and Associate-Provost Academic Innovation to act and sign on my behalf.

A handwritten signature in black ink, appearing to read 'D. Farrar', followed by a long horizontal line.

David H. Farrar  
Provost and Vice-President Academic



## Memorandum

Date	25 February 2015
To	David Farrar, Provost & Vice President Academic
cc	Anne Condon, Head, Computer Science Liz Moxham, University Counsel Allan Berezny, Assistant Dean Development, Faculty of Science Tara MacKenzie, Executive Director, Development Terry Kellam, Director, Development
From	Simon Peacock, Dean, Faculty of Science Barbara Miles, Vice President Development & Alumni Engagement
Subject	Proposed Cheriton Chair in Computer Science

Dear David,

Please find attached a draft submission to the Vancouver Senate for your consideration, requesting approval of the establishment of the **David R. Cheriton Chair in Computer Science**. The Endowment Trust Agreement terms have been reviewed and approved by the Office of University Counsel, and this proposed Chair has the full support of the Faculty of Science and the Department of Computer Science.

**Background and Rationale:**

In June 2014 Dr. Cheriton committed \$7 million to fund a new endowed chair in computer science, and to facilitate the recruitment and hiring of a senior academic by the Department of Computer Science.

The recruitment for this Chair will be broadly in the field of computer systems, encompassing a variety of fields within the computer science domain. The successful candidate will ideally transform computer science research, providing a substantial boost to the department at a time of rapidly growing enrollment and disciplinary change. It is expected that he or she will significantly enhance the department's ability to train the best students and foster a thriving ecosystem for computing research and innovation in British Columbia, and build strong national and international collaborative networks. He or she will also enhance the vital research of current department members, already leaders in their field.

This chair represents the Department of Computer Science's strongly held belief that computer systems is a field which requires greater research, and is consistent with departmental goals and well-suited to its current needs.

**Background on Dr. David R. Cheriton:**

Dr. Cheriton is an alumnus of UBC, having attained his BSc at UBC in 1973 (later receiving a MSc and PhD from University of Waterloo). A member of the *start an evolution* Campaign Cabinet, he has previously supported UBC with a donation of CAD \$2 million to support the Carl Wieman Science Education Initiative (2010). In addition to this support for an endowed chair, Dr. Cheriton has contributed an additional CAD \$535,000 to establish a first-year course in computational thinking.

He has been a professor of computer science at Stanford University since 1983, and has been involved in several startup companies, most notably being one of the first investors to support Larry Page and Sergey Brin with an investment of \$100,000 to fund the startup of Google.

Prior to his appointment at Stanford, Dr. Cheriton was an assistant professor at UBC, from 1979 to 1982.

Other philanthropic commitments include providing \$25 million in funding to University of Waterloo to create the David R. Cheriton School of Computer science (2005).

**Attachments:****Attachment 1 – Endowment Trust Agreement**

Respectfully,



Simon Peacock



Barbara Miles



18 March 2015

To: Vancouver Senate

From: Senate Academic Policy Committee

Re: Disestablishment of the College of Health Disciplines

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The College of Health Disciplines was reviewed internally in January 2014, to determine its most effective positioning within the University and its alignment with UBC Health. Although the achievements of the College have been recognized, there continues to be confusion about its place within the university, in particular whether it acts as a separate academic unit that “owns” interprofessional education and thus competes with the health programs or acts as a facilitator and enabler for the other units. The report was very positive about the work of the College in providing a voice to all health programs and reinforced the need for a UBC focus on interprofessional health education. It also underscored the need for the College to have greater influence through closer alignment with the Provost’s office in order to build on its achievements and provide support to UBC Health in its integration goals.

As a result, a recommendation is being made to close the College and relocate a core of its function and personnel into the Office of the Provost.

The Academic Policy Committee has reviewed the proposal and recommends the following:

**Motion:** *“That Senate approve the disestablishment of the College of Health Disciplines and the transfer of its current responsibilities to the Office of the Provost effective July 1, 2015.”*

Respectfully submitted,

Dr. Paul Harrison, Chair

Senate Academic Policy Committee



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THE UNIVERSITY OF BRITISH COLUMBIA

Provost and Vice President Academic  
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Fax 604 822 3134

## MEMO

To: Senate

From: David Farrar, Provost and Vice-President Academic

A handwritten signature in dark ink, appearing to read 'DAF', followed by a horizontal line.

Date: March 4, 2015

Re: **Disestablishment of the College of Health Disciplines**

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With the approval of Senate, as detailed in the proposal, the CHD will be disestablished. Concurrently, the position of Associate-Provost Health will be created to support and advance integrated education across the health disciplines. The position of Associate-Provost Health will be resourced in the office of the Vice-President Academic and Provost.

The rationale and benefits as well as the results of the consultations are compelling and, thus, this proposal has my full support.



## **Background, Rationale, and Highlights**

The College of Health Disciplines (CHD) was established in 2001 as an academic unit mandated to (a) bring together all of the health and human service programs to discuss and share issues of common interest and (b) promote and facilitate interprofessional education (IPE).

Currently the CHD supports two units: The Division of Interprofessional Education (IPE) and the Division of Health Care Communications (DHCC). In addition, the College has, until recently, housed a number of related centres or institutes whose function has been transferred to more appropriately situated units in other faculties or as part of new initiatives.

In fulfilling the first part of its mandate, it has successfully provided a voice for smaller programs that often feel hidden within the larger faculties. In addition, best practices have been shared between programs in areas such as assessment of students in the practice setting, dealing with difficult student situations such as appeals, and communicating effectively with health authority partners. The CHD Council has provided an opportunity to hear opinions on issues of importance across programs and to provide guidance on policy direction within the CHD.

The second part of the CHD mandate has been fulfilled primarily through the Division of Interprofessional Education (IPE) which has created a rich foundation for IPE that brings students from a variety of programs together for complex clinical reasoning in both the academic and practice settings. Examples of the resources and activities developed over time are the IP Passport, the “IPC–on–the Run” modules, Interprofessional Learning videos, two pain management modules and the “IP-PBL” module. Key partnerships with the health authorities have created strong links between theory and practice and have created opportunities for continuing professional development innovation through programs such as the IP-CLS sessions. Both student and patient advisory groups have helped to ensure that all aspects of IP developments are considered. Support for student involvement in interprofessional activities (HSSA) and community engagement (CHIUS) has also been a focus of the Division. Research and educational development grants have helped the CHD to contribute to scholarly work in, and evaluation of IPE and interprofessional practice.

The Division of Health Care Communications has developed a partnership model of communication between patients and health professionals to increase patient involvement in decision-making through collaborative research, development of community-driven programs and patient participation in health professional education.



Over the last three years, discussions and consultations have taken place across the University related to improved integration in the health sector in order to (a) increase UBC's health-related capacity in education and research and (b) meet the changing needs of health care in BC and Canada. The concept of "UBC Health" has emerged as an identifiable interface with a developing, province-wide Academic Health Sciences Network. (see Appendix 1 "UBC Health Blueprint Executive Summary"). The role of the CHD has been part of these discussions. Although the achievements of the College have been recognized, there continues to be confusion about its place within the university, in particular whether it acts as a separate academic unit that "owns" interprofessional education and thus competes with the health programs or acts as a facilitator and enabler for the other units.

The CHD was reviewed internally in January, 2014, to determine its most effective positioning within the University and its alignment with UBC Health. The report was very positive about the work of the College in providing a voice to all health programs and reinforced the need for a UBC focus on interprofessional health education. It also underscored the need for the College to have greater influence through closer alignment with the Provost's office in order to build on its achievements and provide support to UBC Health in its integration goals.

As a result of the development of UBC Health and the recommendations of the internal review of the CHD, a recommendation is being made to close the College and relocate a core of its function and personnel into the Office of the Provost under the direction of the Associate-Provost Health (APH), effective July 1<sup>st</sup>, 2015.

Currently the CHD administers 15 IHHS courses. Negotiations have taken place with other academic units to transfer all of the courses. Details are found in Appendix 2. The intent is to have the courses housed in academic units, maintaining accessibility by undergraduate and graduate students from across campus. The "Interprofessional" nature of the courses would be monitored by the Health Education Curriculum Committee (HECC) within the office of the APH thus ensuring that they meet the requirements for credit within the IP Passport.

The Endowments and Awards (see Appendix 5) currently managed by the CHD will be managed centrally with the Awards being made on the recommendation of an inter-professional committee.

Appendix 3 describes the role of the office of the APH to support the integration of education activities.





Its main focus will include: the development and implementation of new integrated curricula in partnership with the health programs; support for practice education; support and facilitation for applied program development and other CPD activities; and support for specific student groups.

### **Consultation Process**

A number of consultations were held with student groups. Three main issues emerged:

1. Maintaining access to and the nature of the IHHS courses, including finding them in the course calendar, being assured of enrolment and ensuring that they remain interprofessional.
2. The continuation of IPE activities linked to the IP Passport.
3. A suggestion that the APH establish and support a health student caucus that would provide input on issues related to integration activities.

As a result of this feedback, the CHD has received assurance from the new academic homes that the courses will remain accessible to undergraduate and graduate students from across campus and agreement to the proposed oversight by the HECC of the IP nature of the courses.

Secondly, the office will continue to facilitate IPE activities linked to the IP Passport which will remain the responsibility of the office of the APH to maintain.

Thirdly, once the proposal has been endorsed by Senate, the senior student leaders in the health programs will be convened to discuss the establishment of a caucus that would come into effect in the fall of 2015.

Faculty members have been involved in consultations around UBC Health for the past three years with an understanding that part of this process would include the closing of the CHD and relocation of personnel into the Office of the Provost. Overall, this proposal has been viewed positively once assurances have been given that the current Council of the CHD would transition to a Strategic Academic Health Council through which all programs would have input and influence on decisions affecting education and research. A number of opportunities that would result from improved collaboration and integration were identified leading to a sense of optimism and enthusiasm.

The Town Hall that was held on February 2<sup>nd</sup> was attended by faculty members and a few staff from across the health programs with strong representation from the School of Nursing. The discussion focused more on UBC Health and less on the closure of the CHD. The main concerns that were raised referred to the need for all programs to have a “voice” within the new structure while preserving discipline-specific autonomy where important and dictated to by accreditation requirements.



Please refer to Appendix 4 for a detailed description of the process used to consult with students and faculty members.

### **Benefits to Students**

The core activities related to IPE will continue to be administered by the office of the APH as per Appendix 3. These include the IP Passport, facilitation of new integrated curriculum in specific areas, improved coordination and interface with health authorities for practice education placements, and support to IP groups of students such as HSSA and CHIUS. The new structure will allow decisions to be made by the collective programs about such issues as timetabling, policies on placements, and new educational activities. Students will retain a strong presence on both the new Strategic Academic Health Council and the Health Education Committees (HECs) as well as on specific working groups as appropriate. Although the IHHS courses will be transferred to other academic units, the “Interprofessional” label for the courses that qualifies them for credit in the IP Passport will be overseen by the HECC. Students from across campus will continue to have access to these courses.

In addition the creation of a health student caucus as identified through the consultation process will provide a mechanism for sharing across programs and organized input from the student groups.

### **Benefits to Faculty**

The new office of the APH will provide support for faculty members for both education and research activities. A small but expert group of staff will facilitate the development of new curriculum in specific areas but these will be led by faculty members. A Practice Education Committee will be supported by staff who will be able to coordinate centrally the numerous issues that individual placement coordinators deal with on a regular basis, including creating a common interface with the health authorities. A similar approach will be used to support the development of applied programs and CPD initiatives. The office also will serve as a hub for the coordination of discussions on research across the health sector.

In addition, the office may assist faculty members through the development of common policies and procedures in areas such as promotion and tenure, accreditation, and other topics identified by the programs.

### **Benefits to the University**



The benefits identified for students and faculty apply equally to the university. Having a common voice and interface between UBC and government and the health authorities will streamline cumbersome processes. The Health Research Committee will create a more nimble approach to respond to call for proposals for large scale grants. The SAHC will identify new trends in health and health care that can be addressed collectively rather than program by program. In addition, it is anticipated that operational efficiencies will be gained over time.

### **Benefits to the Community**

As stated above, UBC will have a common voice and interface with government and health authorities. The presence of patients/clients and community groups will be strengthened and channeled through key committees. The development of joint applied programs and CPD activities will enrich the educational offerings for practitioners.



The following supporting documents are attached:

Appendix 1	Blueprint for UBC Health: Executive Summary
Appendix 2	Proposals for course transfers
Appendix 3	UBC Health Education
Appendix 4	Consultation Process
Appendix 5	Current Endowments and Awards



## **APPENDIX 1**

### **BLUEPRINT FOR UBC HEALTH: EXECUTIVE SUMMARY**

#### **Background**

Over the last two years, discussions and consultations have taken place across the University related to improved integration in the health sector in order to (a) increase UBC's health-related capacity in education and research, and (b) meet the changing needs of health and health care systems in BC and Canada. The original consultation was led by Drs. Gavin Stuart and Louise Nasmith, who explored options for a Faculty of Health. This was followed by a more in-depth discussion led by Drs. Hugh Brock and Nasmith of the merits of improved integration in education and research. While the option of a single Faculty was not endorsed, the concept of "UBC Health" emerged as an identifiable institutional entity that would enable more systematic collaboration across health programs and provide critical interface with the province-wide Academic Health Sciences Network (AHSN) that is now developing. In parallel, UBC health units have pursued targeted operational integration in order to strengthen capabilities and achieve efficiencies, notably in Finance and IT, and this provides a foundation for further collaboration.

#### **Rationale**

UBC is uniquely placed to play a leading role in the evolution of the health sector towards an integrated system focused on the wellbeing of the BC population (patient-centered, team-oriented, and community-based). It is the sole education provider in the province for Medicine, Pharmacy, Dentistry, the Rehabilitation Sciences, Speech-Language Pathology, Audiology and Dietetics, and has significant experience in distributed health education in BC through the 4-campus Faculty of Medicine. The School of Nursing is the lead research program in the province and many units have developed strong research programs in health promotion and population well-being. UBC as a whole accounts for 85% of health research in BC and has worked closely with the other universities to grow their research funding. Over the last decade, UBC's health sector has demonstrated leadership in the development of integrated education of health practitioners and health care professionals, and has the scope to take excellence in research to the next level through strengthened collaboration and dissemination. Government and Health Authorities are asking UBC to speak with a common voice, and improved internal collaboration provides the University with both the credibility and capability to effect this coordinated system interface. Stronger linkages between education, research and the health system create the opportunity for improved population



health outcomes in a rapidly changing global environment. UBC has an obligation to society to facilitate and reinforce these connections through closer alignment of academic processes with those in the health system, which are themselves structured around the cross-disciplinary health needs of the population. The Academic Health Sciences Network provides the required infrastructure through which UBC can help mobilize these interactions, and its formation acts as a catalyst for change and action.

### **Goals**

UBC Health formalizes an integrated and streamlined governance mechanism for University health programs to agree and be accountable for the achievement of common goals while respecting the distinct disciplines and preserving unit autonomy. UBC Health combines accountability, facilitation, cross-cutting challenge and resource mobilization into a structure to drive internal collaboration and to act as a focal point for external collaboration. The two primary outcomes of the integration are:

1. Strengthened **UBC impact and capacity for excellence in health education and research** advancing the national and international reputation of the University in health sciences;
2. Improved capability and positioning of UBC to play a leadership role in the **creation of an Academic Health Sciences Network (AHSN)** linking UBC's health programs and research institutes, other universities / colleges, the Health Authorities and other stakeholders to improve research and training effectiveness, accelerate the translation of innovation into practice and foster private sector participation.

### **Governance model**

The **Provost** provides the highest level of oversight and support for UBC Health as with all academic programs at the University. Deans and Directors of the Health Faculties and Schools will continue to ultimately report to the Provost. As an extension of the Provost's Office, UBC Health will facilitate cross-discipline connection with other University governance groups (Senate, Committee of Deans, UBC Executive).



*The **UBC Health Executive (UBCHE)*** which includes the Vice-Provost Health, the Deans of Dentistry, Medicine and Pharmaceutical Sciences and the Director of the School of Nursing at UBC-V, and the Associate-Provost Health, will ensure that there is shared accountability in matters such as inter-professional and practice education, integration opportunities aligned with major curriculum changes, growth in applied (post-entry-level) programs, identification of UBC Health research priorities and coordination of major UBC grant applications. It also will drive and facilitate the evolution of the UBC Health organization and the identification of opportunities for greater effectiveness and efficiency across UBC Health – both academic and operational (e.g. faculty relations, development, communications and the creation of shared working space).

*The **Vice-Provost Health (VPH)*** reports to the Provost and has overall responsibility to ensure that the goals set by UBC Health to achieve excellence and sector impact through health education and research are achieved. The VPH will facilitate and oversee internal collaboration and will be the principal external liaison on behalf of UBC, ensuring effective interface with UBC's partners in the Academic Health Sciences Network (AHSN) (health authorities, government, other health and education institutions, and the private sector).

*The **Associate-Provost Health (APH)*** is responsible for integrated health education (both academic and applied) and, in partnership with the Associate Vice-President Research (AVPR), research, as well as projects or initiatives that support issues of common concern across the academic health programs. The APH will work through the ***Strategic Academic Health Council (SAHC)***, with lead representation from all UBC Health units, to solicit pan-University input and shape recommendations to the UBCHE around strategic academic issues. The disciplines represented to date include: Counseling Psychology, Dentistry, Dietetics, Genetic Counseling, Kinesiology, Medicine, Midwifery, Nursing, Occupational Science and Occupational Therapy, Pharmaceutical Sciences, Physical Therapy, Psychology, Social Work, and Speech Sciences and Audiology.

The APH and SAHC will in turn be enabled through the operation of cross-cutting committees in education and research with UBC and Health Authority representation. Acting at the interface between the University and the health sector, these groups are a pragmatic step (working model) towards the creation of the AHSN.

### **Support for UBC Health**

Three core components of collaboration are supported under UBC Health: (1) classroom-based and practice education, (2) research and (3) the health system. These are in part



overlapping, but dedicated focus and resources are critical against each in order to maximize impact.

**1. *Education collaboration*** will be led by the Associate-Provost Health (APH), working closely with a team in the Provost's Office. A proposal will be going to Senate for the closure of the College of Health Disciplines (CHD). The APH will support UBC Health education initiatives with a particular focus on the growth of new integrated curricula and applied health programs at UBC. The APH will collect input, build alignment and galvanize activity through the UBC Health Education Committees (Curriculum, Practice Education and CPD), consisting of senior Faculty leaders / Associate Deans with discipline responsibility for University education, together with Health Authority and patient representatives. The office of the APH will:

- Facilitate cross-cutting themes and provide program management support to specific projects (education, applied (post-entry level) programs, programming for international students, community engagement);
- Facilitate closer relationships across the health system to help enable optimum placement of health students and new models of clinical teaching and learning;
- Catalyze shared and integrated flexible learning (FL) innovation within UBC Health;
- Track and assess performance against agreed education outcomes for UBC Health.

**2. *Research collaboration*** will be led by the VPH, working closely with the Associate Vice-President Research and the APH. The APH office will provide administrative support to a set of theme-based research tables comprised of faculty members from across UBC who are independently or collectively leading research in the respective topics to provide structured forums for exchange and partnership. The UBC Health Research Committee, also with senior University and system representation, will prioritize, mobilize and 'program manage' activity across the research tables. Under the oversight of the APH and the AVP Research, these cross-cutting groups will:

- Promote information sharing across all involved Departments and faculty members;
- Enable synergy and opportunity identification around ongoing or new areas of research;
- Drive growth in both level and scope of funding in order to deliver better research outcomes and impact;
- Provide infrastructure for colleague collaboration (including around grant application), both within and beyond the University;





- Track and assess performance against agreed research outcomes for UBC Health.

**3.** The creation and ongoing direction of the AHSN will support UBC's collaborative *interface with the health system*. The VPH would help drive the development of the Network, and – acting as facilitator rather than conduit – co-ordinate and channel the expertise and activity of all UBC health units vis-à-vis improvements in clinical practice and health policy across the system. The VPH would:

- Work with Health Authority, government and industry representatives to agree a roadmap and funding model for the creation of the AHSN;
- Drive the establishment of the AHSC (organization, resources, processes etc), with appropriate representation from all stakeholders;
- Help promote and sustain strong ongoing relationships between UBC and other members of the Network;
- Work with colleagues within and beyond UBC to maximize University contributions towards greater efficiency, access and patient outcomes in clinical practice across BC;
- Work with colleagues within and beyond UBC to maximize University contributions towards improving the health and well-being of the population;
- Track and assess performance against agreed clinical practice outcomes for UBC Health.



## APPENDIX 2

*Table with all current courses and future home unit and course numbers and Concurrent proposal to be sent to Senate Curriculum Committee for course transfers.*

<p><b>Proposed Calendar Entry:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=name&amp;institution=11&amp;code=LFS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=name&amp;institution=11&amp;code=LFS</a></p> <p>LFS 340: Land &amp; Food Systems</p> <p>As of July 1, 2015, the IHHS courses have been distributed among the following units: School of Social Work, School of Population Health, and Faculty of Land and Food Systems.</p> <p><b>LFS 340</b> (3) First Nations Health and the Traditional Role of Plants  <b>This Interprofessional Health and Human Service (IHHS) course covers the</b> First Nations medical systems and medicinal plants. Bridging the traditional with modern sciences.</p>	<p><b>Current URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?code=IHHS</a></p> <p><b>Present Calendar Entry:</b>  <del>IHHS 301</del> (3) <b>First Nations Health and the Traditional Role of Plants</b>  First Nations medical systems and medicinal plants. Bridging the traditional with modern sciences.  <del>Prerequisite: Enrolment in a health and human service program.</del></p>
<p><b>Proposed Calendar Entry:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=SOWK">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=SOWK</a></p> <p>As of July 1, 2015, the IHHS courses have been distributed among the following units: School of Social Work, School of Population Health, and Faculty of Land and Food Systems.</p> <p><b>SOWK 451</b> (3) <b>Health Care Team Development</b>  <b>This Interprofessional Health and Human Service (IHHS) course covers the</b> skills, knowledge, roles and issues involved with working <b>successfully</b> in interprofessional</p>	<p><b>Current URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a></p> <p><b>Present Calendar Entry:</b>  <del>IHHS 400</del> (3) <b>Health Care Team Development</b>  Skills, knowledge, roles and issues involved with working <del>successfully</del> in interprofessional health and human service</p>



health and human service teams. Intended for upper division students in any health and human service program.

**SOWK 452 (6) HIV/AIDS Prevention and Care**

This Interprofessional Health and Human Service (IHHS) course prepares senior students to respond effectively to the HIV epidemic and its consequences. The knowledge and skills required for interprofessional and discipline-specific work are explored. Intended for students in health and human service programs. *This course is not eligible for Credit/D/Fail grading.*

**SOWK 453 (3) Disability and Justice**

**SOWK 454 (3) Interdisciplinary Practice with Children and Families**

This Interprofessional Health and Human Service (IHHS) course covers interprofessional perspectives, challenges, and strategies. Clinical experience and some knowledge of child protection issues required. [3-0-0]

**SOWK 455 (6) Palliative Care**

This Interprofessional Health and Human Service (IHHS) course covers attitudes, knowledge, skills and abilities necessary for interprofessional and discipline-specific work in palliative care. For students registered in health and human service programs only.

**SOWK 456 (1-6) d Special Topics in Collaborative Healthcare**

This Interprofessional Health and Human Service (IHHS) course prepares students to practice patient-centred interprofessional collaboration in a specific area of healthcare.

teams. Intended for upper division students in any health and human service program.

**~~IHHS 402~~ (6) HIV/AIDS Prevention and Care**

Preparation for senior students to respond effectively to the HIV epidemic and its consequences. The knowledge and skills required for interprofessional and discipline-specific work are explored. Intended for students in health and human service programs. *This course is not eligible for Credit/D/Fail grading.*

**~~IHHS 407~~ (3) Disability and Justice**

**~~IHHS 403~~ (3) Interdisciplinary Practice with Children and Families**

Interprofessional perspectives, challenges, and strategies. Clinical experience and some knowledge of child protection issues required. [3-0-0]

**~~IHHS 405~~ (6) Palliative Care**

Attitudes, knowledge, skills and abilities necessary for interprofessional and discipline-specific work in palliative care. For students registered in health and human service programs only.

**~~IHHS 480~~ (1-6) d Special Topics in Collaborative Healthcare**

Practicing patient-centred interprofessional collaboration in a specific area of healthcare.



### Proposed Calendar Entry:

<http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&code=SPPH>

SPPH: School of Population & Public Health

As of July 1, 2015, the IHHS courses have been distributed among the following units: School of Social Work, School of Population Health, and Faculty of Land and Food Systems.

#### **SPPH 200 (3) Understanding the Sociocultural Determinants of the Health of Populations**

This Interprofessional Health and Human Service (IHHS) course covers the idea of "population health," and the implementation and evaluation of programs or policies to improve health. Open to all students. [3-0-0]

#### **SPPH 300 (3) Working in International Health**

This Interprofessional Health and Human Service (IHHS) is a tutored, web based course on planning/preparing for work in a developing country. Causes of ill health amongst populations living in poverty; analysis of available solutions. Health Science background not essential.

#### **SPPH 302 (3) Topics in Health Informatics for Health/Life Sciences Students**

Interprofessional Health and Human Service (IHHS) course

#### **SPPH 404 (3) First Nations Health: Historical and Contemporary Issues**

This Interprofessional Health and Human Service (IHHS) course covers an epistemological approach that considers the determinants of health and spiritual-environmental-cultural perspectives. [3-0-0]

### Current URL:

<http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&code=IHHS>

### Present Calendar Entry:

#### **~~IHHS~~ 200 (3) Understanding the Sociocultural Determinants of the Health of Populations**

The idea of "population health," and the implementation and evaluation of programs or policies to improve health. Open to all students. [3-0-0]

#### **~~IHHS~~ 300 (3) Working in International Health**

Tutored, web based course on planning/preparing for work in a developing country. Causes of ill health amongst populations living in poverty; analysis of available solutions. Health Science background not essential.

#### **~~IHHS~~ 302 (3) Topics in Health Informatics for Health/Life Sciences Students**

#### **~~IHHS~~ 404 (3) First Nations Health: Historical and Contemporary Issues**

An epistemological approach that considers the determinants of health and spiritual-environmental-cultural perspectives. [3-0-0]



**SPPH 406 (3) Aging from an Interdisciplinary Perspective**

This Interprofessional Health and Human Service (IHHS) course covers issues associated with aging in our society. For students registered in health and human services programs only.

**SPPH 408 (6) Topics in Aboriginal Health: Community-based Learning Experience**

Interprofessional Health and Human Service (IHHS) course

**SPPH 409 (3) International Indigenous Experiences of Colonization**

This Interprofessional Health and Human Service (IHHS) course is an online, interprofessional, comparative inquiry of indigenous experiences of global colonization and the manifestations of that experience in the contemporary socio-cultural environment. Informed and guided by indigenous knowledge and drawing upon a range of disciplines such as public health, history, sociology and public policy.

**SPPH 410 (3) Improving Public Health: an Interprofessional Approach to Designing and Implementing Effective Interventions**

This Interprofessional Health and Human Service (IHHS) course promotes collaborating interprofessionally; each student team will identify and research a critical public health issue, and develop a detailed practical and effective intervention. Intended for students in health and human service programs.

**SPPH 411 (3) Violence Across the Lifespan**

This Interprofessional Health and Human Service (IHHS) course covers violence in families across the lifespan. Particular emphasis on intersections of race, class, and gender; the long-term impact of childhood exposure to violence; and prevention-focused

**IHHS 406 (3) Aging from an Interdisciplinary Perspective**

Issues associated with aging in our society. For students registered in health and human services programs only.

**IHHS 408 (6) Topics in Aboriginal Health: Community-based Learning Experience**

**IHHS 409 (3) International Indigenous Experiences of Colonization**

An online, interprofessional, comparative inquiry of indigenous experiences of global colonization and the manifestations of that experience in the contemporary socio-cultural environment. Informed and guided by indigenous knowledge and drawing upon a range of disciplines such as public health, history, sociology and public policy.

**IHHS 410 (3) Improving Public Health: an Interprofessional Approach to Designing and Implementing Effective Interventions**

By collaborating interprofessionally, each student team will identify and research a critical public health issue, and develop a detailed practical and effective intervention. Intended for students in health and human service programs.

**IHHS 411 (3) Violence Across the Lifespan**

Interprofessional learning about violence in families across the lifespan. Particular emphasis on intersections of race, class, and gender; the long-term impact of childhood exposure to violence; and prevention-focused initiatives.



initiatives.

**Proposed Calendar Entry:**

**~~IHHS 401 (3) Ethical Decision-Making in Health Care~~**

~~An interprofessional approach using case studies to illustrate the application of bioethical principles and theories. Intended for students in health and human service programs. [3-0]~~

**Current URL:**

<http://www.calendar.ubc.ca/vancouver/courses.cfm?code=IHHS>

**Present Calendar Entry:**

**IHHS 401 (3) Ethical Decision-Making in Health Care**

An interprofessional approach using case studies to illustrate the application of bioethical principles and theories. Intended for students in health and human service programs. [3-0]

**Type of Action:**

Discontinue the above listed IHHS course (IHHS 401).



### **APPENDIX 3**

#### **UBC HEALTH EDUCATION**

##### **ROLE**

This document is part of the UBC Health Blueprint and expands the section that describes the role of the office of the Associate-Provost Health (APH) to support Education across the health professional programs.

In order to maintain and grow the new integrated face of health professional programs and in order to align with internal and external changes at UBC, it is proposed that the College of Health Disciplines will close and be reorganized to be more closely aligned with the Provost's office under the leadership of an Associate-Provost Health within the Office of the Provost. To ensure representation and appropriate input to policy, practices and scholarly work, and to align this unit with emerging changes in the relationship between the University and the health authorities, an emerging office of the APH would:

- Facilitate cross-cutting themes and required committees/working groups (e.g. education, professional programs, community engagement);
- Advise and support collaborative initiatives determined by the UBC Health Executive (e.g. Aboriginal Health, admissions policies);
- Provide program management/oversight of specific integrated initiatives or projects relevant to the health programs (e.g. curriculum at the classroom or practice education level, student placements, professional [post entry-level] programs, community/patient engagement); and
- Act as a catalyst for shared and integrated flexible learning (FL) innovation within UBC Health.

The principles that would guide the activities of this office include the following:

- Enables all health professional programs to provide input into the directions for UBC Health;
- Reinforces and supports discipline-specific training;
- Implements flexible, multidisciplinary learning strategies which are cost-effective and collectively relevant;
- Brings students and practitioners across professions together in relevant and realistic mixes to learn about, with and from each other;



- Works in partnership with communities to enable strong experiential learning in the most common areas of practice;
- Actively and authentically involves the patient and family voice in the health professional education programs; and
- Evaluates the impact of all activities using a quality improvement framework and contributes to a range of scholarly works through robust educational scholarship.

## **STRUCTURE and ACCOUNTABILITY**

In order to enable the appropriate activities, outputs and impact for this office, there are key structural elements that relate to either accountability or to reporting relationships. There will be three Health Education Committees (HECs) – Curriculum, Practice Education and CPD. They will be accountable to the UBCHE and the SAHC.

## **FUNCTION**

In addition to providing a voice for all health and human service programs as a part of UBC Health, the office of the APH will be responsible for two main areas:

- activities related to integrated health education;
- other activities related to integration identified by the UBC Health Executive (UBCHE) or the Strategic Academic Health Council (SAHC).

## ***SPECIFIC AREAS OF CONCENTRATION:***

## **COMMON POLICIES AND PRACTICES ACROSS THE HEALTH PROGRAMS**

- Issues identified at any level of the health programs are raised at UBCHE, SAHC for discussion and direction.
- Common policies and practices may include shared admissions protocols, assessment practices, structure and process for student appeals, shared human resource management, etc.

## **INTEGRATED CURRICULUM – CORE AREAS OF STUDY (INCLUDES INTERPROFESSIONAL EDUCATION)**

- SAHC or HECs identify common or shared areas of study across the health programs.





- Common areas of study may include ethical practice\*, quality and patient safety, professionalism, patient-centred care, health systems, global health, advocacy, social accountability, cultural awareness and competence etc. \*Ethical practice is the test case for integrated curricula.
- Using the integrated curriculum model, each common area of study will be developed, tested, implemented and evaluated with oversight provided by the Curriculum Committee.
- An interprofessional education pathway, including the IP Passport, will be used to guide the IPE components of the integrated curriculum model. IPE activities currently offered will be positioned and sustained within the IPE pathway e.g. Health Care Team Challenge.
- Oversight of the interprofessional designation (e.g. IHHS) for courses housed in programs.
- **PRACTICE EDUCATION**
- A Practice Education Committee (PEC) identifies issues for discussion at the UBCHE or SAHC as appropriate.
- The PEC chaired by a faculty lead.
- The PEC liaises with community partners directly and facilitates seamless communication and practice education standards and processes.
- Provincial initiatives are discussed with the PEC.
- New approaches to practice education such as student clinics, supervision models, new assessment practices, etc. are developed and tested by the PEC.
- PE think tanks and educational activities are conducted annually.

### **CONTINUING PROFESSIONAL DEVELOPMENT**

- In line with UBC's approach to "applied" program of post-licensure study or continuing professional health education (CPHE), population health or other



collective areas that may support a CHPE approach may be identified by SAHC and/or HECs and/or by community partners;

- Synergies are sought among continuing education needs, existing areas of expertise within UBC Health, professional associations and regulators, community organizations and patient outcome/health systems improvements.
- Applied health programs may be developed by one existing health program or may be co-developed through partnerships of 2 or more programs with the APH office providing support as part of the FL initiative.
- Interprofessional Education (IPE) is central to applied health programs in health where two or more programs are involved.
- Faculty development is required to develop and maintain appropriate teaching and assessment skills for integrated curricula for faculty members and external instructors as well as preceptors.

### **SUPPORT FOR STUDENT GROUPS**

- The office will provide financial support for HSSA and CHIUS and facilitate cross-program advising, mentorship and discussions related to curriculum.

### **QUALITY IMPROVEMENT AND EVALUATION OF OUTCOMES (QI and evaluation will be threaded throughout the areas of concentration)**

- SAHC and the HECs will assess the office's progress in meeting its goals and in ensuring that its structure and practices achieve the best outcomes.
- Evaluation of the office outcomes will be important to the UBC Health Executive and the SAHC.
- Evaluation studies of integrated curricula and changes in common policies and practices will be essential.

The Health Education Committees would provide direction, guidance and feedback to a range of educational activities that involve both the creation of educational resources/activities and the sustainable operationalization of these activities. These



activities should include those based on academic or classroom learning, practice education, and continuing professional development. The HECs would be supported by a range of academic leads and staff with demonstrated skills commensurate with the work that needs to be accomplished. The work undertaken by the Committees would be identified by members of the HECs, SACH or UBCHE based on needs of the programs in consultation with students and the practice sites. The intent is to create a sustainable and integrated approach to health professional education across UBC within the context of the Academic Health Sciences Network.

In addition to the health and human service integrated education portfolio, the office will facilitate discussions and recommendations related to issues common to more than one program. It will facilitate discussions related to research across the campus and in collaboration with community partners. It may also serve as a useful forum for debate on strategic integrated issues or issues of common concern in preparation for consideration by the UBC Health Executive.



## APPENDIX 4

### CONSULTATION PROCESS

Over the last three years, discussions and consultations have taken place across the University related to improved integration in the health sector in order to (a) increase UBC's health-related capacity in education and research, and (b) meet the changing needs of health and health care systems in BC and Canada. The original consultation was led by Drs. Gavin Stuart and Louise Nasmith, who explored options for a Faculty of Health. A series of small group consultation sessions were held with senior leadership across the health programs in education, research, practice and administration. There was widespread support for improved **coordination and collaboration** across the health sector. Broader consultation with faculty members also supported the goals of collaboration but not a major structural change that would lead to one Faculty of Health. Following this phase, the Provost requested that a more in-depth discussion (led by Drs. Hugh Brock and Nasmith) of the merits of improved **integration** in health education and research and an optimal organization that would support this goal. A year-long consultation process involved a steering committee and working group exploring the benefits of integration in health education and research and organizational options that would be supportive. These in turn were discussed with the faculty from the health programs. While the option of a single Faculty was not endorsed, the concept of "UBC Health" emerged as an identifiable institutional entity and mechanism that would enable more systematic collaboration and integration where appropriate across health programs and provide an interface with a developing, province-wide Academic Health Sciences Network (AHSN). In parallel, UBC health units have pursued targeted operational integration in order to strengthen capabilities and achieve efficiencies, notably in Finance and IT, which provides a foundation for further collaboration.

As part of this process, the Provost mandated that an internal review be conducted of the College of Health Disciplines to determine its role in an emerging "UBC Health" and its optimal positioning. The review team was comprised of Professor Catherine Backman, Dean Murray Isman and Dean Michael Coughtrie who reviewed previous documentation and met with a broad variety of individuals including College staff, faculty members from a number of health programs, students and health authority representatives. As stated earlier, their recommendations reaffirmed support for the work of the College to date but a need to align the CHD much more closely with the Provost's office with the Principal becoming the Associate-Provost Health, in order to wield more influence and authority. The review team also recommended that the IHHS courses would be better placed within a Faculty(ies) as most of the students who enrolled in these courses were undergraduate rather than health professional students.



Closely following the review of the CHD, the UBC Health Blueprint was drafted and involved several iterations following consultations with senior leaders, faculty members and students.

Specific to the disestablishment of the CHD, The Principal met with a number of student associations in the health programs and faculty groups. An email was sent out to 12 health programs to request a list of their student leaders. These were then contacted by email in early December, 2014 to request a meeting with appropriate student groups in their program. In early January 2015, the UBC Health Blueprint and the Education document describing the role of the office of the APH were sent to all student groups with a reminder to those who had not responded regarding a potential meeting. These meetings were held over the month of January as described in the table below. Student groups who were not able to arrange a meeting were asked to submit written feedback. The same documents were distributed to the CHD Council members in December 2014, with a request to share widely with their faculty members. They also were encouraged to invite the Principal to faculty meetings to discuss the proposed changes. These are described in the table below. The Senate Student Caucus was met on December 17<sup>th</sup>, 2014.

The discussions were framed using two questions:

1. Are there concerns that something will be lost (particularly for the students)?
2. What opportunities may result from this change?

### **Specific consultations regarding the disestablishment of the College of Health Disciplines:**

<b>Whom we consulted</b>	<b>When</b>	<b>What feedback we received</b>	<b>What actions we took based on that feedback</b>
CHD Council*	September 3, 2014 October 23, 2014 December 11, 2014	Support was voiced Suggestions made for consultation process Questions re. the transfer of the courses	Modified the blueprint to reflect feedback Consulted with their student groups Ensured that they were updated on course transfers
Senate Student Caucus	December 17, 2014	Accessibility to "IHHS" courses	Intention of the units to which courses have been



		Maintaining a “balance of power” between large and small programs Suggestion to consider the establishment of a health student caucus within UBC Health	transferred to maintain broad access Function of the SAHC and the HECs  To be discussed with student groups
Email sent to all health programs requesting contact information for student leaders	November 26, 2014	Received information from 11/12 programs	
Email sent to all student leaders to request a meeting with student groups	December 1-6, 2014	Received responses from 11/11 student groups	
<b>Student associations:</b> -Kinesiology student leaders -Occupational Therapy students -Midwifery students -Social Work Student Council -Dentistry and Dental Hygiene -LFS Council  -Pharmaceutical Sciences -Audiology and Speech Sciences -Nursing -Medicine	Meeting January 14, 2015 Meeting January 14, 2015 Written Feedback Meeting January 12, 2015 Meeting January 12, 2015 Meeting January 15, 2015 Meeting January 21, 2015 Meeting January 26, 2015 Written feedback solicited Meeting February 3, 2015	Assurance of access to IHHS courses and safeguarding their IP nature Assurance that IPE activities linked to the IP passport would continue Establishment of a health student caucus in UBC Health	Access and identification ensured Oversight of IP nature of courses by the HECs  Continued IPE activities linked to the IP Passport  Exploration of forming a caucus in spring 2015 to be in place in the fall of 2015



<b>Faculty Groups:</b> -Pharmaceutical Sciences  -all other health programs	Meeting December 5, 2014  Documents circulated by Deans and Council members	Rich discussion about opportunities that ranged from the continuum of education to operational issues Few comments received: -concern about budget	Ideas brought to various tables (Applied programs; CPD; UBCHE; SAHC)  Reassurance re balanced budget
<b>Town Hall Meeting</b>	February 2, 2015	Issues were raised more about UBC Health	Assurance provided that all health programs will have a `voice` while respecting discipline-specific issues

\*College Council Members:

Dr. Louise Nasmith  
Chair, Principal, College of Health Disciplines

Dr. Lesley Bainbridge  
Associate Principal, College of Health Disciplines

Dr. Ingrid Sochting  
Dept. of Psychology

Dr. Marla Buchanan  
Counselling Psychology

Dr. Tim Stainton



Director, School of Social Work

Dr. Valter Ciocca  
Director, School of Audiology & Speech Language Pathology

Dr. Kavita Mathu-Muju  
Faculty of Dentistry

Ms. Susana Leon  
Administrator, College of Health Disciplines

Dr. Wayne Riggs  
Associate Dean, Education, Faculty of Pharmaceutical Sciences

Dr. Jayne Garland  
Head, Department of Physical Therapy

Ms. Elsie Tan  
School of Nursing, Faculty of Applied Science

Dr. Alethea Greenwood  
Woodward Library & Hospital Branch Libraries

Dr. Catherine Backman  
Head, Dept. of Occupational Sciences & Occupational Therapy

Dr. Robert Sparks  
Director School of Human Kinetics

Dr. Angela Towle  
Co-Director, Division of Health Care Communication

Dr. Karol Traviss  
Dietetics Program Leader  
Land and Food Systems

Dr. William Miller  
Associate Dean, Health Professions  
Faculty of Medicine





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Dr. David Snadden  
Executive Associate Dean, Education  
Faculty of Medicine

Jason Hu  
HSSA President

Sukhpaul Gurm  
Dentistry Student Senator

Aliyah Daulat  
Pharmacy Student Senator



## **APPENDIX 5**

### **Current Endowments and Awards in the College of Health Disciplines**

#### **Endowments:**

18E46420 Principal's Fund – College of Health Disciplines  
18E84060 BC Health Association Award  
18E84090 Professorship in Health Care Ethics  
18E84860 McCreary Lecture Endowment  
18E88210 Cedar Lodge Society Fund (Vancouver Foundation)

#### **Student Scholarships:**

John H. V. Gilbert Interprofessional Scholarship (Award ID 1425)  
Professor Jessie Gordon MacCarthy Memorial Scholarship (Award ID 601)



18 March 2015

To: Vancouver Senate

From: Senate Academic Policy Committee

Re: Establishment of the Institute for the Oceans and Fisheries and  
Disestablishment of the Fisheries Centre

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The Faculty of Science has submitted a proposal to establish the Institute for the Oceans and Fisheries and disestablish the Fisheries Centre. Discussions around the transformation of the Fisheries Centre arose from a 2009 external review of the unit, and continued in more detail with the formation of an ad hoc committee which advised on the Fisheries Centre in 2013. The Institute for the Oceans and Fisheries intends to build upon and broaden the current mandate of the Fisheries Centre.

The broader Institute for the Oceans and Fisheries, like the Fisheries Centre, will be an academic unit, but the focus will be on research with the faculty tenure homes residing in other academic units. All current faculty members in the Fisheries Centre will become faculty members in the Institute for the Oceans and Fisheries. The administration of the Resource Management and Environmental Studies Fisheries Stream will be transferred to the Institute for the Oceans and Fisheries.

The Academic Policy Committee has reviewed the proposal and recommends the following:

**Motion:** *“That Senate approve and recommend to the Board of Governors the establishment of the Institute for the Oceans and Fisheries in the Faculty of Science effective July 1, 2015;*

*and;*

*That the administration of the Fisheries Streams within the Resource Management and Environmental Studies (RMES) graduate programs be transferred from the Fisheries Centre to the Institute for the Oceans and Fisheries, effective July 1, 2015;*

*and;*



*That Senate approve and recommend to the Board of Governors the disestablishment of the Fisheries Centre in the Faculty of Science effective July 1, 2015.”*

Respectfully submitted,

Dr. Paul Harrison, Chair

Senate Academic Policy Committee



**a place of mind**  
THE UNIVERSITY OF BRITISH COLUMBIA

Provost and Vice President Academic  
Walter C. Koerner Library  
1958 Main Mall  
Vancouver, BC Canada V6T 1Z2

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## MEMO

To: Vancouver Senate

From: David Farrar, Provost and Vice-President Academic

A handwritten signature in black ink, appearing to read 'DF', followed by a horizontal line.

Date: March 5, 2015

Re: Proposal to establish a new **"Institute for the Oceans and Fisheries"**  
and to disestablish the existing **"Fisheries Centre"**

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I am pleased to support the attached proposal to establish a new "Institute for the Oceans and Fisheries" and to disestablish the existing "Fisheries Centre".

This proposed set of actions reflects a strong desire (1) to broaden the research centre's mission, building upon the Fisheries Centre's world-renowned expertise and (2) to bring together faculty from across UBC whose research programs and interests intersect with oceans and fisheries policy.

An earlier version of this proposal was reviewed by the Senate Academic Policy Committee in February, 2015. Their suggestions for revisions were incorporated into a revised proposal which was presented, discussed and approved unanimously at the March 3, 2015 meeting of the Faculty of Science Council.

## Overview

UBC's Fisheries Centre has earned a world-class reputation in fisheries research that has played a transformational role in shaping fisheries policy around the world. The proposed Institute for the Oceans and Fisheries is designed to build upon and broaden the mandate of the Fisheries Centre. The new Institute for the Oceans and Fisheries envisions "*a world in which the ocean is healthy and its resources are used sustainably and equitably*". The proposed mission of the new Institute of Oceans and Fisheries is "*to lead the way to healthy and sustainable marine and freshwater systems through excellent research, inspirational education, and innovative societal engagement.*" The Institute for the Oceans and Fisheries will bring together UBC researchers from different UBC Vancouver Faculties who have a commitment to excellence in research and training, and who will work collectively to create and apply knowledge that can achieve transformational change for sustainable oceans and fisheries. The collective strengths of the new Institute would include fisheries research with significant policy implications, biodiversity and ecosystem studies from microbes to mammals, and an integrated approach to coastal oceanography.

## Background

In 1991, the UBC Senate established the Fisheries Centre as an academic unit within the Faculty of Graduate Studies. The Fisheries Centre was created to "provide the academic focus, through its personnel and facilities, for fundamental studies in the scientific and social aspects of living aquatic resources in marine and freshwater environments." On January 1, 2007, the Fisheries Centre was transferred to the newly established College for Interdisciplinary Studies (CFIS). On April 1, 2012, the Fisheries Centre was transferred from CFIS to the Faculty of Science.

In May 1994, the UBC Senate received the first of several reports of the *Ad Hoc* Committee on University Organization. Based on administrative and academic effectiveness arguments, this comprehensive report recommended that "Senate establish a minimum size for departments, schools and divisions with department-like responsibilities" and "The minimum size for departments, schools and divisions be 15 full-time faculty members in the department."

In Fall 2014, the Fisheries Centre had eight tenured and tenure-track faculty members (7.1 FTE) and one grant-tenured faculty member. Of the nine current Fisheries Centre faculty members, three hold partial (25-33%) academic appointments in the Department of Zoology, five are Associate members of the Department of Zoology, and two are Associate members of the Institute for Resources, Environment, and Sustainability (IRES). The 60 graduate students supervised by Fisheries Centre faculty are currently enrolled in one of two graduate programs - the Resource Management and Environmental Studies (RMES) program administered by IRES, and the Zoology graduate program administered by the Department of Zoology. In February 2012 Senate approved (effective for the 2012

winter session) a Fisheries Stream within the RMES graduate program to be governed and administered by the Fisheries Centre. The Fisheries Centre does not deliver an undergraduate program.

### Proposal

The new Institute for the Oceans and Fisheries will be an academic unit, like the Fisheries Centre is today, with UBC faculty holding *partial* academic appointments in the Institute. At a high level, this may be viewed as simply a name change reflecting a broadening of the mission, but with the following important caveat: all Institute faculty will have at least 50% of their academic appointment in another academic unit (e.g., Department of Zoology, IRES) and this unit will serve as their primary academic home for promotion and tenure, and for teaching. Faculty members in the Institute for the Oceans and Fisheries will participate in the promotion and tenure decisions of Institute faculty following the normal procedures for joint appointments as described in the Collective Agreement between UBC and the Faculty Association, and in the Senior Appointments Committee guidelines. Note that the Institute will not serve as the lead academic unit (tenure home). Teaching commitments are to be negotiated between the Department Head and Institute Director on an annual basis, with the goal that the total teaching contribution is consistent with the norms of the primary academic unit.

All current faculty members in the Fisheries Centre (FC) would become faculty members in the new Institute for the Oceans and Fisheries (IOF). Our goal is to encourage at least 10 non-FC faculty members to join the IOF by moving a portion of their academic appointment into the new Institute. For the initial cohort, applicants wishing to join the new Institute would be vetted and approved by a committee struck by the Dean of Science composed of senior faculty members. After formation of the Institute, subsequent applicants would be vetted and recommended for approval to the Dean by a committee struck by the Institute Director and approved by a majority vote of all IOF Faculty members. Criteria for Institute membership will include a commitment to the vision and mission of the Institute, a proven track record of excellence in research and training related to the oceans, fisheries, and policy, and a willingness to work collectively to create and apply knowledge that can achieve transformational change for sustainable oceans and fisheries.

All Institute members will have full voting privileges regarding decisions affecting the Institute, including IOF faculty hiring, promotion, and tenure decisions. Institute members are expected to participate in multidisciplinary research projects and grant opportunities. All Institute members would have access to Institute resources, which would potentially include:

- an internal UBC scholar-in-residence program
- teaching buyouts for developing and leading large, collaborative proposals
- funding for Institute post-doctoral scholars and graduate students

Our goal is for these resources to come from external sources, but in the near-term these programs will be funded by the Faculty of Science.

The existing Fisheries Centre budget, including faculty budget lines, will be transferred to the new Institute. The governance and administration of the Fisheries Stream of the RMES graduate program will be transferred from the Fisheries Centre to the new Institute for the Oceans and Fisheries. There will be no budget transfers associated with Fisheries Centre faculty moving academic appointments into other units nor associated with UBC faculty members joining the new Institute.

### Consultations

In January 2009, the Fisheries Centre underwent an external review. The external review committee concluded that “the scholarly productivity of the Fisheries Centre is exceptional and internationally recognized”, but “the Fisheries Centre was developed and functions like a soft money research institute rather than an academic department.” The proposed transformation of the Fisheries Centre has been under discussion since the summer of 2013 and was formally taken up by an *ad hoc* Committee Advising on UBC’s Fisheries Centre in September 2013. Prof. Vanessa Auld (Faculty of Science, Associate Dean) chaired this *ad hoc* committee comprised of Sally Otto (Director, Biodiversity Research Centre), John Richardson (Head, Forest Sciences Department, Faculty of Forestry), and Les Lavkulich (emeritus professor, Faculty of Land and Food Systems). The committee validated the Fisheries Centre’s excellent international reputation for research and commitment to conservation, research, and policy development. The committee encouraged the Fisheries Centre to expand their focus to encompass ocean sciences, climate change, policy and social sciences. While praising the centre’s research reputation, the committee expressed serious concerns about the Fisheries Centre’s effectiveness as an academic unit, echoing many the same concerns expressed in the 2009 external review. The *ad hoc* committee presented two possible approaches going forward: (1) that the Fisheries Centre be given no more than three years to demonstrate they were able to function effectively as an academic unit or (2) that the Fisheries Centre be transformed into a research centre, with faculty positions transferred to other academic units. The broader Institute for the Oceans and Fisheries proposed here combines both of these recommendations – the Institute, like the Fisheries Centre, will remain an academic unit, but the Institute focus will be on research with the faculty tenure homes residing in other academic units.

In September 2014, Professor Curtis Suttle (Botany, EOAS, Microbiology and Immunology) was asked to chair an Institute Working Group, consisting of faculty members drawn from both inside and outside the existing Fisheries Centre, to develop the Institute’s vision and mission, expand Institute membership, and to work with the Dean to develop a budget that would enable the Institute’s vision and mission. Existing Fisheries Centre (FC) faculty have been consulted at numerous points in the process and three (of the nine) FC Faculty serve on the Institute Working Group.



*Institute Working Group*

Natasha Affolder (Law)  
Villy Christensen (Fisheries Centre)  
Simon Donner (Geography)  
Chris Harley (Zoology)  
Curtis Suttle (Botany, EOAS, Microbiology & Immunology) – chair  
Philippe Tortell (EOAS)  
Andrew Trites (Fisheries Centre)  
Amanda Vincent (Fisheries Centre)  
Simon Peacock (Dean) – *ex officio*

The proposed new Institute for the Oceans and Fisheries was discussed several times at Faculty of Science Heads and Directors meetings in 2014 and 2015 and at the Committee of Deans (Feb. 11, 2015).

The Dean of Science has met individually with each member of the Fisheries Centre in order to determine their preferences regarding potential academic homes. The Dean of Science has met with Department heads and directors of academic units likely to serve as academic homes for existing FC faculty (Department of Zoology; Department of Earth, Ocean, and Atmospheric Sciences; Institute for Resources, Environment, and Sustainability; Liu Institute). Upon approval of the new Institute, each current FC faculty member would be issued a new contract specifying the new academic appointment, effort distribution (research, teaching, service), tenure and promotion home and process. These contracts will be signed off by the FC faculty member, the Institute Director, the Department Head (or academic unit Director), the Dean of Science, and other Deans where appropriate. A similar contract would be issued for non-FC faculty members wishing to join the new Institute for the Oceans and Fisheries, with appropriate sign-offs.

An earlier version of this proposal was discussed and approved by the Senate Academic Policy Committee on February 23, 2015. This proposal was presented, discussed and approved unanimously at the March 3, 2015 meeting of the Faculty of Science Council.



18 March 2015

To: Vancouver Senate

From: Senate Academic Policy Committee

Re: Establishment of the Institute for Critical Indigenous Studies

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The Faculty of Arts has submitted a proposal to establish the Institute for Critical Indigenous Studies. It will serve as the interdisciplinary home of community-driven Indigenous research initiatives in the Faculty of Arts, a research hub and learning community for undergraduate and graduate students, visiting scholars, and artists. In addition, it will serve as a home for local, regional, and international research and teaching partnerships.

The Institute will bring the First Nations and Indigenous Studies and the First Nations and Endangered Languages Programs into closer collaboration, with both Program Chairs serving as Co-Directors.

The Academic Policy Committee has reviewed the proposal and recommends the following:

**Motion:** *“That Senate approve and recommend to the Board the establishment of the Institute for Critical Indigenous Studies in the Faculty of Arts;*

*and;*

*That the administration of the First Nations and Indigenous Studies and the First Nations and Endangered Languages Programs be transferred to the Institute for Critical Indigenous Studies.”*

Respectfully submitted,

Dr. Paul Harrison, Chair

Senate Academic Policy Committee

**THE INSTITUTE FOR CRITICAL INDIGENOUS STUDIES**

Faculty of Arts, University of British Columbia

**PLANNING PROPOSAL 1.D****REVISED: MARCH 2015****ICIS STATEMENT OF GUIDING PRINCIPLES**

*Located on the traditional, ancestral, and unceded territory of the hən̓q̓əmin̓əm'-speaking Musqueam people, the Institute for Critical Indigenous Studies (ICIS) in the Faculty of Arts at UBC is dedicated to the development and dissemination of robust and ethical scholarship, culturally attentive teaching practices and research methods, and meaningful partnerships with Indigenous communities and within the social sciences and humanities. We work together to further the resurgent cultural strength and sustainable self-determination of Indigenous peoples in Canada, across the Pacific, and throughout the world.*

**OVERVIEW**

Indigenous peoples and their concerns are increasingly at the forefront of significant and often highly charged political, intellectual, environmental, and economic discussions in Canada and across the globe. Indigenous assertions of their political rights and territorial claims offer various challenges—structural, legal, ideological, and moral—to settler populations and nation states. Idle No More, the Northern Gateway Pipeline protests, and public debate surrounding the Truth and Reconciliation movement are local and national evidence of growing public awareness of Indigenous concerns, but there remains little widespread understanding of the historical and contemporary contexts that help to make sense of these current events.

Such understanding takes place in academia, but it also finds purchase beyond the classroom, and it is at the crossroads of transformative research, reflective critical context, and cultural and geographic specificity, that the **Institute for Critical Indigenous Studies** (hereafter ICIS) makes a significant contribution. Combining theory with practice, and firmly embedding global connections in local commitments, ICIS is envisioned as a site of cutting-edge research, transformative teaching, community engagement and partnership, and intellectual analysis and exchange, where productive approaches to contemporary Indigenous concerns and their historical contexts are fully realized and shared with the local, regional, and international public.

**DISCIPLINARY CONTEXT**

This research and teaching institute will be unique in North America for its structural commitment to the intellectual project of *Critical Indigenous Studies*, a cognate discipline to Critical Ethnic Studies that is rooted in global Indigenous decolonial, feminist, and antiraICIS scholarship and politics. Its primary purpose is not cultural education, but rather the rigorous and ethical engagement of Indigenous political, methodological, and ideological concerns and conditions. Attention is given to the structures of and relationships between domains of knowledge and power, and the ways that experience informs knowledge across and between categories of difference. The commitments shaping ICIS are therefore focused less on teaching *about* Indigenous issues than on empowering Indigenous peoples and transforming Indigenous-settler relationships through theoretically sophisticated, intellectually rigorous, and socially and publicly engaged research. In other words, we don't teach about it, we work *in it* and *through it*.

Further distinguishing ICIS from other Indigenous Studies programs in Canada and the U.S., the Institute explicitly prioritizes Indigenous critical theory and applied social practice *within the humanities and social sciences*, with an emphasis on ethical research methods and community-responsive scholarship. Rather than trying to address all areas of scholarship on Indigenous issues, the Institute will maintain its focus on interdisciplinary research and teaching excellence within the Faculty of Arts. All units within the Institute—currently the First Nations and Indigenous Studies Program (FNIS, formerly FNPS) and the First Nations and Endangered Languages Program (FNEL, formerly FNLG)—will have a core commitment to scholarship and sustained community participation and partnership.

The international dissemination of best ideas, practices, and methods beyond the classroom is also a primary commitment of the Institute, particularly across BC, North America, and the Pacific. This will include, as relevant, international student and faculty exchanges and networks with academic partners in other countries, participation in media training and interviews, sponsorship of public events, lectures, symposia, and workshops, hosting of visiting scholars and artists, and investment in significant research and media projects and programs in the Indigenous humanities.

## UBC CONTEXT

The development of a dedicated research institute in the Faculty of Arts realizes some of the most significant elements of UBC's Strategic Plan. This is significantly but not exclusively emphasized through *Aboriginal Engagement*, which currently stands as a defining institutional commitment: "UBC engages in research and generates curricula across the University that respect, reflect, and include Aboriginal cultures, histories, and systems of knowledge. In both academics and operations, the University addresses issues of ignorance and misunderstanding resulting from the educational failures of the past." The Institute's potential as a site of research rigour, attention to Indigenous-centred research protocols and ethical methods, and sustained community-focused scholarship fully exemplifies the realized possibilities of this institutional commitment. It also contributes to the research momentum in new or ongoing Indigenous initiatives elsewhere at UBC, such as the First Nations Natural Resources Working Group and Aboriginal Mineral Resource Centre, the Centre for Excellence in Indigenous Health, Centre for Teaching and Learning Technologies, and various Aboriginal programs in the Faculty of Education and the Sauder School of Business.

Yet these commitments are not limited to the Aboriginal component of the Strategic Plan. The Institute's attention to transnational and global Indigenous concerns furthers UBC's emphasis on both *Intercultural Understanding* and *International Engagement*; the current internationally recognized scholarship and award-winning teaching of FNIS and FNEL faculty demonstrate their ongoing commitment to the Strategic Plan's *Research Excellence* and *Student Learning*, while FNIS's fourth-year Research Practicum—the only one of its kind in any Indigenous Studies program in North America, and a successful model for extended flexible learning opportunities across and beyond UBC—and FNEL's long and fruitful hənqəminəm' language partnership with the Musqueam First Nation are celebrated and highly respected examples of *Community Engagement* in action.

## WHY AN INSTITUTE IN THE FACULTY OF ARTS?

Indigenous Studies is currently thriving at UBC—so much, in fact, that the demand for expertise in the field is proving an infrastructural, pedagogical, and administrative challenge to the vibrant but still small number of specialist researchers at this institution. A number of the academic programs are outgrowing their current status and facilities; with increased attention to Indigenous issues nationally and globally, there is more public and political interest in smart, active, and socially

engaged scholars doing work in this field. And as various levels of government and First Nations and other Indigenous communities become increasingly attentive to meaningful partnerships with academic and professional accrediting institutions, the need for more widespread fluency in Indigenous cultural, historical, political, economic, and intellectual issues will put further pressure on scholars and students doing such work at UBC.

An Institute for Critical Indigenous Studies, located in the Faculty of Arts, is a much-needed structural evolution that serves a number of purposes: first, it builds upon the many research and teaching strengths already in evidence in Arts, particularly in FNIS and SPbut inclusive of scholars across the Faculty; second, it provides a high-profile Arts venue for cutting-edge, Indigenous-focused research and social outreach at UBC, one that offers exciting complements to but remains distinctive from related efforts in other Faculties; and third, an Institute brings scholars and community members committed to integrated, trans-disciplinary, and Arts-based research and teaching together in a space explicitly dedicated to meaningful and transformational intellectual exchange. Further, an Institute extends structural capacity and provides a high-profile growth platform for the development and expansion of diverse undergraduate learning and service initiatives, graduate and postdoctoral research opportunities, community collaborations and public outreach campaigns, and artist and visiting scholar residencies.

#### STRUCTURE AND AFFILIATED UNITS

The Institute will serve as the interdisciplinary home of community-driven Indigenous research initiatives in the Faculty of Arts, with undergraduate and graduate offerings, pre- and post-doctoral fellowships, short- and long-term residencies for visiting scholars and artists, and international faculty and student exchanges and research networks. Core faculty will determine both Institute and unit-specific curricular, structural, and administrative priorities, as well as inclusion of proposed Arts units and relevant outside research initiatives into the Institute; selected faculty affiliates from other Arts units will contribute to the intellectual range and service capacity of the Institute, while benefiting from Institute research, teaching, and outreach opportunities.

The current central pillar of ICIS will be Critical Indigenous Studies. The previous First Nations Studies undergraduate program has been renamed **First Nations and Indigenous Studies (FNIS)** to more accurately reflect the combined local and global commitments of the curriculum and faculty, and it will continue its engagement of theoretical analysis and community engagement, with a particular emphasis on transformative pedagogy and ethical research. (The major/minor name change is underway, although the program name and course code changes were approved at the December 2014 meeting of Senate.) FNIS has initiated curriculum renewal to ensure teaching excellence, community engagement, and student success, and will be working closely with Associate Dean Giltrow in this process. The First Nations Languages Program has been renamed **First Nations and Endangered Languages** (approved at the same meeting of Senate noted above), and will continue to develop a major/minor program that fully reflects its commitments to endangered language stabilization and revitalization. Planning for the new ICIS graduate program will begin upon approval of the Institute; while we hope to begin the MA in fall 2016 and Ph.D. in 2017, timing and student enrolment will be dependent upon institutional and Ministry approval. The Institute MA will be in Language Documentation, Conservation, and Revitalization, while the Ph.D. will be in Critical Indigenous Studies. All ICIS graduate students will take FNEL courses as their language requirement.

Other potential partners in ICIS would be committed to the guiding principles of the Institute, and might include the Centre for Teaching and Learning Technologies (through the ongoing work of

Amy Perreault) and other relevant humanities and social sciences and complementary extra-Faculty units (such as Language and Literacy Education, especially the work of Candace Galla). Similarly, the Dechinta Centre for Research and Learning and the national Indigenous Literary Studies Association are two other initiatives with which the Institute might establish promising relationships, as well as various international initiatives.<sup>1</sup> ICIS would also provide space, as available, for graduate students affiliated with ICIS faculty to meet and work.

#### INTERNATIONAL RESEARCH NETWORKS AND ARTS/LEARNING EXCHANGES

Another important growth area for ICIS partnership is on the global scale. Responding to UBC's call for a more active engagement of international students and scholarship, and reflecting our own commitments to international Indigenous concerns, we have been in first-phase discussions with interested faculty and staff at a number of international universities about collaborative research networks and student/faculty exchanges for the Institute, including Japan (Centre for Global Discovery, Sophia University), Australia (Melbourne Institute for Indigenous Development, the University of Melbourne), New Zealand (Maori Studies, the University of Auckland), and the U.S. (American Indian Studies, the University of North Carolina at Chapel Hill, and the Department of English at the University of Hawai'i at Mānoa). In collaboration with staff at Go Global, we are pursuing undergraduate learning opportunities and student/faculty exchanges with some of the above institutions, and have expressed interest in more extensive teaching and learning opportunities through UBC's relationship with the University of Copenhagen. Given UBC's location and significant intellectual, artistic, and political affinities, ICIS would be an ideal home for formal partnerships and exchanges with Pacific institutions, but we are also open to other opportunities, such as UBC's established relationship with the University of Copenhagen (and the long colonial history of Denmark in relation to the Inuit of Greenland) and educational institutions throughout the traditional lands of Sámi peoples in Scandinavia. We would encourage UBC's specific Indigenous Studies-focused outreach to these institutions, especially when the Institute and its initiatives are fully in place.

#### CAPACITY CONTEXTS AND CHALLENGES

ICIS will require sustainable growth in staffing and faculty to ensure its viability as one of the premier Indigenous Studies academic units in North America and, indeed, the world. Our current tenured and tenure-track faculty complement includes the following:

##### *FNIS*

- Daniel Heath Justice, FNIS/English (100% FNIS, but with administrative and CRC teaching reductions)
- Dory Nason, FNIS/English (.75 FNIS)
- Glen Coulthard, FNIS/Political Science (.75 FNIS)
- Sheryl Lightfoot, FNIS/Political Science (.50 FNIS, with CRC teaching reductions)
- Johnny Mack, FNIS/Law (.25 FNIS)
- Linc Kesler, FNIS/English (on secondment to the President's Office and the First Nations House of Learning)

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<sup>1</sup> Dechinta is a land-based educational initiative located in Denendeh territory/NWT; it is currently affiliated with the University of Alberta, but there is potential for partnership/accreditation through UBC (<http://dechinta.ca/#>). ILSA is currently in the process of incorporation. Steering Committee members charged with this task include Kristina Bidwell (University of Saskatchewan), Renate Eigenbrod (University of Manitoba), Jo-Ann Episkene (First Nations University, University of Regina), Daniel Heath Justice (UBC), Keavy Martin (University of Alberta), Sam McKegney (Queen's University), Rick Monture (McMaster University), Deanna Reder (Simon Fraser University), and Armand Ruffo (Carleton University).

*FNEL*

- Mark Turin, FNEL/Anthropology
- Patricia Shaw, FNEL/Anthropology
- Daisy Rosenblum, FNEL/Anthropology

FNIS is currently hiring for a minimum 75% appointment in Critical Indigenous Geographies.

The Faculty of Arts has acknowledged FNEL's acute faculty needs through two recent hires; this year's introductory *hənq̓əminəm* course is the largest in the Program's history, nearly double last year's enrolment, so these hires come at a critical juncture for FNEL's teaching capacity. FNIS courses are also growing, in both number of course offerings and in student numbers: total number of FNIS courses went from 4 in 2008 to 11 in 2014—nearly triple in just five years—with student enrolments over the same period nearly quadrupling, from around 60 to over 230. (These numbers do not include the numerous graduate students working with FNIS faculty, nor those engaged with Pat Shaw in FNEL.) With the increasing public profile of our faculty, increased student advocacy on campus, and an active student and alumni engagement and outreach strategy fully underway, these numbers are expected to continue a steep climb. Last year FNIS introduced three new courses and two permanent Category One changes of existing courses to meet current curricular needs and prepare for the Institute's graduate initiatives (as we have between five and ten graduate students taking our undergraduate courses every year given the dearth of graduate-level options in Indigenous Studies). Our curriculum renewal process has helped us revisit current courses to ensure their viability and integrity in the face of growing student interest: for example, in response to student feedback, our 100-level foundations course, previously full-year, has become a one-term course offered twice annually to allow more students to take it and to accommodate international students on exchange (as well as FNIS majors and minors, who are sometimes unable to take advantage of these opportunities due to program requirements). We are excited about these possibilities and initiatives and are doing what we can to meet student interest and broader research demands; the Institute makes possible the opportunity to draw upon affiliate faculty to meet our various constituencies' needs.

In terms of future growth, previously noted tenure-track positions for FNIS in Film and Visual Media, Pacific Indigenous Studies, Métis Studies, and Indigenous Economies would extend the teaching, service, and research capacity to a fully competitive and sustainable level and further enhance UBC's international status in the field. FNIS staffing levels meet the Program's current needs, but will be stretched by the current and expected growth. Similarly, after extensive discussion with other Arts faculty, and with the support of Associate Dean Young, we have committed to a three-year investment in a digital ethnography and technologies course that would serve our Practicum students as well as students in Anthropology, Film, and other units, but hope to include that course in our permanent core beyond that period.

As with FNIS and FNEL, potential partner units would likely require ongoing investment in human resources to ensure their capacity for achieving their own research and community mandates as well as their ability to contribute to Institute-wide initiatives. The development of initiatives across other academic units will provide some opportunities for affiliate status of interested Arts faculty, which will be approved by core faculty and, with FAS approval, a nominal portion of each line—up to ten percent—will transfer to the Institute to reflect a shared commitment between the candidate, her/his home unit, and the Institute. (We have already had keen interest in closer connection through the proposed Institute from a number of faculty and staff, and would like to develop opportunities for

such colleagues to participate more closely in shaping the Institute's pedagogical and intellectual commitments.)

The expectation here is not for growth for its own sake or redundant replication, but to ensure that there are adequate resources for the Institute's anticipated needs. As such, before any staffing requests are made to the Dean's office, extensive consultation between all current stakeholders will accompany a full audit of current and projected staffing and personnel needs, thereby providing the most efficient, responsible, and ethical assessment of and plan for the Institute's personnel projections.

## GOVERNANCE

Given their distinctive priorities and mandates, each unit within the Institute will retain administrative, staffing, and funding independence regarding their own programmatic priorities. All units will, however, contribute to shared, Institute-wide resources and support. With the co-Headship of Anthropology as a successful collaborative precedent, and in recognition of the shared participation by both Programs and the need for administrative workload balance and to date few tenured faculty members, the Chairs of FNIS and FNEL will serve as co-Directors of the new Institute. Changes to that structure, if any, will be developed through consultation between the Dean's office, the Advisory Council, and the primary participating units. This governance structure will follow best practice and UBC policy, and will fully incorporate the Institute's Statement of Guiding Principles into its processes.

## ADVISORY COUNCIL

Reflecting ICIS's commitment to both academic and community concerns, an Advisory Council will be struck to help the Institute and its members fully realize its principles and serve its various constituencies as effectively as possible. Membership of the council will be limited to seven, and will include two academic, three community, and two student members. (To ensure that there is no conflict of interest, academic members will not be formal affiliates of the Institute; given UBC's relationship to Musqueam, one position on the Council will be reserved for a Musqueam representative.) The Council will meet at the end of every academic year to review and comment upon the Institute's activities over the previous period and to give guidance on future activities.

## FUNDING AND FACILITIES

The First Nations and Indigenous Studies Program has reserved a significant portion of its carry-forward as seed funding for the Institute. Future funding contributions will come from affiliated units, the Faculty of Arts and other administrative units at UBC, relevant granting agencies, and a robust development campaign, which is currently at its early stages. (We are currently in discussions about hiring a grant writer specifically for the Institute and its projected initiatives.)

Given the expected expanding complement of faculty, staff, and students, space will be an inevitable concern for the Institute. In the initial phase of restructuring, we anticipate the need for more room on the current floor of Buchanan E. Current faculty have office space, and an office has been found for Mark Turin and Daisy Rosenblum, but staff offices are cramped and also serve as storage, and the FNIS sessional/postdoc office currently houses four postdocs and three graduate students in addition to office supplies. Any growth in faculty, staff, postdocs, or graduate students will be a major challenge to accommodate within existing facilities.

Within the next two to five years, a larger and more collaborative space in another centrally accessible area in Arts would be necessary, to ideally include space for events and offices for media



and technology courses and the FNIS Research Practicum, language and transcription labs, shared office space for research fellows and visiting scholars/artists, as well as room for student initiatives like the First Nations Studies Student Association (FNSSA) and their undergraduate Indigenous Studies journal. Other space needs would depend upon affiliated units, but all ICIS facilities requirements would be assessed through extensive consultation with UBC Facilities Planning to ensure effective and efficient use of available resources. (FNIS has already initiated this consultation process. We have a current plan for reorganizing existing offices to better meet current needs, but are hesitant to invest too many resources in the changes until we have a clear sense of our future location.)

#### ANTICIPATED TIMELINE

Our growth plan is incremental and integrated:

- Initial restructuring and consultation with potential partner units underway.
- FNIS and FNEL curriculum renewal beginning October 2013 and to continue through 2014-2015 academic year.
- Formal transition into FNISP and FNEL under ICIS to take place during the 2014-2015 academic year.
- Fundraising campaign to begin summer 2014 (ongoing).
- Formal directorship and permanent governance structure in place by summer 2015.
- Graduate program planning in 2014-15, with first students beginning MA in Critical Indigenous Studies fall 2016 or 2017.
- Ph.D. in Critical Indigenous Studies to begin fall 2018 or 2019.

The availability of facilities and resources will determine the viability of this timeline, but these are currently reasonable estimates for the transition to full Institute status.

#### SUMMARY

Given the increasing prominence and significance of Indigenous issues in Canada and across the globe, UBC's ongoing commitments to Aboriginal engagement and international outreach, and the acute need for more widely disseminated scholarship and accessible learning opportunities within the humanities and social sciences, this is an ideal time for UBC and the Faculty of Arts to support the creation of the Institute for Critical Indigenous Studies (ICIS). Located within the Faculty of Arts and committed to rigorous Indigenous-focused scholarship in the humanities and social sciences, this research and teaching Institute will bring into closer collaboration two internationally recognized academic units—the First Nations and Indigenous Studies Program and the First Nations and Endangered Languages Program—and various affiliate faculty and staff from across the Faculty and University. ICIS will serve as a research hub and learning community for undergraduate and graduate students and visiting scholars and artists, and will serve as the institutional home for local, regional, and international research and teaching partnerships. Structural development will begin in the late fall of 2013, with full implementation of curriculum renewal by 2015 and graduate capacity by 2016/2017.

Although much of the early planning can be accommodated through existing resources of partner units, ICIS will require an expansion in personnel and facilities and a major capital campaign to realize its potential as a major driver of UBC's world leadership in Indigenous scholarship. FNIS and FNEL administration, faculty, and staff are committed to the successful implementation of this expansive vision, in partnership with our campus and community colleagues, and look forward to more extensive discussions with the Dean's office about this proposal, its goals, and its realization.

**ACKNOWLEDGMENTS**

This proposal is the result of significant consultation and discussions between and among FNIS and FNEL faculty and numerous students, administrators, staff members, faculty, and community members, all of whom have provided extensive feedback and assistance in ensuring that it is reflective of and responsive to the needs and priorities of its constituencies. Though too numerous to name here, we hold our hands up in deep gratitude and ongoing commitment. In particular, we would like to thank the following for their good guidance and advice: Elder Larry Grant and Leona Sparrow of the Musqueam Nation; Associate Deans of Arts Mary Lynn Young, Michael Richards, Janet Giltrow, and Anne-Marie Fenger; Professor Linc Kesler and Rick Ouellete of the First Nations House of Learning; Amy Perreault; Professors Patricia Shaw, Mary Bryson, Sunera Thobani, Candace Galla, and Mark Turin; and the members of the First Nations Studies Student Association and FNIS alumni.

<p>Faculty: Arts  <b>Department:</b> FNSP  <b>Faculty Approval Date:</b> 16 October 2014  <b>Effective Session (W or S):</b> W  <b>Effective Academic Year:</b> 2014</p>	<p><b>Date:</b> 4 June 2014  <b>Contact Person:</b> Daniel Justice  <b>Phone:</b> 604-827-5176  <b>Email:</b> daniel.justice@ubc.ca</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>The Institute for Critical Indigenous Studies</b></p> <p><b>The Institute for Critical Indigenous Studies (ICIS) is an interdisciplinary research unit for Indigenous critical theory and politics, arts research, and applied social practice within the humanities and social sciences at UBC. It hosts the First Nations and Indigenous Studies Program (FNIS) and the First Nations and Endangered Languages Program (FNEL). In addition to providing institutional support for undergraduate and graduate education and a home for visiting scholars in the field and Indigenous artists, ICIS fosters ethical research practices and meaningful partnerships with communities that further the social and political health, capacity, and self-determination of Indigenous peoples locally and globally.</b></p>	<p><b>URL:</b> n/a  <b>Present Calendar Entry:</b> n/a</p> <p><b>Type of Action:</b>  Creation of a new research institute housing the First Nations and Indigenous Studies Program (FNIS) (currently the First Nations Studies Program/FNSP) and First Nations and Endangered Languages Program (FNEL) (currently the First Nations Languages Program/FNLG).</p> <p><b>Rationale for Proposed Change:</b>  An Institute for Critical Indigenous Studies, located in the Faculty of Arts, is a much-needed structural evolution that serves a number of purposes: first, it builds upon the many current research and teaching strengths of FNSP and FNLG while being more explicitly inclusive of scholars across the Faculty and combining the strengths of these currently small academic units; second, it provides a high-profile Arts venue for politically grounded, community-relevant research, one that complements but remains distinctive from efforts and work underway elsewhere at UBC; and third, an Institute adds to current Arts capacity in Indigenous Studies by bringing interdisciplinary scholars and community members committed to integrated, trans-disciplinary, and Arts-based research and teaching together in a research hub explicitly dedicated to meaningful and transformational intellectual exchange. Further, an Institute extends structural capacity and provides a sustainable growth platform for the development and expansion of diverse undergraduate learning and service initiatives, graduate and postdoctoral research opportunities,</p>

	community collaborations and public outreach campaigns, and artist and visiting scholar residencies.
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6 March 2015

To: Vancouver Senate

From: Admissions Committee

Re: Suspension of Admission: Bachelor of Dental Science in Dental Hygiene, Degree Completion Option, Category 2 (approval)(circulated)

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**Suspension of Admission: Bachelor of Dental Science in Dental Hygiene, Degree Completion Option, Category 2 (approval)(circulated)**

The Admissions Committee has reviewed and recommends to Senate for approval the proposed suspension of Degree Completion Option, Category 2 admission for the Bachelor of Dental Science in Dental Hygiene. The Degree Completion Option is open to applicants who are graduates of accredited North American Dental Hygiene diploma programs and has two categories: Category 1 applicants have completed 30 credits of university transfer prerequisites in their accredited dental hygiene diploma program; category 2 applicants have not completed these 30 credits.

The program admits 6-8 Category 2 students per year, from an applicant pool of approximately 30-35. The majority of these applicants are graduates of dental hygiene programs from out-of-province colleges. The quality and adherence to national standards for many of these programs have come into question, prompting the national body to undertake an extensive review.

While this review is being conducted, the program would like to suspend Category 2 admission and undertake an evaluation to ensure that students admitted through all pathways are suitably prepared for the program and that the endpoints of all admission pathways are equivalent in achieving the UBC competencies and National Standards. The UBC competencies are used to describe the essential knowledge, skills and attitudes important for the practice of a profession. The suspension of Category 2 will assist the Faculty in achieving this objective.

***Motion:*** *That Senate approve suspension of admission to the Bachelor of Dental Science in Dental Hygiene Degree Completion Option Category 2, effective for the 2015 Winter Session and thereafter.*

Respectfully submitted,

Dr. Robert Sparks  
Chair, Senate Admissions Committee



## UBC Admissions Proposal Form

<p><b>Faculty:</b> Dentistry  <b>Department:</b> Dean's Office  <b>Faculty Approval Date:</b> November 2014  <b>Effective Session (W or S):</b> for 2015 Calendar release  <b>Effective Academic Year:</b> For students entering the B.D.Sc. (Dental Hygiene) program in September 2016</p>	<p><b>Date:</b> 26 January, 2015  <b>Contact Person:</b> Vicki Koulouris  <b>Phone:</b> 2-4486  <b>Email:</b> vkoulouris@dentistry.ubc.ca</p>
<p><b>Homepage &gt; Faculties, Colleges, and Schools &gt; The Faculty of Dentistry &gt; Dental Hygiene Degree Program</b></p> <p><b>Proposed Calendar Entry:</b></p> <p>The Faculty of Dentistry offers a multiple admissions approach to the Dental Hygiene Degree Program. The admission options or entry points are:</p> <ol style="list-style-type: none"> <li>1. Entry-to-Practice Admission Option  The Entry-to-Practice admission option, open to secondary school graduates and applicants with post-secondary education, is the entry point to full-time, four-year studies at UBC that includes development of the knowledge base and pre-clinical and clinical skills required to earn the B.D.Sc. degree in Dental Hygiene and become a registered dental hygienist (RDH).</li> <li>2. Direct Entry Admission Option</li> </ol> <p>The Faculty of Dentistry is not accepting applications to the Direct Entry admission option at this time.</p> <ol style="list-style-type: none"> <li>3. Dental Hygiene Degree Completion Admission Option</li> </ol>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,201,315,0">http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,201,315,0</a></p> <p><b>Homepage &gt; Faculties, Colleges, and Schools &gt; The Faculty of Dentistry &gt; Dental Hygiene Degree Program</b></p> <p><b>Present Calendar Entry:</b></p> <p>The Faculty of Dentistry offers a multiple admissions approach to the Dental Hygiene Degree Program. The admission options or entry points are:</p> <ol style="list-style-type: none"> <li>1. Entry-to-Practice Admission Option  The Entry-to-Practice admission option, open to secondary school graduates and applicants with post-secondary education, is the entry point to full-time, four-year studies at UBC that includes development of the knowledge base and pre-clinical and clinical skills required to earn the B.D.Sc. degree in Dental Hygiene and become a registered dental hygienist (RDH).</li> <li>2. Direct Entry Admission Option</li> </ol> <p>The Faculty of Dentistry is not accepting applications to the Direct Entry admission option at this time.</p> <ol style="list-style-type: none"> <li>3. Dental Hygiene Degree Completion</li> </ol>



<p>The Dental Hygiene Degree Completion admission option, open to dental hygienists who are graduates of accredited North American Dental Hygiene diploma programs, is the entry point to full or part-time studies leading to the B.D.Sc. degree in Dental Hygiene.</p> <p>4. International Dental Hygiene Degree Completion Admission Option The International Dental Hygiene Degree Completion admission option, open to dental hygienists who are graduates of non-North American Dental Hygiene programs, is the entry point to full or part-time studies leading to the B.D.Sc. degree in Dental Hygiene.</p> <p>...</p> <p><b>Aboriginal Applicants</b></p> <p>...</p> <p><b>Admission:</b></p> <p>1. Entry-to-Practice <b>Admission</b> Option</p> <p>...</p> <p>2. Direct Entry <b>Admission</b> Option –</p> <p>NOTE: The Faculty of Dentistry will not be accepting applications to the Direct Entry admission option at this time.</p> <p><b>Degree Completion Option</b></p> <p>3. Dental Hygiene Degree Completion (category 1 or 2) <b>Admission</b> Option (for dental hygiene diploma graduates)</p> <p>Admission to the Dental Hygiene Degree</p>	<p><b>Admission Option</b></p> <p>The Dental Hygiene Degree Completion admission option, open to dental hygienists who are graduates of accredited North American Dental Hygiene diploma programs, is the entry point to full or part-time studies leading to the B.D.Sc. degree in Dental Hygiene.</p> <p>4. International Dental Hygiene Degree Completion Admission Option</p> <p>The International Dental Hygiene Degree Completion admission option, open to dental hygienists who are graduates of non-North American Dental Hygiene programs, is the entry point to full or part-time studies leading to the B.D.Sc. degree in Dental Hygiene.</p> <p>...</p> <p><b>Aboriginal Applicants</b></p> <p>...</p> <p><b>Admission</b></p> <p>1. Entry-to-Practice Option</p> <p>...</p> <p>2. Direct Entry Option –</p> <p>NOTE: The Faculty of Dentistry will not be accepting applications to the Direct Entry admission option at this time.</p> <p><b>Degree Completion Option</b></p> <p>3. Dental Hygiene Degree Completion (category 1 or 2) Option (for dental hygiene diploma graduates)</p> <p>Admission to the Dental Hygiene Degree</p>
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<p>Completion admission option is based upon:</p> <ul style="list-style-type: none"> <li>• academic performance (overall GPA)</li> <li>• personal statement</li> </ul> <p>An in-person admissions interview is mandatory. Only eligible candidates will be invited for an interview at the discretion of the admission committee.</p> <p>Applicants must meet the <a href="#">Admissions</a> requirements of the University (see <a href="http://you.ubc.ca/vancouver">you.ubc.ca/vancouver</a>).</p> <p>There are two categories of students in the Degree Completion option: Category 1 and Category 2, which are detailed in bullets 3.1 and 3.2 respectively. Visit <a href="#">Dentistry</a> to determine eligibility for the appropriate admission category. Students in either category may undertake studies on a full or part-time basis. Part-time students will have up to five years to complete the program.</p> <p><b>3.1 Category 1 - Students who have completed 30 credits of university transfer prerequisites.</b></p> <p>Graduates of dental hygiene diploma programs accredited by the Commission of Dental Accreditation of Canada (CDAC) or the Commission of Dental Accreditation (CODA) of the American Dental Association (ADA) with a minimum overall average of 70% are eligible for admission to the fourth year of the Program. Current registration, in good standing, with a regulatory authority where the applicant has practiced most recently and a Canadian National Dental Hygiene Certification Board Examination Certificate or the American National Board Certificate are required. If an applicant is a recent graduate of a dental hygiene diploma program seeking to enter the Dental Hygiene Degree Program directly and has not yet practiced, then a recommendation letter from the director of the dental hygiene</p>	<p>Completion admission option is based upon:</p> <ul style="list-style-type: none"> <li>• academic performance (overall GPA)</li> <li>• personal statement</li> </ul> <p>An in-person admissions interview is mandatory. Only eligible candidates will be invited for an interview at the discretion of the admission committee.</p> <p>Applicants must meet the <a href="#">Admissions</a> requirements of the University (see <a href="http://you.ubc.ca/vancouver">you.ubc.ca/vancouver</a>).</p> <p>There are two categories of students in the Degree Completion option: Category 1 and Category 2, which are detailed in bullets 3.1 and 3.2 respectively. Visit <a href="#">Dentistry</a> to determine eligibility for the appropriate admission category. Students in either category may undertake studies on a full or part-time basis. Part-time students will have up to five years to complete the program.</p> <p><b>3.1 Category 1 - Students who have completed 30 credits of university transfer prerequisites.</b></p> <p>Graduates of dental hygiene diploma programs accredited by the Commission of Dental Accreditation of Canada (CDAC) or the Commission of Dental Accreditation (CODA) of the American Dental Association (ADA) with a minimum overall average of 70% are eligible for admission to the fourth year of the Program. Current registration, in good standing, with a regulatory authority where the applicant has practiced most recently and a Canadian National Dental Hygiene Certification Board Examination Certificate or the American National Board Certificate are required. If an applicant is a recent graduate of a dental hygiene diploma program seeking to enter the Dental Hygiene Degree Program directly and has not yet practiced, then a recommendation letter from the director of the</p>
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<p>diploma program is required.</p> <p>Applicants seeking to enter Category 1 must have completed 30 credits of university transfer courses including:</p> <ul style="list-style-type: none"> <li>• 6 credits of first-year biology (anatomy and physiology)</li> <li>• 6 credits of first-year chemistry</li> <li>• 6 credits of first-year English</li> <li>• 6 credits of first or second-year psychology</li> <li>• 6 credits of electives (3 credits of statistics preferred)</li> </ul> <p>See <a href="#">Admissions</a> for information on application procedures and UBC admission policies. All applicants must complete the Dental Hygiene Degree Program on-line personal statement <a href="#">application</a>.</p> <p>The required non-refundable application fee and all supporting documents must be submitted to the Manager, Admissions, Faculty of Dentistry. Incomplete and late applications will not be considered.</p> <p>All inquiries relating to admission should be addressed to the Dentistry <a href="#">Admissions</a> Office.</p> <p>Further information about the program coursework can be found in <a href="#">the-UBC Calendar and Faculty website</a>.</p> <p><b>3.2 Category 2 – Students who have NOT completed 30 credits of university transfer prerequisites.</b></p> <p><b>The Faculty of Dentistry is not accepting applications to the Degree Completion Admission Option-Category 2 at this time.</b></p>	<p>dental hygiene diploma program is required.</p> <p>Applicants seeking to enter Category 1 must have completed 30 credits of university transfer courses including:</p> <ul style="list-style-type: none"> <li>• 6 credits of first-year biology (anatomy and physiology)</li> <li>• 6 credits of first-year chemistry</li> <li>• 6 credits of first-year English</li> <li>• 6 credits of first or second-year psychology</li> <li>• 6 credits of electives (3 credits of statistics preferred)</li> </ul> <p>See <a href="#">Admissions</a> for information on application procedures and UBC admission policies. All applicants must complete the Dental Hygiene Degree Program on-line personal statement <a href="#">application</a>.</p> <p>The required non-refundable application fee and all supporting documents must be submitted to the Manager, Admissions, Faculty of Dentistry. Incomplete and late applications will not be considered.</p> <p>All inquiries relating to admission should be addressed to the Dentistry <a href="#">Admissions</a> Office.</p> <p>Further information about the program coursework can be <del>viewed on the</del> <a href="#">Faculty website</a>.</p> <p><b>3.2 Category 2 - Students who have NOT completed 30 credits of university transfer prerequisites.</b></p>
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### **Graduates of dental hygiene diploma programs**

accredited by the Commission of Dental Accreditation of Canada (CDAC) or the Commission of Dental Accreditation (CODA) of the American Dental Association (ADA) with a minimum overall average of 70% are eligible for admission to third year of the Program. Current registration, in good standing, with a regulatory authority where the applicant has practiced most recently, and a Canadian National Dental Hygiene Certification Board Examination Certificate or the American National Board Certificate are required. If an applicant is a recent graduate of a dental hygiene diploma seeking to enter the Dental Hygiene Program directly and has not yet practiced, then a recommendation letter from the director of the dental hygiene diploma program is required.

Applicants NOT completing the 30 credits of university transfer courses including 6 credits of first-year biology (anatomy and physiology), 6 credits of first-year chemistry, 6 credits of first-year English, 6 credits of first or second-year psychology, and 6 credits of electives are eligible to apply under Category 2.

See [Admissions](#) for information on application procedures and UBC admission policies. All applicants must complete the Dental Hygiene Degree Program on-line personal statement [application](#).

The required non-refundable application fee and all supporting documents must be submitted to the Manager, Admissions, Faculty of Dentistry. Incomplete and late applications will not be considered.

All inquiries relating to admission should be addressed to the Dentistry [Admissions](#) Office.

Further information about the program

accredited by the Commission of Dental Accreditation of Canada (CDAC) or the Commission of Dental Accreditation (CODA) of the American Dental Association (ADA) with a minimum overall average of 70% are eligible for admission to third year of the Program. Current registration, in good standing, with a regulatory authority where the applicant has practiced most recently, and a Canadian National Dental Hygiene Certification Board Examination Certificate or the American National Board Certificate are required. If an applicant is a recent graduate of a dental hygiene diploma seeking to enter the Dental Hygiene Program directly and has not yet practiced, then a recommendation letter from the director of the dental hygiene diploma program is required.

Applicants NOT completing the 30 credits of university transfer courses including 6 credits of first-year biology (anatomy and physiology), 6 credits of first-year chemistry, 6 credits of first-year English, 6 credits of first or second-year psychology, and 6 credits of electives are eligible to apply under Category 2.

See [Admissions](#) for information on application procedures and UBC admission policies. All applicants must complete the Dental Hygiene Degree Program on-line personal statement [application](#).

The required non-refundable application fee and all supporting documents must be submitted to the Manager, Admissions, Faculty of Dentistry. Incomplete and late applications will not be considered.

All inquiries relating to admission should be addressed to the Dentistry [Admissions](#) Office.

Further information about the program



<p>coursework can be <b>found in</b> the <a href="#">UBC Calendar</a> and <a href="#">Faculty website</a>.</p> <p>4. International Dental Hygiene Degree Completion Admission Option</p> <p>...</p> <p>Further information about the program coursework can be <b>found in</b> the <a href="#">UBC Calendar</a> and <a href="#">Faculty website</a>.</p> <p>Acceptance</p> <p>1. Entry-to-Practice Applicants</p> <p>...</p> <p>For more detailed information please view the website: <a href="http://www.dentistry.ubc.ca/Education/Hygiene/EntryToPractice/default.asp">www.dentistry.ubc.ca/Education/Hygiene/EntryToPractice/default.asp</a></p> <p>2. Direct Entry Applicants</p> <p>NOTE: The Faculty of Dentistry is not accepting applications to the Direct Entry admission option at this time.</p> <p><b>3. Degree Completion Applicants</b></p> <p>...</p> <p><b>4. International Degree Completion Applicants</b></p> <p>...</p> <p><b>Readmission</b></p>	<p>coursework can be <b>viewed on</b> the Faculty website.</p> <p>4. International Dental Hygiene Degree Completion Admission Option</p> <p>...</p> <p>Further information about the program coursework can be <b>viewed on</b> the Faculty website.</p> <p>Acceptance</p> <p>1. Entry-to-Practice Applicants</p> <p>...</p> <p>For more detailed information please view the website: <a href="http://www.dentistry.ubc.ca/Education/Hygiene/EntryToPractice/default.asp">www.dentistry.ubc.ca/Education/Hygiene/EntryToPractice/default.asp</a></p> <p>2. Direct Entry Applicants</p> <p>NOTE: The Faculty of Dentistry is not accepting applications to the Direct Entry admission option at this time.</p> <p><b>3. Degree Completion Applicants</b></p> <p>...</p> <p><b>4. International Degree Completion Applicants</b></p> <p>...</p> <p><b>Readmission</b></p> <p>...</p>
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### Program Inquiries

All inquiries relating to the Dental Hygiene Degree Program should be addressed to:

Student Services Office  
Faculty of Dentistry  
The University of British Columbia  
278-2199 Wesbrook Mall  
Vancouver, BC, V6T 1Z3  
Tel: 604.822.9726  
Fax: 604.822.8279  
Email: [dhygadm@dentistry.ubc.ca](mailto:dhygadm@dentistry.ubc.ca) (Faculty of Dentistry Admissions)

### Program Inquiries

All inquiries relating to the Dental Hygiene Degree Program should be addressed to:

Student Services Office  
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Fax: 604.822.8279  
Email: [dhygadm@dentistry.ubc.ca](mailto:dhygadm@dentistry.ubc.ca) (Faculty of Dentistry Admissions)

### Type of Action:

1. Add a moratorium on admission to Degree Completion **Category 2** until further notice.
2. Editorial changes

### Rational for Proposed Changes:

1. The Dental Hygiene Degree Program (DHDP) has been involving over the last 20 years. At the moment, there is one program (DHDP) but two pathways granting the same Bachelor of Dental Science degree, entry-to-practice and degree completion. Within the degree completion pathway there are two categories, category I applicants who has completed 30 credits of university transfer **prerequisites** to an accredited dental hygiene diploma program and category II who have not achieved the 30 credits university transfer.

The Faculty is in the process of evaluating the program (DHDP) to ensure the endpoints of both entry-to-practice and all degree completion pathways are equivalent in achieving the UBC competencies and National Standards. The UBC competencies are used to describe the essential knowledge, skills and attitudes important for the practice of a profession. A moratorium on Category II will

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	<p>assist the Faculty in achieving this objective.</p> <p>2. Editorial changes: Editorial changes to describe and clarify the Dental Hygiene admissions procedures.</p>
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18 March 2015

To: Vancouver Senate

From: Senate Curriculum & Admissions Committees

Re: Master of Engineering Leadership in Dependable Software Systems  
(approval)

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The Senate Curriculum and Admissions Committees have reviewed the material forwarded to them by the Faculty of Applied Science and enclose those proposals they deem ready for approval.

The following is recommended to Senate:

**Motion:** *“That the new Master of Engineering Leadership (M.E.L.) in Dependable Software Systems program and its associated new and revised courses be approved.”*

Respectfully submitted,

Dr Peter Marshall, Chair, Senate Curriculum Committee  
Dr Robert Sparks, Chair, Senate Admissions Committee



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**FACULTY OF APPLIED SCIENCE**

*New program and new and revised courses*

Master of Engineering Leadership in Dependable Software Systems; EECE 513 (3) Error Resilient Computing Systems; EECE 514 (3) Software Verification and Testing



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**Provost and Vice President Academic**  
Walter C. Koerner Library  
1958 Main Mall  
Vancouver, BC Canada V6T 1Z2

Phone 604 822 4948  
Fax 604 822 3134

**Memo**

**To:** Paul Harrison, Chair, Senate Academic Policy Committee

**From:** David Farrar, Provost and Vice-President Academic

A handwritten signature in dark ink, appearing to read 'DAF', followed by a horizontal line.

**Date:** January 15, 2015

**Re:** **Administration of Master of Engineering Leadership Programs**

The Dean of the Faculty of Applied Science has requested that the proposed new graduate professional programs be officially designated as professional programs and that they be administered by the Faculty of Applied Science rather than by the Faculty of Graduate and Postdoctoral Studies.

The proposed programs are:

- Master of Engineering Leadership in Advanced Materials Manufacturing
  - Master of Engineering Leadership in Clean Energy Engineering
  - Master of Engineering Leadership in Dependable Software Systems
  - Master of Engineering Leadership in Green Bio-Products
  - Master of Engineering Leadership in Integrated Water Management
  - Master of Engineering Leadership in Naval Architecture and Marine Engineering
  - Master of Engineering Leadership in Urban Systems
  - Master of Health Leadership in Seniors Care
1. I am satisfied that these programs meet the criteria for designation as professional graduate programs.
  2. For the reasons outlined below, I support these programs being administered by the Faculty of Applied Science
    - a) All criteria laid out "Optional Transfer of Professional Graduate Programs from the Faculty of Graduate and Postdoctoral Studies to the Disciplinary Faculties" document, approved by Senate in January of 2005, have been met.
    - b) The Faculty of Applied Science has been successfully handling the administration of the Master of Engineering programs for nearly a decade. In that time, the Faculty of Applied Science gained considerable experience in effective graduate program administration. There is a healthy and productive relationship between the Faculty of Graduate and Postdoctoral Studies and Applied Science which all expect to continue.
    - c) The Faculty of Applied Science has the resources, including staff and financial resources, to provide the suite of services the Faculty of Graduate and Postdoctoral Studies provides for most graduate programs including financial support for students, student appeals, and matters relating to admissions and compliance with requirements for degree completion.



- d) This does not set a precedent. Decisions about the administration of future new graduate professional programs will be made in accordance with the guidelines approved by Senate in January, 2005.
- e) I have consulted with Vice-Provost and Dean, Graduate and Postdoctoral Studies, Dr. Susan Porter. She agrees to this request because the M.Eng. Programs are already administered by the Faculty of Applied Science, and the Masters of Engineering Leadership are closely related to the M.Eng. programs.

**EXECUTIVE SUMMARY**  
**MASTER OF ENGINEERING LEADERSHIP IN DEPENDABLE SOFTWARE**  
**SYSTEMS**  
**FACULTY OF APPLIED SCIENCE**  
**UNIVERSITY OF BRITISH COLUMBIA**  
**FEBRUARY 22, 2015**

**Overview**

The University of British Columbia is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. It creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning. The program strives to provide students with a comprehensive and innovative education that enables them to build on their past work experience and technical skills, adding leadership and interdisciplinary opportunities for learning and interaction with other students. Consultation with stakeholders has revealed that experienced engineers and early-career professionals in the chosen focus areas require sector-relevant, cross-disciplinary technical skills. They also require project management, communication and business skills to be effective leaders.

Modern computer systems have become tightly intertwined with our daily lives. However, they are failure-prone and difficult to manage. Their dependability is critical in a variety of contexts (healthcare and medical systems, energy systems, transportation systems, banking, etc.). Dependability-related problems dominate total cost of ownership of computer systems, and unfortunately, they have no simple solutions. There is a realization that these problems cannot be decisively solved, but are ongoing facts of life that must be dealt with regularly. The challenges are multi-faceted: hardware faults, software bugs, security issues. To tackle these challenges, engineers need to understand the source of these problems, some of which are engineering design errors, and others are due to process and project management failures. The proposed program will provide a broad foundation for analyzing and improving the dependability of software systems. The pervasiveness of software systems makes this a program that can impact a variety of application areas, and will be attractive to many software engineers.

The time is now appropriate to move research ideas into widespread practice and that is the purpose of a specialized professional master's program in this area. Software dependability is often an orthogonal consideration in software projects because it is not a functionality issue. Leadership is needed in organizations to make software dependability a core value.

**Credential**

The credential awarded will be the Master of Engineering Leadership (M.E.L.) in Dependable Software Systems (D.S.S.). The degree will be a master's degree with a balance between advanced engineering theories, interdisciplinary knowledge and real-world applications. The field of study will be advanced technology and techniques for dependable software system applications.

**Location**

The Vancouver Campus of UBC is the main location for classroom education and administration. Course instruction and assignments will be achieved through collaborations among UBC, provincial and federal agencies and local private sector stakeholders involved in dependable software systems research and development.

**Faculty Offering Program**

The program will be offered formally, administered and delivered by the Faculty of Applied Science, UBC.

**Program Start Date**

The program will be offered in the 2015/2016 academic year, beginning in January 2016.

**Program Completion Time**

Anticipated time for completion of the program is 1 year of full-time academic study, including any work-term placements and non-academic activities.

**Objectives of the Proposed Program**

The Master of Engineering Leadership program in Dependable Software Systems is intended to provide software systems professionals with multifaceted development opportunities. The key goals of the program are:

1. Equip software professionals of tomorrow with in-depth knowledge of principles and techniques for developing dependable systems including software testing and verification, error resilient computing, computer security, and software processes and project management.
2. Enable translation of research ideas to practice.
3. Develop leadership and business skills that will help graduates instill best practices in organizations around software dependability and establish Vancouver, British Columbia and Canada as leading venues for such activity.
4. Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.
5. Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's companies to benefit from the minds of UBC's top graduate-level students.
6. Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with sector professionals in the Vancouver region – particularly as Vancouver is growing as a software technology hub.
7. Emerge as the leading institution for the continuing education of current leaders in the area of dependable software systems and for the training of tomorrow's leaders.
8. Continue to recruit and retain excellent faculty members with international expertise in dependable computing and software systems.

**Program Learning Outcomes**

The learning outcomes of the M.E.L. in D.S.S. program are to:

- Understand how software-intensive systems are engineered through collaborative processes
- Deepen understanding of teams in collaborative system development.
- Master and apply core disciplinary knowledge as relates to software testing and verification, dependable computing systems design and implementation, and secure computing systems.
- Develop abilities for problem formulation, organization and planning of the solution process in the technical space.
- Gain exposure to dependability issues in the most common software-intensive industries.
- Gain project design experience in an application area.
- Develop communication of ideas and decision justification.
- Enable self-directed learning and professional development.
- Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability)
- Use data appropriately for technical and business decision-making
- Understand the critical components of how business works

### **Contribution to UBC's Mandate and Strategic Plan**

In *Place and Promise: The UBC Plan*, our vision statement is: "As one of the world's leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world." The program will act as one route to the fulfillment of this promise. With the involvement of faculty from all areas in APSC and the partnership of the Faculty of Commerce and Business Administration; the development of new facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored project topics, and co-op job placements, the program will offer an exceptional learning environment for students and faculty. In addition, the program will attract students from around the world to study in Vancouver's diverse environment and graduate students, who will, in turn, be in demand across the globe.

### **Delivery Methods**

The Faculty of Applied Science (APSC) has taken the lead in developing a conceptual framework for new Professional Programs comprising a common "Platform" that provides the professional skills required for an experienced graduate to be an effective professional leader, with "Pillars" of specialization courses in particular sectors relevant to APSC's educational mission and professional communities (the term Platform refers to foundation coursework focused on project management, data analysis, and leadership skills, while the term Pillar is equivalent to specialization). The program will be delivered as an intensive one-year program. It is anticipated that this program will be favourable to post-professional students already in the workplace. The Platform will be delivered by faculty from APSC and the Faculty of Commerce and Business Administration.

The program requires a minimum of 30 credits of coursework. The distribution will be 12 credits dedicated to the Platform providing the professional skills required for an experienced graduate to be an effective technical manager and 18 credits dedicated to the Pillar in advanced technical courses. Both the Platform and the Pillar have prescribed core courses. The Pillar contains

technical courses particular to the development of dependable software, including software testing and verification, computer security, error-resilient computing and software project management. For this program there will be 3 credits of constrained electives. A capstone project, which is part of the core technical courses, will help students to apply the learning from other coursework and develop a portfolio to reflect their capabilities.

### **Linking Learning Outcomes and Curriculum Design, Optional Work-terms**

The number and variety of courses available to students is purposely limited to ensure a robust and streamlined learning experience that is centered on the program learning outcomes. Each of these outcomes corresponds to at least one of the core courses and summarizes the goal of that course. Work experience is an essential admission requirement and also a key feature of the optional co-op component.

### **Program Strengths**

Dependability of software systems is gaining much attention and importance with the pervasiveness of software systems. The ubiquity of these systems requires that these systems perform correctly with high confidence, and building such systems requires a multifaceted approach. This program addresses key concepts, namely:

- System correctness within specifications
- System robustness outside of specifications
- System security in case of hostile use outside of specification
- Software project lifecycle management for robust systems.

The world economy could not function without reliable and efficient software to run the many computational devices and processes that allow the management of complex supply chains for production and distribution of goods and services. Global financial markets, regulation of power generation, telecommunications and public transport are all controlled with computer software, as is the manufacturing of equipment, vehicles, and household appliances. Even the entertainment we consume is largely produced with specialized software. According to the BC Technology Industry Association, BC has one of the top tech ecosystems in the world. It was home to over 9,000 tech companies and generated over \$23bn in revenues annually; it also nearly doubled in size since 2002. In the area of software development, BCTIA counted close to 100 companies as members. These firms specialized in developing software programs for water monitoring, records management, valuation of financial securities, spatial data infrastructure, film special fx, and gaming. Vancouver is both a longstanding a growing hub for tech companies that rely on the development of large, dependable software systems. Examples companies include MacDonald Detwiler Associates, SAP, Absolute Software, and more recently HootSuite, Microsoft, and Amazon. British Columbia and Canada need the proposed program for the success of the provincial and federal software industries to stay competitive with international markets. Given UBC's location, the research of current faculty, it is appropriate that UBC be the institution to implement a graduate-level programs that are lacking in Canada and are now more important than ever.

The program offers a comprehensive curriculum that is grounded in a collaborative project embedded in the Platform coursework, and that draws upon the combined expertise of faculty in the participating units. The Department of Electrical & Computer Engineering at UBC has faculty members that are known for their expertise in the core topics within the program.

**Related Programs at UBC or other BC Post-secondary Institutions**

A selection of courses offered through existing graduate programs will be used for the new program as well as the creation of new courses. There are currently no existing programs at UBC or within British Columbia that offer this program's combination of technical skills and advanced leadership training. There is no master's program that covers this specific niche. There are professional master's programs in software engineering offered by many institutions in Canada, but they are more general in nature.

**Institutional Contact**

University of British Columbia

Faculty of Applied Science

Elizabeth Croft, Associate Dean, Education & Professional Development

604-822-6614 [elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca)

**Appendix to the Executive Summary (for internal UBC purposes only)****Budget and Funding**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020. Tuition is \$27,000 per year for domestic students and \$46,000 per year for international students. The M.E.L. in D.S.S. will not impact the enrolment of existing programs such as the M.Eng. in Electrical & Computer Engineering or the Master of Software Systems which have different admission requirements and attract a different learner audience.

**Space Requirements**

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

**Library**

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support, and the Platform courses requiring new resources will be funded by the APSC Dean's Office. (See Appendix 2 and 3 and Appendix 7 Platform Proposal)

## 1. Introduction

This proposal represents one of a suite of new professional programs to be offered at the master's level in the Faculty of Applied Science (APSC). The programs were developed in parallel and will be delivered in parallel. That is, there will be a common start date and timeline for cohorts in all of the programs. A key feature of this suite of programs is that they are structured in two parts, which will be referred to as the "Platform" and the discipline-specific "Pillar". The Platform is foundational coursework focused on project management, data analysis, and leadership skills. It is a largely common element accessible to the suite of new APSC professional programs. The Dependable Software Systems pillar will provide the technical skills and knowledge needed to develop robust software systems that are, ideally, bug-free, secure and resilient to hardware faults. Students will develop an in-depth knowledge of the principles and techniques used in developing dependable systems, including software testing and verification methods, error resilient computing, computer security, and software processes and project management.

Successful completion of the Platform and a Pillar will result in the granting of one degree. Details of the contents of both the Platform and the Dependable Software Systems Pillar are documented in this proposal.

## 2. Program Rationale

### 2.1. Defining the Need for the Program

Over the past year, members of the University's Flexible Learning Initiative and the APSC Dean's office have formed and worked closely with a Program Advisory Committee consisting of faculty from all areas of APSC. The following program proposal is the result of collaborative planning on the part of this committee.

### 2.2. Professional Program Mission Statement and Context

*The University of British Columbia, Faculty of Applied Science, wishes to attract students into a **high quality, sector-focused, distinctive & integrated** Applied Science Professional Program that has resources to be delivered sustainably and fiscally meets the University's goals.*

1. **UBC continues to encourage innovative** learning approaches within the fiscal model of cost recovery.
2. **The Flexible Learning Strategy** introduced in 2014 lists the development of new Professional Programs as a priority.

UBC has the opportunity to deliver a distinctive APSC Program in line with the University's Professional Program objectives.

### 2.3. Applied Science Professional Program Approach

#### 2.3.1. Guiding Principles of the Program Advisory Committee

1. There is meaningful engagement with stakeholders in market research, development, delivery and career opportunities.
2. Our target market is candidates who might consider either an M.B.A. or M.Eng. Management, but would prefer to develop both sector-relevant technical skills and management and leadership skills – our program will be distinctive in the market.
3. We take advantage of a standardization of core courses to improve quality of offering while reducing costs and complexity.
4. The program is positioned as a premium alternative to a conventional professional master's program by offering distinctive, high quality, cross-disciplinary technical and non-technical skills to the experienced professional who wants to become a Sector Specialist.
5. Pillars are developed around areas of unique research and teaching strength in APSC, where multiple program “Faculty Champions” are identified, that have strong relevance to our professional community and societal benefit, have strong learner demand, and have strong industry demand for people trained in this sector.
6. Graduate courses offered in the Dependable Software Systems Pillar will be open to all APSC graduate students with the appropriate prerequisites, and similarly to students in other graduate programs, space permitting. This will allow APSC to revitalize our graduate program offerings around areas of research and teaching strength, build strong interdisciplinary sector training capacity, and improve our connections to our professional community.

### **2.3.2. Extensive Market Research was used to develop the Value Propositions**

In order to establish the viability of offering new programs, the following activities were undertaken to validate the structure and proposed D.S.S. Pillar. Market research information is provided in Appendix 6. The objectives and curriculum were developed in conjunction with meaningful stakeholder consultation in 3 phases.

1. Market research & concept development conducted through:
  - a. Multiple meetings of the Inter-Disciplinary Working Committee of Applied Science that included the following core members:
    - i. Elizabeth Croft (Associate Dean)
    - ii. James Olson (Associate Dean)
    - iii. Hugh Brock (Vice Provost)
    - iv. Reza Vaziri (Head of Civil Engineering)
    - v. Peter Englezos (Head of Chemical & Biological Engineering)
    - vi. Sathish Gopalakrishnan (Associate Head in Electrical Engineering)
    - vii. Scott Dunbar (Head of Mining)
    - viii. Walter Merida (Director of Clean Energy Research Centre)
    - ix. Jon Mikkelson (Director of Naval Architecture & Marine Engineering)
    - x. Panos Nasiopoulos (Director of ICICS)
  - b. Survey of current M.Eng students and alumni (Appendix 6)
  - c. Survey of APSC employers (via Co-op Database) (Appendix 6)



- d. Desktop research of comparable programs in Canada and the United States of America
2. Validation by external sector expert  
Validation: June 27 2014
  - Steve Adolph (Development Knowledge)
  - Philippe Kruchten (UBC)
3. Refinement through sector focus groups  
Dependable Software System Focus Group: August 28 2014
  - Ajai Sehgal (Hootsuite)
  - Jarrod Levitan (Trinimbus)
  - Joel Greensite (Flexsmart)
  - David Liao (Ensemble)
  - Thomas Ng (Ericsson) – by correspondence after the date

Specific findings of this group were:

- The candidate positions for graduates of this program would be a Senior Development Manager, senior Developer or Product Manager. This would set them up well with 5 years of work experience and it would probably apply to multiple disciplines.
- The Platform design was applicable to everything that leaders in the software industry do.
- The target market should include computer science students, not just computer engineers or software engineers. This would be an transformational program for computer science students
- The content is useful for targeting someone with 3-5 years, but it has to be a stepping stone to something else (possibly a future M.B.A.).

### **2.3.3. Market Insights**

Consistently repeated messages, related to the potential student market and the relevance of the particular focus areas, were heard through all market research activities outlined above.

For example:

1. Experienced engineers in their chosen careers require sector-relevant, cross-disciplinary technical skills.
2. Engineers require project management, communication and business skills to be effective leaders.
3. Few, if any, schools in Canada and the United States of America offer this combination of skills in a technical master's program.
4. There is a demonstrated need for a program. (Figure 1)
5. Students are willing to apply to graduate-level programs that are relevant to the stakeholders in their chosen sector. (Figure 2)

Figure 1 Estimated Market Size (number of students per year - Engineering)

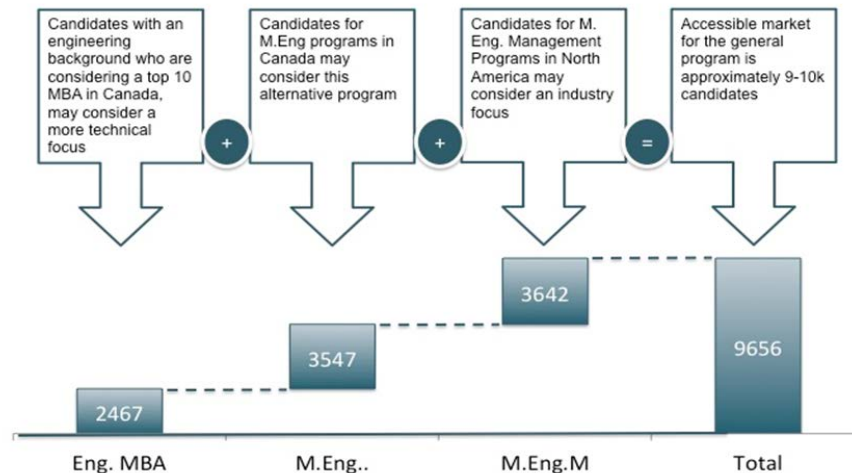
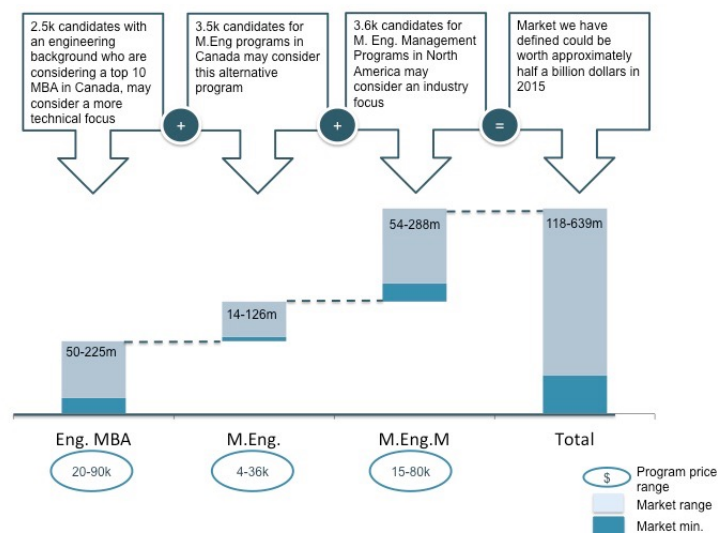


Figure 2 Estimated Market Size (\$ per year - Engineering)

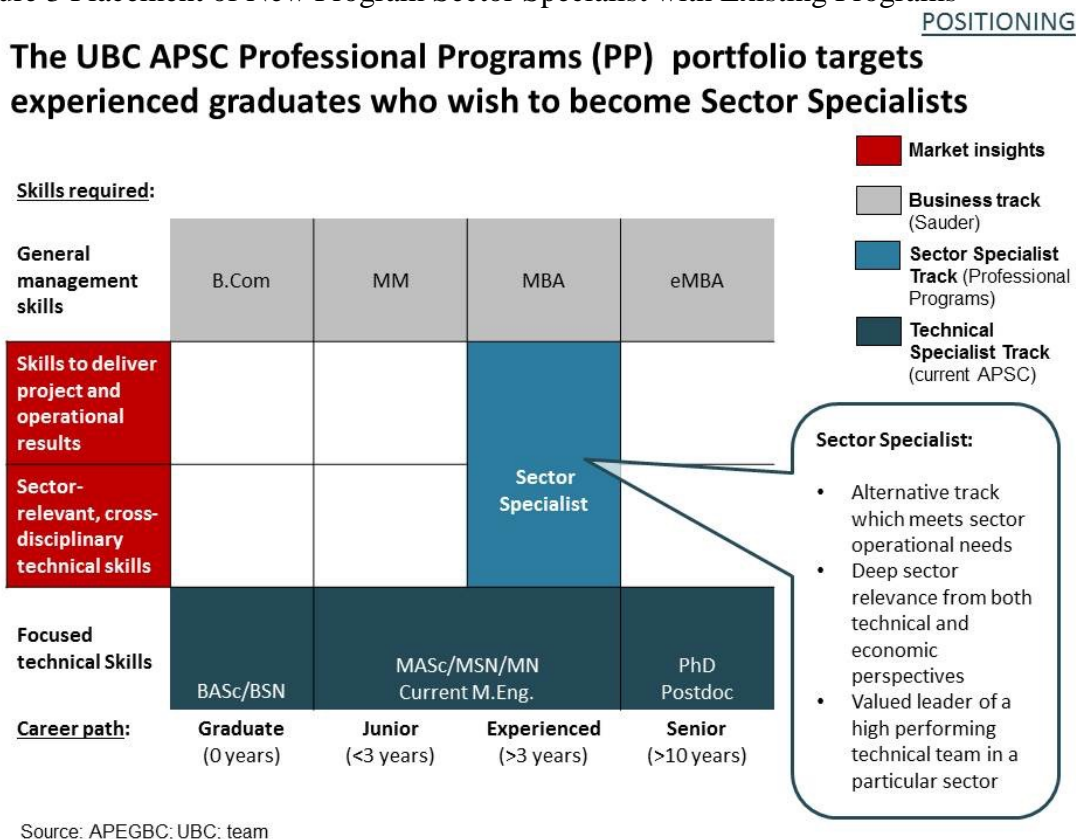


## 2.4. Program Overview

### 2.4.1. Mission

The program strives to provide students with a comprehensive and innovative education that will enable them to advance their career in a path that is different from the traditional APSC course-based master's or the Master of Business Administration (M.B.A.). The program is structured to provide a combination of advanced technical skills, integrated with professional skills, which will enable graduates to practice these skills and advance their career trajectory in their chosen industries.

Figure 3 Placement of New Program Sector Specialist with Existing Programs



## 2.4.2. Objectives of the Proposed Program

Dependability of software systems is gaining much attention and importance with the pervasiveness of software systems. One example that illustrates a change in view is that the Fault-Tolerant Computing Symposium (FTCS), a leading research venue for work in this area, was rebranded in 2000 as the International Conference on Dependable Systems and Networks (DSN). The time is now appropriate to move research ideas into widespread practice and that is the purpose of a specialized professional Master's program in this area. This is also why an M.E.L. degree fits a niche that will be attractive. The degree will provide the software professional of the future access to both the leadership and management training and the toolset of technical knowledge that this program aims to provide. Accordingly, the M.E.L. in D.S.S. program will:

1. Equip tomorrow's professionals with the critical thinking and practical skills necessary to make important contributions to their chosen sector and to make Canada a leader in the global market.
2. Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's companies to benefit from the minds of UBC's top graduate-level students.

3. Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with growing sector of software professionals in the Vancouver “tech hub” region.
4. Emerge as the leading institution for the continuing education of current leaders in the dependable software systems sector and for the training of tomorrow’s leaders.
5. Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.
6. Continue to develop a high profile faculty with international expertise in the theory and practice of dependable software systems.

### 2.4.3 Program Learning Outcomes

The learning outcomes of the M.E.L. in D.S.S. program are to:

1. Understand how software-intensive systems are engineered through collaborative processes.
2. Deepen understanding of teams in collaborative system development.
3. Master and apply core disciplinary knowledge as relates to software testing and verification, dependable computing systems design and implementation, and secure computing systems.
4. Develop abilities for problem formulation, organization and planning of the solution process in the technical space.
5. Gain exposure to dependability issues in the most common software-intensive industries.
6. Gain project design experience in an application area.
7. Develop communication of ideas and decision justification.
8. Enable self-directed learning and professional development.
9. Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability)
10. Use data appropriately for technical and business decision-making
11. Understand the critical components of how business works

## 2.5. Contribution to UBC Mandate and Strategic Plan

UBC is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning.

In *Place and Promise: The UBC Plan*, our vision statement is: “As one of the world’s leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world.”

The program will act as one route to the fulfillment of this promise. With the involvement of faculty from all areas in APSC and from the Faculty of Commerce and Business Administration; the development of new laboratory facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored research topics, and co-op job placements, the program will offer an exceptional learning environment for students and for faculty undertaking research. In addition, the program will attract students from around the world to study in Vancouver’s diverse environment and graduate students who will, in turn, be in demand across the globe.

When we speak of globalization today, it is a synthesis of exploration, learning, and the global exchange of resources and knowledge—not unlike the university itself. Accordingly, the program addresses many of the goals outlined in *The UBC Plan*.

### 2.5.1. Student Learning

- The University provides the opportunity for transformative student learning through outstanding teaching and research, enriched educational experiences, and rewarding campus life.

The program will offer a comprehensive curriculum that draws upon the combined expertise of faculty in all areas of APSC and the Faculty of Commerce and Business Administration and of sector professionals. The program will synthesize theory and practice through a challenging project-based learning experience that will equip students with the skills and experience needed to excel in the world’s most important and fast-growing industries. The number and variety of courses available to students will be purposely limited, as will student enrolment, to ensure a robust and streamlined learning experience that is centered on the program objectives. As well, strong stakeholder support and existing relationships between UBC APSC and local companies promises students both a rich educational experience and employment opportunities after graduation.

### 2.5.2. Innovation Excellence

- The University creates and advances knowledge and understanding, and improves the quality of life through the discovery, dissemination, and application of research within and across disciplines.

As a leading research and educational facility, UBC is expected to be a world leader, and *the* Canadian leader in the area of Dependable Software Systems, as we invest time and resources to create, sustain and grow for the future. By expanding UBC's current scholarship in the areas of this program, UBC will not only be a leader in the exchange of knowledge in these areas; it will also, by contributing to the involved industries, be a central part of the means by which people and knowledge are mobilized.

### **2.5.3. Community Engagement**

- The University serves and engages society to enhance economic, social, and cultural well-being.

Engaging with local companies with regard to the needs of their sector is one of the key components of the program. With a curriculum grounded in collaborative community projects, a reciprocal and experiential learning environment will be created between students and local stakeholders.

### **2.5.4. International Engagement**

- The University creates rich opportunities for international engagement for students, faculty, staff, and alumni, and collaborates and communicates globally.

The program will graduate students who will be in demand across the globe, from industries that will be based in Canada. It will graduate the trained professionals needed to ensure the self-sufficiency of Canada's sector-specific professionals, and the global influence of Canada itself. Strong industries, backed by highly qualified professionals, are key to securing Canada's global presence – to improving and sustaining Canada's innovation and economy, and strengthening Canada's contribution to the global market. By offering the program, UBC will therefore become an invaluable player in both national and international development.

### **2.5.5. Sustainability**

- The University explores and exemplifies all aspects of economic, environmental, and social sustainability.

The program will play a role with the rest of the UBC community to meet society's needs without compromising those of future generations. Through the Platform courses that will have a focus on leadership and sustainability, to the activities and services provided both inside and outside of the classroom, the program is designed to be accountable and transparent in the use of available resources.

## **2.6. Support for New APSC Professional Master's Programs**

The University supports the formation of new professional master's programs having goals in alignment with that of the institution. Support and resources are available in a variety of forms including assistance with market research, budgeting, and curriculum development. We have and continue to take advantage of all assistance in the creation, development, delivery and evaluation of the program. As part of the Flexible Learning Initiative, targeted growth of professional

master's programs is one of UBC's four priorities over the next five years. Continued support for the Flexible Learning Initiative has been confirmed by our new UBC President, Dr. Arvind Gupta. The strategic plan for flexible learning campus-wide is articulated in its own web space, which can be found here:

<http://flexible.learning.ubc.ca/what-is-flexible-learning/flexible-learning-goals/>

APSC has identified its professional master's programs as having the potential to benefit greatly from not only revitalization, but also expansion. This initiative has been led by the Dean's office and has received consistent support from the Provost's Office through the Flexible Learning Initiative. An over-arching goal of these new programs is to revitalize the APSC graduate program offerings which have not been systematically redeveloped for over 20 years. New Pillar courses will be available to all Ph.D., M.A.Sc. and Professional Master's students providing high quality, sector relevant, technically leading edge education for our graduate students. This objective is in line with the espoused goal of the Faculty of Graduate and Postdoctoral studies to rethink graduate education as a preparation not only for academe but also for service in a wide range of leadership opportunities in society.

### **2.6.1. Opportunity Identification**

It was felt that an opportunity may exist that had, as yet, not been explored in APSC. Given the unique structure of the Faculty, which is home to not only engineering programs, but also the School of Nursing, the School of Architecture and Landscape Architecture and the School of Community and Regional Planning, it was felt that the potential existed to create a suite of interdisciplinary master's degrees that were aligned with stakeholders in a way that a program housed in a single department or school could not. In order to establish the market for such opportunities, and to establish potential interdisciplinary themes to pursue, the following activities were undertaken:

1. Competitor scans
2. Alumni tracking
3. Ongoing dialogue with stakeholders to identify skills gaps
4. Targeted market research / focus groups
5. Dialogue with faculty to shape opportunities and program champions
6. Initial feasibility assessment
7. Distillation of program concept(s) including clear objectives in launch
8. Straw man concept for new professional program, with clear student target

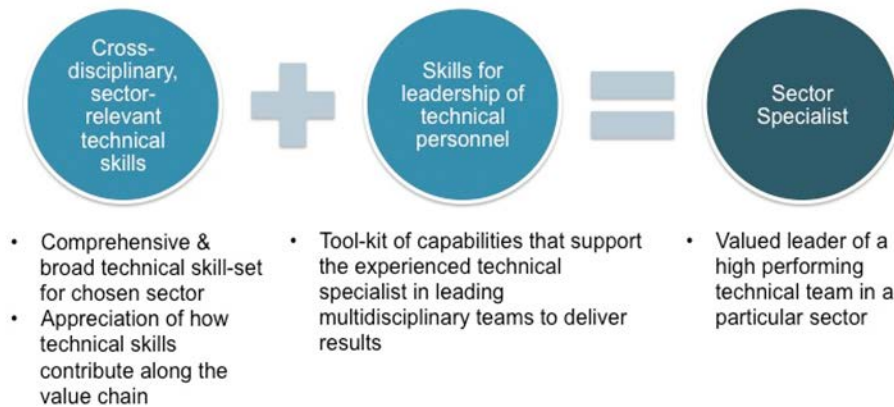
Figure 4 Relationship of Technical and Leadership Skills for a Sector Specialist



VALUE PROPOSITION

**The Sector Specialist is equipped with the skills & perspective to effectively deliver cross-disciplinary projects and operational results**

Professional Program Distinctive Value Proposition



### 2.6.2. Program Development

Upon successful conclusion of the opportunity identification phase, program development initiated via the steps outlined below, with this document representing the basis of the material required for step 9. A key element that emerged from the opportunity identification phase was a program structure that featured a largely common Platform, comprising approximately 40% of each program, which would be the foundation for all new professional master's programs in APSC. The remaining 60% of the course content is then comprised of a set of courses drawn from across the Faculty that provide sector-specific technical content. The technical material is referred to as a Pillar. This structure was identified quite early on in the development process and has been referred to internally as a "Platform and Pillar" model from both the curriculum development and delivery perspectives.

1. Appointment of program Champion (Sathish Gopalakrishnan)
2. Discussions with advisory committee
3. Refinement of proposition, program design and pricing
4. Definition of operating model / formation of any partnerships
5. Financial modelling
6. Funding application
7. Planning for course (re)design (CTLT)
8. Development of project plan
9. Presentation to Faculty council, Senate, Board, Ministry – and plan refinement as needed
10. Full program design in place
11. Approval from the Senate, Board of Governors, and the Ministry of Advanced Education

### 2.6.3. Implementation



In parallel with the approval process, implementation and launch of the new professional programs will require a significant effort well in advance of the commencement of the programs for the first cohort, which is anticipated for January 2016. Key activities are summarized here:

1. Development of course materials and flexible learning (FL) delivery / co-op modules
2. Development and launch of multi-touch marketing efforts (ideally at least 1 year in advance)
3. Set up in central systems (Enrolment Services, UBC IT)
4. Evaluation of applications (ideally application deadline 7 months in advance) and submission of accepted applications to Department and APSC Dean's Office for approval
5. Program ready to launch with inaugural group of students

#### **2.6.4. Program Management**

Due to the intensive nature of the proposed programs and the expected audience, which would be primarily early-career professionals, these programs will require dedicated resources within the Faculty to maintain high-quality, responsive service for administrative details surrounding their delivery (e.g. registration issues, scheduling details, facilitation of workshop activities, co-op placements, coordination of interdisciplinary capstone projects, etc.). Additionally, it is anticipated that there will be support for maintaining continuous program improvement, sufficient marketing efforts, ongoing development of community partners and stakeholder participants, and so on. The budget for these programs includes provisioning for the necessary staff, to be located in the Faculty, to ensure the ongoing support for the activities itemized below, which are regarded as necessary to deliver and maintain a program of the highest caliber:

1. Continuous feedback loop to improve delivery and learning outcomes
2. Refreshment of marketing materials, with relationships / channels fostered ongoing
3. Exploration / implementation of any content repurposing opportunities
4. Tracking of student success rates
5. Financial / operational management
6. Ongoing evolution of program to achieve learning, access, reputational and financial objectives

### **2.7. Relationship to Established Programs**

#### **2.7.1. The University of British Columbia**

Many of the advanced topics that will be covered under the program are already available through programs in the involved departments and schools of APSC at UBC, but the program will synthesize this material and offer a more interdisciplinary approach.

Existing professional programs relevant to the D.S.S. program include:

Master of Engineering (M.Eng.)

Faculty of Applied Science, Engineering

The Master of Engineering is a non-thesis, course-based program designed for students who would like to further their education without pursuing research, or individuals who wish to

advance their careers with enhanced technical knowledge. It normally takes 12-16 months to complete 30 credits. Students register for the M.Eng. at the faculty level but generally complete courses within a specific department, and may take a collection of related courses that would be considered a 'specialization', although the degree is somewhat generic in that it is simply granted as a M.Eng. in a specific department in most cases. Admission to the M.Eng. is not cohort-based, and the entry point may be either September or January. If there is a demonstrated demand to continue offering the M.Eng. in addition to the M.E.L., then it is within each individual department's discretion to do so.

#### Master of Software Systems (M.S.S.)

Administered through the Institute for Computing, Information and Cognitive Systems (ICICS), Dual report to Faculties of Applied Science (administrative lead) and Science

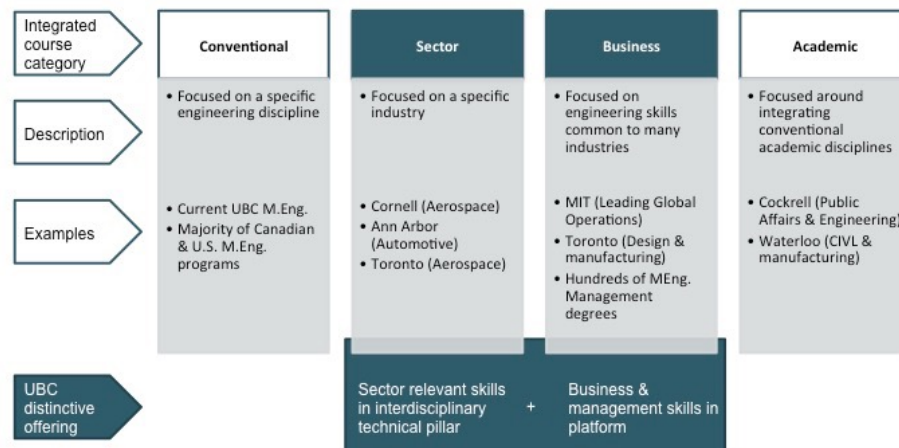
This program has been in operation for several years, and has a distinctly different target market. A key admissions requirement for M.S.S. is that graduates of undergraduate programs in computer engineering or computer science are not eligible to apply. By contrast, the M.E.L. in D.S.S. is targeting graduates of these programs.

#### **2.7.2. Other British Columbia and Canadian universities**

There are currently no universities in British Columbia or in Canada that offer accredited *graduate* programs with the proposed Platform and Pillar structure.

There is no master's program that covers this specific niche. There are professional master's programs in software engineering offered by many institutions in Canada, the United States of America and Europe (e.g., Carnegie Mellon University, Cornell University), but they are more general in nature. They are often relevant for engineers that are transitioning from a different specialization to software-intensive industries with limited formal training in software systems. There are some professional master's programs that focus on Secure Computing Systems (e.g., Oxford University), but here the emphasis is on security and they do not take a wider view of what it means to build dependable software systems. The focus on dependability in the proposed program brings to the fore some of the societal issues in an age of ubiquitous computing. Further, none of the programs to date integrate the development of dependable software systems with the business aspects of these engineered systems.

Figure 5 Assessment of Categories of Professional Engineering Master's Programs



Source: US News, Top school websites (MIT, Stanford, Berkeley, CalTech, Carnegie Mellon, Georgia Tech, Urbana-Champaign, Purdue, Ann Arbor, Cockrell, Toronto, Waterloo), team

### 2.7.3. Level of support and recognition from other post-secondary institutions

As a new program, support and recognition from other post-secondary institutions is limited. However, it is anticipated that participation from faculty members outside of UBC delivering content in the program will promote further support from institutions that offer traditional graduate programs in dependable software systems both nationally and internationally. Given UBC's history of expertise in electrical and computer engineering (the largest program in Western Canada) and the fact that UBC's engineering programs have been ranked second in the nation and among the top 50 worldwide (*Times Higher Education*), it is expected that other post-secondary institutions both in Canada and abroad will recognize and support this program.

### 2.8. Demand for Program

The demand for professionals with technical and integrated professional skills is growing rapidly, and Canada currently has neither the trained personnel required to meet the needs, nor the means of training them. There are currently *no* other Canadian institution that offer sector-focused (rather than research-oriented) training at the graduate level with the proposed Platform leadership skills and Dependable Software System Pillar structure.

The demand for the suite of APSC professional master's programs comes from multiple sides. Vancouver is both a longstanding and growing hub for tech companies that rely on the development of large, dependable software systems. Example companies include MacDonald Detwiler Associates, SAP, Absolute Software, and more recently HootSuite, Microsoft, and

Amazon. British Columbia and Canada need the proposed program for the success of the provincial and federal software industries to stay competitive with international markets. Given UBC's location, the research of current faculty, it is appropriate that UBC be the institution to implement a graduate-level programs that are lacking in Canada and are now more important than ever.

Modern computer systems have become tightly intertwined with our daily lives. However, they are failure-prone and difficult to manage. Their dependability is critical in a variety of contexts (healthcare and medical systems, energy systems, transportation systems, banking, etc.). Dependability-related problems dominate total cost of ownership of computer systems, and unfortunately they have no simple solutions. There is a realization that these problems cannot be decisively solved, but are ongoing facts of life that must be dealt with regularly. The challenges are multi-faceted: hardware faults, software bugs, security issues. To tackle these challenges, engineers need to understand the source of these problems, some of which are engineering design errors, and others are due to process and project management failures. The proposed program will provide a broad foundation for analyzing and improving the dependability of software systems. The pervasiveness of software systems makes this a program that can impact a variety of application areas, and will be attractive to many software engineers.

The world economy could not function without reliable and efficient software to run the many computational devices and processes that allow the management of complex supply chains for production and distribution of goods and services. Global financial markets, regulation of power generation, telecommunications and public transport are all controlled with computer software, as is the manufacturing of equipment, vehicles, and household appliances. Even the entertainment we consume is largely produced with specialized software.

According to the BC Technology Industry Association, BC has one of the top tech ecosystems in the world. It was home to over 9,000 tech companies and generated over \$23bn in revenues annually; it also nearly doubled in size since 2002. In the area of software development, BCTIA counted close to 100 companies as members. These firms specialized in developing software programs for water monitoring, records management, valuation of financial securities, spatial data infrastructure, special effects for motion pictures, and gaming.

### **2.8.1. Enrolment Predictions and Capacity**

Significant demand is anticipated for the new programs. The desirability of an educational experience that can lead to rapid career progress upon graduation is reflected in the interest we have seen in the existing professional master's programs

To maintain a vibrant learning environment and admit the best and brightest applicants, however, the cohort size will be purposely limited. The minimum initial cohort will be 20 students increasing to 41 by 2020. The M.E.L in D.S.S. will not impact the enrolment of existing programs such as the M.Eng. in Electrical and Computer Engineering which attracts students who have obtained less than 3 years of relevant work experience since they finished their bachelor's program, nor will it impact the enrolment of the Master of Software systems which has different admission requirements and therefore attracts a different learner audience. It is also worth noting

that the M.Eng. in Electrical and Computer Engineering is a very broad program consisting of students who construct programs in virtually all of the research and industrial themes that this large department has to offer. The M.Eng. degree name is not specific as regards these individual areas, all of which will continue to be offered to meet the needs of students with varying interests and admissions profiles.

### **2.8.2. Tuition Rationale**

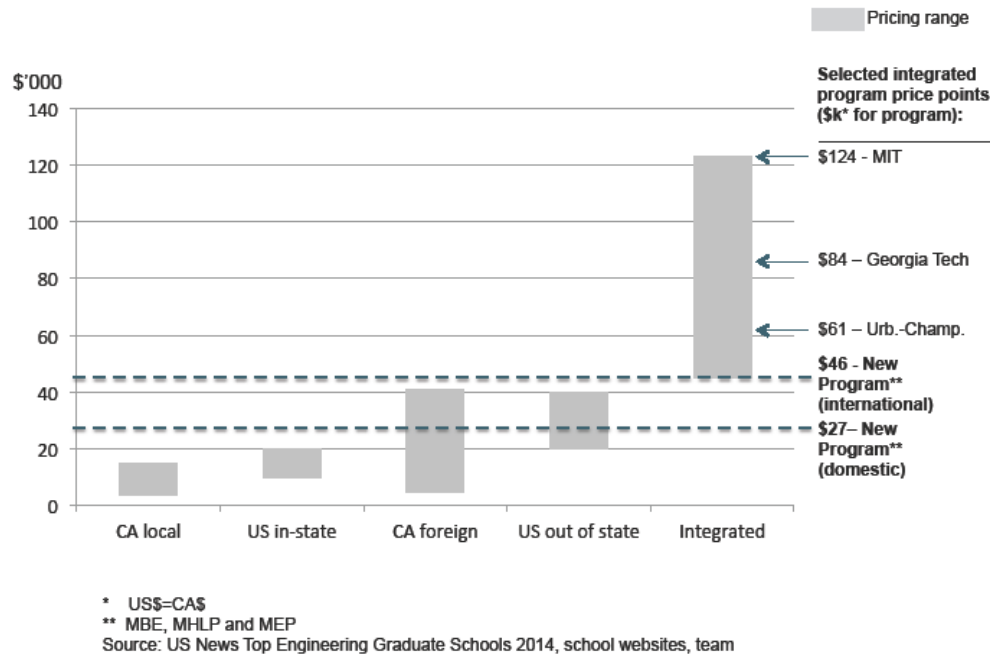
The program falls under the APSC “Guidelines for Professional Programs” (August 31, 2012) which stipulates that new professional programs in the Faculty, as of January 2009, must generate revenue to cover a range of expenses including equipment, facilities and salaries of faculty and staff involved in course delivery and administration. The primary source of revenue for these programs is through the tuition flow-back from the University to the Faculty and unit delivering the program.

The starting tuition level requested for the program is \$27,000 CAD for the one-year program for Canadian citizens and Permanent Residents and \$46,000 CAD for the one-year program for international students requiring a Study Permit. Tuition is paid in three equal installments per year, normally in January, May and September. The student is required to pay a minimum of three installments of tuition in order to graduate, but if the program is extended by permission of the program Director, the student pays tuition installments until the program requirements are met. For domestic students, the continuing fee and the extension fee are set by the University. No part-time studies are allowed. Currently, tuition increases by 2% each year.

We are confident that the program can attract students to pay the proposed tuition for the following reasons:

1. Vancouver is an acknowledged centre for the dependable software systems area
2. A one-year program fits into the lifestyle framework for most of our potential students
3. The program will draw from an international pool of students
4. The tuition has been researched to be positioned in the lower cost bracket compared to programs at institutions such as MIT and Georgia Tech

Figure 6 Comparison of Tuition within Canada and the United States of America



### 2.8.3. Scholarships

We are concerned about getting the right students for the program and recognize that the tuition assessment may be prohibitive for some outstanding applicants. As a consequence, we intend to go to stakeholders in each sector seeking named scholarships. We have set aside 7.5 percent of the tuition revenue for financial need.

### 2.8.4. Potential Sectors of Employment for Graduates

Graduates of the program will have developed those skills and practices that stakeholders value most highly in experienced APSC professionals. They will be creative and visionary to see the potential to use the knowledge and training from the program effectively in their employment choices. Government and the private sector are hungry for experts to develop new processes and systems to explore and implement positive changes in their chosen area. Graduates can expect to find careers locally, nationally, and internationally.

### 2.8.5. Opportunities for Further Study

The professional master's degree at UBC is generally not recommended for students who wish to continue on to a Ph.D., and the proposed program will conform to this. As such, it is anticipated that most or all of the graduating students will go on to or return to work in their chosen sector. It is possible, however, that a small number of students will continue to Ph.D.-level study at UBC or elsewhere.

### 3. Program Description and Specifications

#### 3.1. Admission Requirements

Applicants must hold an undergraduate degree in Computer Engineering or Computer Science, must have prior experience developing software systems and 3 years relevant experience. Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director.

Students not possessing a background in Computer Engineering or Computer Science may wish to consider application to the Master of Software Systems program, which is designed for recent graduates with backgrounds not in computing. For more information on this program visit the M.S.S. [program website](#).

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the MEL DSS are:

- TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 81
- PTE (Pearson Test of English - Academic): minimum overall score of 59
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 60

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science. Lists of the required application documents are available on the program website. The Applied Science graduate program office is responsible for collection and assessment of application documents.

### 3.2. Program and Pillar Requirements for the M.E.L. in Dependable Software Systems

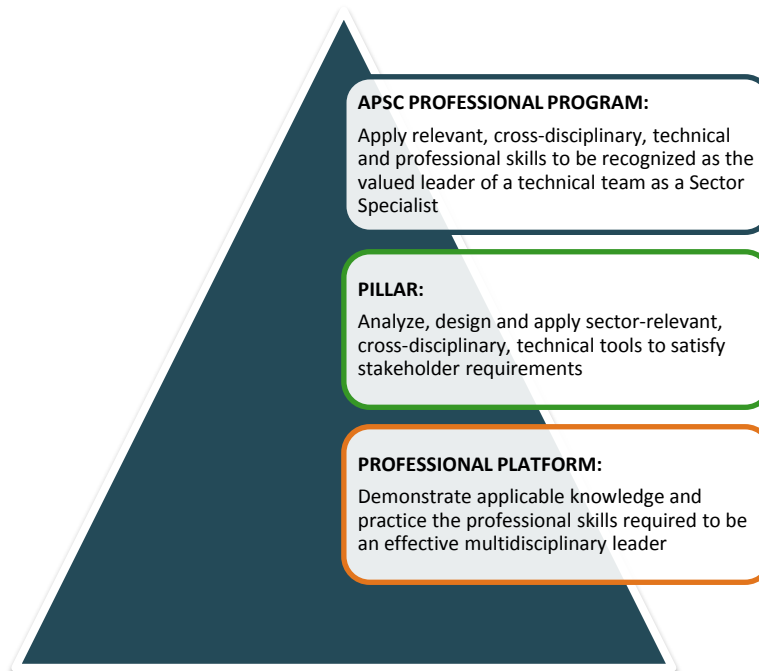
The program requires a minimum of 30 credits of coursework. The distribution will be 12 credits dedicated to the Platform providing the professional skills required for an experienced graduate to be an effective technical manager and 18 credits dedicated to the Pillar advanced technical courses. Both the Platform and the Pillar have prescribed core courses. In general, where a program has a provision for elective choices, master's programs in the Faculty will allow a maximum of 6 credits of 300- or 400-level undergraduate coursework and 6 credits of 500-level directed studies. The program includes 3 credits of constrained electives that will be drawn from courses approved by the graduate program office. (The constrained electives will be a set of graduate-level courses offered by the departments of Electrical & Computer Engineering and Computer Science and this list will be published on the program website. A sample set of electives are provided for reference below the table of required courses in section 3.4) The program will be delivered as an intensive one-year program. It is anticipated that this will be favorable to post-professional students already in the workplace. The program courses will involve a combination of classroom learning and integrated hands-on training.

There are seven proposed Pillars leading to the degree of Master of Engineering Leadership at the UBC Vancouver campus (see Appendix 5 for prospective program curriculum). Utilizing the Platform will also be the Master of Health Leadership and Policy in Seniors Care at the UBC Vancouver campus. These programs are distinct and each will be reviewed separately, but as all APSC Professional Programs are conceptualized as sharing a common goal of graduating students with enhanced disciplinary knowledge and business skills the proposed array of programs is listed in Appendix 5 for information only.

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Figure 7 Learning Objectives Relevant to the Three Levels of the Program



### 3.3. Platform Structure utilized by the M.E.L. in Dependable Software Systems

#### 3.3.1. Leadership & Sustainability (4.5 credits total)

APPP 501 (1.5) Project Management and Leadership

APPP 502 (1.5) Sustainability and Leadership

APPP 503 (1.5) Organizational Leadership

#### *Learning Outcomes*

1. Lead multi-disciplinary teams to effectively deliver sustainable projects
2. Articulate ideas, progress and outcomes through oral and written communications
3. Plan & deliver multidisciplinary projects
4. Identify and apply sustainability concepts to influence the triple bottom-line
5. Apply leadership principles to organizational and social change

#### *Content*

1. Project management
2. Organizational behaviour and structure
3. Sustainability, ethics and policy
4. Personal and professional leadership effectiveness & communications
5. Application of concepts to trans-disciplinary challenges in organizational and social change
6. Fully integrated into technical streams through sector-relevant projects

### **3.3.2. Business Foundations (3 credits)**

#### **APPP 504 (3) Business Acumen for Technical Leaders**

##### *Learning Outcomes*

1. Gain broad knowledge of the structure and mechanics of business.
2. How to use data for decision-making
3. Articulate ideas, progress and outcomes through oral and written communication
4. Practical level of understanding in specific aspects of managerial accounting, strategy and performance, market evaluation, operations management, negotiations and contract management and business-case building and valuation

##### *Content*

1. Managerial accounting
2. Strategy and performance
3. Market evaluation
4. Operations management
5. Negotiations and contract management
6. Business-case building and evaluation
7. Communication skills

### **3.3.3. Faculty of Commerce and Business Administration Electives (Select 1.5 credits total)**

##### *Learning Outcomes*

1. Gain exposure to non-technical issues and skills that impacts business and management

*Content (examples of Faculty of Commerce and Business Administration electives, credit values range from 0.7-1.5)*

1. BAEN 542 (0.8) Prototyping
2. BAEN 543 (0.7) Disruption
3. BAEN 544 (0.8) Pitching Your Idea
4. BAEN 545 (0.7) Qualitative Models
5. BAEN 546 (0.8) Social Entrepreneurship
6. BAEN 547 (0.7) Innovation and Sustainability
7. BAFI 540 (0.8) Finance
8. BAMA 540 (0.8) Marketing Fundamentals
9. BAMA 541 (0.8) Product Service Management
10. BASC 540 (0.7) Operations Fundamentals
11. BAEN 550 (1.5) Fundamentals in Entrepreneurship
12. BAPA 501 (1.5) Government and Business
13. BAPA 510 (1.5) Public Policy and the Environment
14. BASD 501 (1.5) Corporate Social Responsibility
15. BASD 505 (1.5) Environmental Economics, Management, and Technology
16. BASM 501 (1.5) Business Strategy
17. BAHHR 505 (1.5) Leadership
18. BAHHR 507 (1.5) Two-Party Negotiations

### **3.3.4. Analytics and Interpretation for Applied Sciences APPP 505 (3 credits)**

Determined by each Pillar and will be used as part of the M.E.L. in D.S.S..

#### *Learning Outcomes*

1. Ensure competency to perform sector-relevant, deep analytical tasks
2. Recognize data visualization tools and understand how they were created
3. Develop a conceptual understanding of 'big data' and predictive analytics for applications in practice
4. Acquire strategies to build a corporate culture around analytics
5. Recognize potential ethics or privacy issues related to data collection or use

### **3.3.5. Project or Capstone APPP 506 (3 credits)**

Determined by each Pillar and will be used as part of the M.E.L. in D.S.S..

#### *Learning Outcomes*

1. Identify a critical dependability requirement in a complex project
2. Design, document, present and implement a solution to a significant open-ended problem related to the Pillar
3. Function effectively in teams

### **3.3.6. Professional Development**

Provide support to candidates who wish to broaden their knowledge

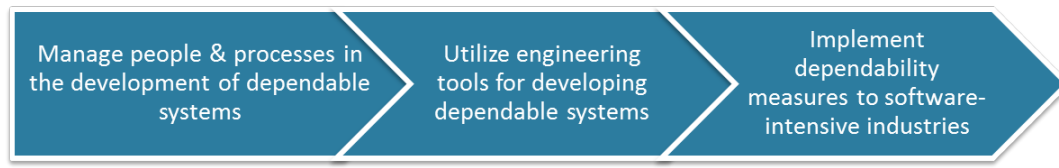
1. Communication Assessment & Support
2. Integrated Sector-specific Experience (Graduate Cooperative Education Program)
3. Employer or Mandatory Sector-specific Project
4. e@UBC Lean Launchpad
5. MITACS Step Business Skills
6. APSC Toastmasters
7. Continuing Studies (PM)
8. APSC Professional Development Workshops
9. English Language Proficiency & Support
10. Data Visualization (VIVA)
11. International Student Support
12. Professional Development Employment Centre (PDEC)

Figure 8 Summary of PDEC Resources



### 3.4 Overview of Pillar for M.E.L. in Dependable Software Systems

#### *Value Chain*



#### *Learning Outcomes*

- Understand how software-intensive systems are engineered through collaborative processes
- Deepen understanding of teams in collaborative system development.
- Master and apply core disciplinary knowledge as relates to software testing and verification, dependable computing systems design and implementation, and secure computing systems.
- Develop abilities for problem formulation, organization and planning of the solution process in the technical space.
- Gain exposure to dependability issues in the most common software-intensive industries. Gain project design experience in an application area.
- Develop communication of ideas and decision justification.
- Enable self-directed learning and professional development.

The program is structured around four core technical courses:

- (1) EECE 513: Error Resilient Computing Systems -- principles and tools for building dependable systems that can tolerate faults in hardware or software bugs
- (2) EECE 514: Software Verification and Testing -- principles and tools for detecting software bugs
- (3) EECE 512: Computer Security -- principles and tools for securing computing systems from malicious attacks
- (4) EECE 543: Software Project Management -- processes and approaches to managing the software development lifecycle for producing robust systems

These four courses are complemented by a capstone project involving widely used open-source software systems and an elective course that allows students to gain specific domain expertise or gather background that is missing from prior coursework/experience.

	Credits
<b>Winter Session – Term 2 (January – April)</b>	
EECE 513	3
EECE 514	3
EECE 543	3
APPP 501	1.5
APPP 502	1.5
APPP 505	3
<b>Summer Session – Term 1 (May – June); Term 2 (July – August)</b>	
APPP 506	3
APPP 503	1.5
APPP 504	3
<b>Winter Session – Term 1 (September – December)</b>	
EECE 512	3
Electives (Faculty of Commerce and Business Administration)	1.5
Electives constrained	3
<b>TOTAL CREDITS</b>	<b>30</b>

Constrained electives (3) [required approval of MEL DSS Program Director]

Examples of constrained electives:

CPSC 507, CPSC 513, CPSC 547, CPSC 564

EECE 411, EECE 494, EECE 518, EECE 527, EECE 528, EECE 592

APPP 503 and APPP 504 will be offered in an intense 4-week version. The APPP 506 Capstone course can begin before or during the delivery of APPP 503 and APPP 504 and extend over one or two terms. Students will choose their schedule with the approval of the M.E.L. in D.S.S. graduate program office.

Figure 9 Course Credits Distribution

**MASTER OF ENGINEERING LEADERSHIP IN DEPENDABLE SOFTWARE SYSTEMS**

APPP 501 (1.5)	APPP 503 (1.5)	APPP 504 (3)	APPP 505 ANALYTICS	APPP 506 (3)	EECE 512 (3)	EECE 513 (3)	EECE 514 (3)	EECE 543 (3)	ELECTIVE (3)
APPP 502 (1.5)	Sauder Elective (1.5)								
PLATFORM (12 CREDITS)				PILLAR COURSES (18 CREDITS)					
Total Credit Load for MEL in DEPENDABLE SOFTWARE SYSTEMS is 30 Credits									

**3.5. Supervision and Evaluation**

Unlike the graduate-level research programs at UBC, a student in the program will not be assigned a single, dedicated supervisor, but will rather be supervised day-to-day in their work by the Pillar Directors and the APSC Professional Program Office. Coursework is evaluated through mini-projects, exams, homework assignments and in-class quizzes. For Pillars having a capstone project as a core component, supervision and evaluation will be provided by a professor and by sector-specific adjuncts, while a Cooperative Education placement will be supervised mainly by the sponsoring company, and given a final mark by a UBC faculty member involved in the professional program based on the company's report and the student's final report and presentation. Expectations of students will be formalized through individual course syllabi.

**3.6. Policies on Program Management and Assessment**

The program will be administered under APSC. In delivering this new model "high touch" program it is essential that the Dean's Office, APSC Professional Program Office and Graduate Program Offices responsible for the Pillars collaborate and cooperate in an intimate fashion. The student should have access to all services and needs from within the same Faculty to ensure timely and comprehensive service of their academic and non-academic activities.

In parallel to internal reviews used to evaluate professional degrees conducted according to the APSC and UBC governance guidelines, the program will be evaluated and developed based on the recommendations of an Advisory Committee. This expert panel of outside professionals and academics will meet once per term. Committee membership will be approved by the Dean of APSC.

#### **4. Calendar Statement - Program**

[Removed from this document and attached separately for purposes of Curriculum.]

### **5. Program Resources**

#### **5.1. Program Funding and Budget**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020. The M.E.L. in D.S.S. will not impact the enrolment of existing programs such as the M.Eng. in Electrical & Computer Engineering or the Master of Software Systems which have different admission requirements.

As this program is unique, and is directed at a sector where there is identified unmet need, impact on enrolment from existing programs or on opportunities for existing students is expected to be small.

#### **5.2. Qualified Faculty**

Courses will be taught by a combination of faculty from all departments and schools in APSC and also from other faculties at UBC; visiting professors, sector-specific adjuncts and guest lecturers will be involved.

#### **5.3. Pillar Champions or Directors**

Each Pillar has a 'Champion', or in some cases more than one Champion, who was instrumental in establishing the value proposition for the Pillar and also in the design of the curriculum. The Champion for the Dependable Software Systems program is Sathish Gopalakrishnan. It is expected that Champions will continue to have an instrumental role in the administration and oversight of the Pillar upon program launch, and may become Program Directors (see Section 5.5).

#### **5.4. Library Resources**

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support and the Platform courses requiring new resources will be funded by the APSC Dean's Office. (see Appendix 2 & 3 and Appendix 7 Platform Proposal).

#### **5.5. Administration**

- **Program Directors**

The Directors for each Pillar will be appointed by the Dean of APSC. The Director will lead the implementation of the program and oversee its evolution, growth and position within APSC. As well as assuming teaching and research commitments, the program Director will represent the program on university committees. The program Director will also be expected to lead the community outreach component of the program to secure co-op opportunities. The Director will take an active role in developing the necessary community and stakeholder linkages to establish a

long-term and wide range of co-op placements. The Director will become the principal point of contact for community and stakeholder partners. The Director will report to the Head of the lead department or school as appointed by the Dean of APSC.

- **Program Manager**

It is expected that the suite of professional programs will be managed on a day-to-day basis by one or more centrally located program managers. This program manager would assist in: student recruitment, student enquiries, website development and maintenance, applications and admissions, timetabling, classroom scheduling, extra-curricular events and workshops, and addressing registration inquiries or issues. Support for admissions and records will also be provided by the APSC Dean's Office.

## **5.6. Space Requirements**

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

## **5.7. Consultations with University Units**

Consultation requests were sent to the following (see Appendix 4):

1. Faculty of Forestry
2. Faculty of Land and Food Systems
3. UBC Sustainability Initiative
4. Department of Electrical and Computer Engineering, Faculty of Applied Science
5. Faculty of Commerce and Business Administration
6. Faculty of Science

## **5.8. Contact Information**

### **Contact Person:**

University of British Columbia, Faculty of Applied Science, Dean's Office  
Elizabeth Croft, Associate Dean, Education & Professional Development  
[elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca) 604-822-6614

## **6 Appendices Accompanying Pillar Proposals**

[Removed for purposes of Curriculum; may be requested.]



**UBC Curriculum Proposal Form****Category: (1)**

<p><b>Faculty:</b> Faculty of Applied Science (APSC)  <b>Faculty Approval Date:</b> December 5, 2014  <b>Effective Session:</b> Winter, Term 2  <b>Year:</b> 2015-2016</p>	<p><b>Date:</b> December 19, 2014  <b>Contact Person(s):</b>  Faculty of Applied Science Dean's Office  <b>Deborah Feduik</b> (Manager, M.Eng &amp; Graduate Programs)  Tel: 604-822-8386  Email: <a href="mailto:gradprog@apsc.ubc.ca">gradprog@apsc.ubc.ca</a></p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>Master of Engineering Leadership in Dependable Software Systems</b></p> <p><b>Program Overview</b></p> <p>Master of Engineering Leadership in Dependable Software Systems (M.E.L. in D.S.S.) is a program within the Faculty of Applied Science.</p> <p>Dependability of software systems is gaining much attention and importance with the pervasiveness of software systems. The ubiquity of these systems requires that these systems perform correctly with high confidence, and building such systems requires a multifaceted approach. This program addresses key concepts, namely:</p> <ul style="list-style-type: none"> <li>• System correctness within specifications</li> <li>• System robustness outside of specifications</li> <li>• System security in case of hostile use outside of specification</li> <li>• Software project lifecycle management for robust systems</li> </ul> <p>The program is supported by a set of leadership, management and analysis courses aimed at providing professional education for dependable software systems technical leaders.</p>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,195,0,0">http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,195,0,0</a></p> <p><b>Present Calendar Entry:</b>  N/A</p> <p><b>Type of Action:</b>  Create new program.</p> <p><b>Rationale:</b></p> <p>The creation of this program has been driven, in part, by strong interest from the external community (whereby British Columbia will see a high level of activity over the next few decades), in part by a desire to collaborate between the Departments and Schools in the Faculty of Applied Science and in part to raise UBC's profile and to attract students (both within Canada and abroad), and to collaborate internationally.</p> <p>Dependability of software systems is gaining much attention and importance with the pervasiveness of software systems. The ubiquity of these systems requires that these systems perform correctly with high confidence, and building such systems requires a multifaceted approach. This program addresses key concepts, namely:</p> <ul style="list-style-type: none"> <li>• System correctness within specifications</li> <li>• System robustness outside of specifications</li> <li>• System security in case of hostile use outside of specification</li> </ul>

<p><b>Admission Requirements</b></p> <p>Applicants must hold an undergraduate degree in Computer Engineering or Computer Science, must have prior experience developing software systems and 3 years relevant experience. Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director.</p> <p>Students not possessing a background in Computer Engineering or Computer Science may wish to consider application to the Master of Software Systems program, which is designed for recent graduates with backgrounds not in computing. For more information on this program visit the <a href="#">M.S.S. program website</a>.</p> <p>The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.</p> <p>The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).</p> <p>Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the M.E.L. in D.S.S. are:</p> <ul style="list-style-type: none"> <li>• TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer</li> </ul>	<ul style="list-style-type: none"> <li>• Software project lifecycle management for robust systems.</li> </ul> <p>These concepts are complemented and synthesized through a capstone project which allows students to develop strong technical skills. The program is supported by a set of leadership, management and analysis courses aimed at providing professional education for dependable software systems technical leaders.</p> <p>The world economy could not function without reliable and efficient software to run the many computational devices and processes that allow the management of complex supply chains for production and distribution of goods and services. Global financial markets, regulation of power generation, telecommunications and public transport are all controlled with computer software, as is the manufacturing of equipment, vehicles, and household appliances. Even the entertainment we consume is largely produced with specialized software.</p> <p>According to the BC Technology Industry Association, BC has one of the top tech ecosystems in the world. It was home to over 9,000 tech companies and generated over \$23bn in revenues annually; it also nearly doubled in size since 2002. In the area of software development, BCTIA counted close to 100 companies as members. These firms specialized in developing software programs for water monitoring, records management, valuation of financial securities, spatial data infrastructure, film special fx, and gaming.</p>
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version); 80 (Internet version, effective September 2005)

- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 81
- PTE (Pearson Test of English - Academic): minimum overall score of 59
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 60

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website. The Applied Science graduate program office is responsible for collection and assessment of application documents.

### **Transfer Credit**

1. Graduate students who have earned credits outside their current master's program (e.g., from a different university, in a different UBC master's program, as an undergraduate, or as an unclassified student) may transfer up to 12 credits or up to 40% of the total number of credits needed for completion of their current

program (whichever is more), provided that:

- the courses were not used to satisfy the requirements of another credential;
- the courses were not used as a basis for admission to the graduate degree program;
- at least a B standing (UBC 74%) was obtained in courses considered for transfer;
- the courses considered for transfer credit have been taken within five years of commencement of the current degree program.

2. No more than 6 credits of transfer credit may be at the undergraduate level (300-/400-level).

3. The 12-credit (40%) restriction applies to students in UBC-approved Exchange Agreements established by the UBC Go Global Office.

4. Requests for transfer credit must be accompanied by a letter from the home graduate program addressed to the Dean of the Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis.

Courses taken as a UBC Access Studies (or non-degree) student may be approved for transfer toward a graduate program (in accordance with transfer credit regulations specified above) with the permission of the graduate program and the Dean of Applied Science.

### **Program Requirements**

Degree completion requires completion of 30 credits. This includes 18 credits of Pillar courses, including 3 credits of constrained electives and 12 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business

<p>Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master's programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the M.E.L. in D.S.S. graduate program office. Students in the M.E.L. in D.S.S. will complete a Capstone Project. A complete list of the courses required for successful completion are available on the program website &lt;insert link&gt;.</p> <p><b>Financial Assistance</b></p> <p>Financial assistance based on academic merit and financial need may be available.</p> <p>Students should consult the M.E.L. in D.S.S. program website for more information.</p> <p><b>Contact Information</b></p> <p>Faculty of Applied Science Dean's Office 5000-2332 Main Mall Vancouver, BC V6T 1Z4 Email: gradprog@apsc.ubc.ca www.apsc.ubc.ca</p>	
<p><b>Proposed Calendar Entry:</b></p> <p><b>EECE 513 (3) Error Resilient Computing Systems</b> <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=EECE">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=EECE</a></p> <p><b>Present Calendar Entry:</b></p> <p><b>EECE 513 (3) <del>Fault-Tolerant Digital Systems</del></b> <del>Design and analysis of high-availability and life-critical embedded and commercial systems.</del> <i>This course is not eligible for Credit/D/Fail grading.</i></p> <p><b>Type of Action:</b></p>

	<p>Change of title and removal of description</p> <p><b>Rationale for Proposed Change:</b>  The course is a core course for the Professional Master's Program Master of Engineering Leadership (M.E.L.) in Dependable Software Systems.  The rationale for this alternative naming is that a traditional view of fault tolerance and digital systems biases one to think about hardware fault tolerance. This is the perception that the new alternative name can correct. Moreover, emerging smaller scale computing systems may rely on analog systems and so the generalization to "computing systems" from "digital systems" is appropriate to support course evolution.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of EECE 513 in the M.E.L. in D.S.S. Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>EECE 514 (3) Software Verification and Testing</b>  <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=EECE">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=EECE</a></p> <p><b>Present Calendar Entry:</b>  N/A</p> <p><b>Type of Action:</b>  Create new course</p> <p><b>Rationale for Proposed Change:</b>  This course is part of the new APSC Professional Master's Program the Master of Engineering Leadership (M.E.L.) in Dependable Software Systems. This is a survey course on concepts, principles, and techniques related to software testing and formal program verification. Students will become acquainted with both the strengths and limitations of various functional and structural testing methods, as well as techniques for proving the</p>

	<p>functional correctness of sequential programs.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of EECE 514 in the M.E.L. in D.S.S. Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
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18 March 2015

To: Vancouver Senate

From: Senate Curriculum & Admissions Committees

Re: Master of Engineering Leadership in Green BioProducts (approval)

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The Senate Curriculum and Admissions Committees have reviewed the material forwarded to them by the Faculty of Applied Science and enclose those proposals they deem ready for approval.

The following is recommended to Senate:

**Motion:** *“That the new Master of Engineering Leadership (M.E.L.) in Green BioProducts program and its associated new course code and new courses be approved.”*

Respectfully submitted,

Dr Peter Marshall, Chair, Senate Curriculum Committee  
Dr Robert Sparks, Chair, Senate Admissions Committee





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THE UNIVERSITY OF BRITISH COLUMBIA

## **FACULTY OF APPLIED SCIENCE**

*New program, course code, and courses*

Master of Engineering Leadership in Green BioProducts; GBPR (Green BioProducts)

Course Code; GBPR 500 (6) Building Blocks of Forest Biomass; GBPR 501 (3) Biomass

Fractionation Chemistry; GBPR 502 (3) Sustainable BioMaterial from Forest Biomass;

GBPR 503 (3) Bioenergy and Biorefinery



**a place of mind**  
THE UNIVERSITY OF BRITISH COLUMBIA

**Provost and Vice President Academic**  
Walter C. Koerner Library  
1958 Main Mall  
Vancouver, BC Canada V6T 1Z2

Phone 604 822 4948  
Fax 604 822 3134

**Memo**

**To:** Paul Harrison, Chair, Senate Academic Policy Committee

**From:** David Farrar, Provost and Vice-President Academic

A handwritten signature in dark ink, appearing to read 'DAF', followed by a horizontal line.

**Date:** January 15, 2015

**Re:** **Administration of Master of Engineering Leadership Programs**

The Dean of the Faculty of Applied Science has requested that the proposed new graduate professional programs be officially designated as professional programs and that they be administered by the Faculty of Applied Science rather than by the Faculty of Graduate and Postdoctoral Studies.

The proposed programs are:

- Master of Engineering Leadership in Advanced Materials Manufacturing
  - Master of Engineering Leadership in Clean Energy Engineering
  - Master of Engineering Leadership in Dependable Software Systems
  - Master of Engineering Leadership in Green Bio-Products
  - Master of Engineering Leadership in Integrated Water Management
  - Master of Engineering Leadership in Naval Architecture and Marine Engineering
  - Master of Engineering Leadership in Urban Systems
  - Master of Health Leadership in Seniors Care
1. I am satisfied that these programs meet the criteria for designation as professional graduate programs.
  2. For the reasons outlined below, I support these programs being administered by the Faculty of Applied Science
    - a) All criteria laid out "Optional Transfer of Professional Graduate Programs from the Faculty of Graduate and Postdoctoral Studies to the Disciplinary Faculties" document, approved by Senate in January of 2005, have been met.
    - b) The Faculty of Applied Science has been successfully handling the administration of the Master of Engineering programs for nearly a decade. In that time, the Faculty of Applied Science gained considerable experience in effective graduate program administration. There is a healthy and productive relationship between the Faculty of Graduate and Postdoctoral Studies and Applied Science which all expect to continue.
    - c) The Faculty of Applied Science has the resources, including staff and financial resources, to provide the suite of services the Faculty of Graduate and Postdoctoral Studies provides for most graduate programs including financial support for students, student appeals, and matters relating to admissions and compliance with requirements for degree completion.

- d) This does not set a precedent. Decisions about the administration of future new graduate professional programs will be made in accordance with the guidelines approved by Senate in January, 2005.
- e) I have consulted with Vice-Provost and Dean, Graduate and Postdoctoral Studies, Dr. Susan Porter. She agrees to this request because the M.Eng. Programs are already administered by the Faculty of Applied Science, and the Masters of Engineering Leadership are closely related to the M.Eng. programs.

**EXECUTIVE SUMMARY**  
**MASTER OF ENGINEERING LEADERSHIP IN GREEN BIOPRODUCTS**  
**FACULTY OF APPLIED SCIENCE**  
**UNIVERSITY OF BRITISH COLUMBIA**  
**March 5, 2015**

**Overview**

The University of British Columbia is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. It creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning. The program strives to provide students with a comprehensive and innovative education that enables them to build on their past work experience and technical skills, adding leadership and interdisciplinary opportunities for learning and interaction with other students. Consultation with stakeholders has revealed that experienced engineers and early-career professionals in the chosen focus areas require sector-relevant, cross-disciplinary technical skills. They also require project management, communication and business skills to be effective leaders.

Climate change and the need to reduce our carbon footprint has provided an incentive to explore the manufacturing of products from renewable resources. This growing area of design and production includes the development of processes and technologies to craft and sustainable bio- products (materials, chemicals, etc.) from renewable bio-products. For example, research and development is underway worldwide to develop new materials and new products by breaking down pulp fibres from plants and trees into their elementary cellulose components. In general, these are manufactured through a combination of chemical and mechanical treatments in which the biomass is separated into its elementary components. The applications for these materials are becoming rapidly apparent with production of these new materials coming online. Other examples of products include biofuels, bioenergy, biodegradable plastics, building materials and chemicals.

The program will focus on developing Highly Qualified Personnel (HQP) for the needs of the rapidly evolving lignocellulosic biomass (Green) products sector. This sector is seeing opportunities in the development of green, sustainable products and chemistries to replace oil-based products and fuels. UBC has an exceptional group of researchers working on development of advanced biomaterials, ranging from specialty paper applications to fibre and fibril reinforced materials and carbon fibres from lignin.

**Credential**

The credential awarded will be the Master of Engineering Leadership (M.E.L.) in Green BioProducts. The degree will be a master's degree with a balance between advanced

engineering theories, interdisciplinary knowledge and real-world applications. The field of study will be advanced technology and techniques for green bioproducts applications.

**Location**

The Vancouver Campus of UBC is the main location for classroom education and administration. Course instruction and assignments will be achieved through collaborations among UBC, provincial and federal agencies and local private sector stakeholders involved in materials manufacturing research and development.

**Faculty Offering Program**

The program will be offered formally, administered and delivered by the Faculty of Applied Science, UBC.

**Program Start Date**

The program will be offered in the 2015/2016 academic year, beginning in January 2016.

**Program Completion Time**

Anticipated time for completion of the program is 1 year of full-time academic study, including any work-term placements and non-academic activities.

**Objectives of the Proposed Program**

The intent is to produce engineering Program Managers who possess sufficient technical understanding to direct detailed engineering analyses. Some large corporations and government activities within the field find themselves deploying skilled business personnel to lead engineering teams. Often this results in a 'communications gap' between managers and technical staff thus impairing team effectiveness. The M.E.L in Green BioProducts program will create Program Managers who are peers to their engineering team members, but whereas those team members may bring specialist skills in an engineering discipline, the graduate of this program will have specialist skills in program management. The program will:

- Equip tomorrow's professionals with the critical thinking and practical skills necessary to make important contributions to their chosen sector and to make Canada a leader in the global market.
- Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's companies to benefit from the minds of UBC's top graduate-level students.
- Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with sector professionals in the Vancouver region.
- Emerge as the leading institution for the continuing education of current leaders in the Green BioProducts sector and for the training of tomorrow's leaders.
- Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.

- Continue to develop a high profile faculty with international expertise in the theory and practice of the Green BioProducts area.

### **Program Learning Outcomes**

The learning outcomes of the M.E.L. in Green BioProducts program are to:

- Develop an understanding of anatomy, physiology, and composition of forest biomass
- Deconstruct forest biomass into its constituent parts
- Strengthen in a core discipline
- Understand the spectrum of potential products, including BioPolymers, BioRefining, BioEnergy, Policy
- Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability)
- Use data appropriately for technical and business decision-making
- Understand the critical components of how business works

### **Contribution to UBC's Mandate and Strategic Plan**

In *Place and Promise: The UBC Plan*, our vision statement is: "As one of the world's leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world." The program will act as one route to the fulfillment of this promise. With the involvement of faculty from all areas in APSC and the partnerships of the Faculty of Commerce and Business Administration and the Faculty of Forestry; the development of new facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored project topics, and co-op job placements, the program will offer an exceptional learning environment for students and faculty. In addition, the program will attract students from around the world to study in Vancouver's diverse environment and graduate students, who will, in turn, be in demand across the globe.

### **Delivery Methods**

The Faculty of Applied Science (APSC) has taken the lead in developing a conceptual framework for new Professional Programs comprising a common "Platform" that provides the professional skills required for an experienced graduate to be an effective professional leader, with "Pillars" of specialization courses in particular sectors relevant to APSC's educational mission and professional communities (the term Platform refers to foundation coursework focused on project management, data analysis, and leadership skills, while the term Pillar is equivalent to specialization.) The program will be delivered as an intensive one-year program. It is anticipated that this program will be favourable to post-professional students already in the workplace. The Platform will be delivered by faculty from APSC and the Faculty of Commerce and Business Administration.

The Pillar courses will be delivered collaboratively by faculty from the Department of Chemical and Biological Engineering and the Faculty of Forestry. The M.E.L. in Green BioProducts program requires a minimum of 30 credits of coursework. The distribution

will be 12 credits dedicated to the Platform providing the professional skills required for an experienced graduate to be an effective technical manager and 18 credits dedicated to the Pillar in advanced technical courses. Both the Platform and the Pillar have prescribed core courses. For this program there will be 3 credits of constrained electives.

### **Linking Learning Outcomes and Curriculum Design, Optional Work-terms**

The number and variety of courses available to students is purposely limited to ensure a robust and streamlined learning experience that is centered on the program learning outcomes. Each of these outcomes corresponds to at least one of the core courses and summarizes the goal of that course. Work experience is an essential admission requirement and also a key feature of the optional co-op component.

### **Program Strengths**

The program offers a comprehensive curriculum that is grounded in collaborative projects, embedded in the Platform coursework, and that draws upon the combined expertise of faculty in the participating units. The Green BioProducts Pillar focuses on developing Highly Qualified Personnel (HQP) needs for the rapidly evolving lignocellulosic biomass<sup>1</sup> (colloquially referred to as “green”) products sector. This sector is seeing opportunities in the development of green, sustainable products and chemistries to replace oil-based products and fuels. The curriculum is designed for the student to understand the chemistry and ultrastructure of biomass and the potential when the individual components are isolated. A survey of the potential green products and fuels will be discussed. By the end of the program the students have knowledge of the chemistry and anatomy of the tree (as one abundant form of biomass important to the BC economy), lignocellulosic separation chemistry, and the production pathways for biocomposites and fuels. There is no other master’s program like this in Canada or the United States of America. However, specific courses offered in this program are available from a number of schools in Canada, the United States of America, and Europe.

### **Related Programs at UBC or other BC Post-secondary Institutions**

A selection of courses offered through existing graduate programs will be used for the new program as well as the creation of new courses. There are currently no universities in British Columbia (or in Canada) that offer accredited *graduate* programs with the proposed Platform and Pillar structure. Some programs offer Biosystems, Biological and/or BioResource Engineering programs, but they are not focused towards Green BioProducts.

### **Institutional Contact**

University of British Columbia

Faculty of Applied Science

Elizabeth Croft, Associate Dean, Education & Professional Development

604-822-6614 [elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca)

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<sup>1</sup> Lignocellulosic biomass is the most abundantly available raw material on the Earth and composed of carbohydrate polymers (cellulose, hemicellulose), and an aromatic polymer (lignin).

**Appendix to the Executive Summary (for internal UBC purposes only)****Budget and Funding**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020. Tuition is \$27,000 per year for domestic students and \$46,000 per year for international students.

**Space Requirements**

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

**Library**

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support, and the Platform courses requiring new resources will be funded by the APSC Dean's Office. (See Appendix 2 & 3 and Appendix 7 Platform Proposal)



## 1. Introduction

This proposal represents one of a suite of new professional programs to be offered at the master's level in the Faculty of Applied Science (APSC). The programs were developed in parallel and will be delivered in parallel. That is, there will be a common start date and timeline for cohorts in all of the programs. A key feature of this suite of programs is that they are structured in two parts, which will be referred to as the "Platform" and the discipline-specific "Pillar". The Platform is foundational coursework focused on project management, data analysis, and leadership skills; it is a largely common element accessible to the suite of new APSC professional programs. The Pillar is equivalent to a specialization; it contains technical material specific to Green BioProducts. In this pillar, students will develop mastery of knowledge related to the chemistry and anatomy of the tree, lignocellulosic separation chemistry, and the production pathways for biocomposites and fuels. Successful completion of the Platform and a Pillar will result in the granting of one degree. Details of the contents of both the Platform and the Green BioProducts Pillar are documented in this proposal.

## 2. Program Rationale

### 2.1. Defining the Need for the Program

Over the past year, members of the University's Flexible Learning Initiative and the APSC Dean's office have formed and worked closely with a Program Advisory Committee consisting of faculty from all areas of APSC. The following program proposal is the result of collaborative planning on the part of this committee.

### 2.2. Professional Program Mission Statement and Context

*The University of British Columbia, Faculty of Applied Science, wishes to attract students into a **high quality, sector-focused, distinctive & integrated** Applied Science Professional Program that has resources to be delivered sustainably and fiscally meets the University's goals.*

1. **UBC continues to encourage innovative** learning approaches within the fiscal model of cost recovery.
2. **The Flexible Learning Strategy** introduced in 2014 lists the development of new Professional Programs as a priority.

UBC has the opportunity to deliver a distinctive APSC Program in line with the University's Professional Program objectives.

### 2.3. Applied Science Professional Program Approach

#### 2.3.1. Guiding Principles of the Program Advisory Committee

1. There is meaningful engagement with stakeholders in market research, development, delivery and career opportunities.
2. Our target market is candidates who might consider either an MBA or M.Eng. Management, but would prefer to develop both sector-relevant technical skills and management and leadership skills – our program will be distinctive in the market.
3. We take advantage of a standardization of core courses to improve quality of offering while reducing costs and complexity.
4. The program is positioned as a premium alternative to a conventional professional master's program by offering distinctive, high quality, cross-disciplinary technical and non-technical skills to the experienced professional who wants to become a Sector Specialist.
5. Pillars are developed around areas of unique research and teaching strength in APSC, where multiple program “Faculty Champions” are identified, that have strong relevance to our professional community and societal benefit, have strong learner demand, and have strong industry demand for people trained in this sector.
6. Graduate courses offered in the Green BioProducts Pillar will be open to all APSC graduate students with the appropriate prerequisites, and similarly to students in other graduate programs, space permitting. This will allow Applied Science to revitalize our graduate program offerings around areas of research and teaching strength, build strong interdisciplinary sector training capacity, and improve our connections to our professional community.

### **2.3.2. Extensive Market Research was used to develop the Value Propositions**

In order to establish the viability of offering new programs, the following activities were undertaken to validate the structure and proposed Green BioProducts Pillar. Market research information is provided in Appendix 6. The objectives and curriculum were developed in conjunction with meaningful stakeholder consultation in 3 phases.

1. Market research & concept development conducted through:
  - a. Multiple meetings of the Inter-Disciplinary Working Committee of Applied Science that included the following core members:
    - i. Elizabeth Croft (Associate Dean)
    - ii. James Olson (Associate Dean)
    - iii. Hugh Brock (Vice Provost)
    - iv. Reza Vaziri (Head of Civil Engineering)
    - v. Peter Englezos (Head of Chemical & Biological Engineering)
    - vi. Sathish Gopalakrishnan (Professor in Electrical Engineering)
    - vii. Scott Dunbar (Head of Mining)
    - viii. Walter Merida (Director of Clean Energy Research Centre)
    - ix. Jon Mikkelsen (Director of Naval Architecture & Marine Engineering)
    - x. Panos Nasiopoulos (Director of ICICS)

- b. Survey of current M.Eng. students and alumni (Appendix 6)
- c. Survey of APSC employers (via Co-op Database) (Appendix 6)
- d. Desktop research of comparable programs in Canada and the United States of America

## 2. Validation by external sector expert

Gail Sherson (FP Innovations) June 27 2014.

Ms. Sherson validated the industry value chain and indicated the program direction was of great importance for the BC Forest sector, and also for the bioproducts sector generally. She felt that there would be strong uptake from the industry.

## 3. Refinement through sector focus groups

Focus Group:

- Doug McKenzie (Principal Engineer at All North)
- Jim Wearing (Director at Noram)
- Gail Sherson (Director at FP Innovations)
- Shawn Mansfield (Professor at Forestry)
- Scott Rennacker (Assistant Professor at Forestry)
- Heather Trajano (Assistant Professor at Chemical And Biological Engineering)

## Summary of findings

The overview of the content and the Platform was well received with some concerns as follows:

- Consider delivery schedule and the need to provide flexible learning options for those in remote areas or who have challenges getting release from work.
- Program should be developed in partnership with Forestry – make sure to accommodate Forestry B.Sc. plus Commerce minor students.
- Consider how to adjust the program to provide value to managers in the BC Wood sector
- Include content on non-forestry products
- Include content on innovation management and managing change

The group also expressed concerns around finding sufficient applicants from the program due to the lag in training of engineers. However, they noted that many experienced engineers have retired, so as the bioproducts industry grows, there will be a need to develop leadership in the industry. The group recommended a survey of prospective students. (This has been done to some extent through a survey of M.Eng. students and alumni.)

### 2.3.3. Market Insights

Consistently repeated messages, related to the potential student market and the relevance of the particular focus areas, were heard through all market research activities outlined above.

For example:

1. Experienced engineers in their chosen careers require sector-relevant, cross-disciplinary technical skills.
2. Engineers require project management, communication and business skills to be effective leaders.
3. Few, if any, schools in Canada and the United States of America offer this combination of skills in a technical master's program.
4. There is a demonstrated need for a program. (Figure 1)
5. Students are willing to apply to graduate-level programs that are relevant to the stakeholders in their chosen sector. (Figure 2)

Figure 1 Estimated Market Size (number of students per year - Engineering)

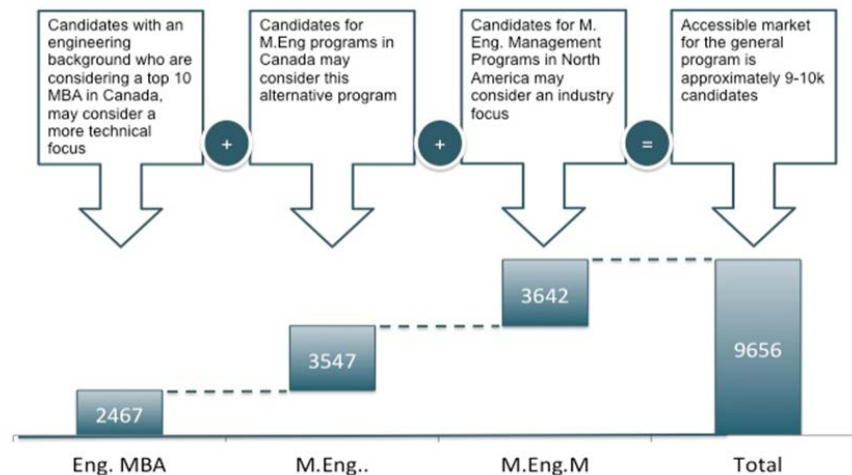
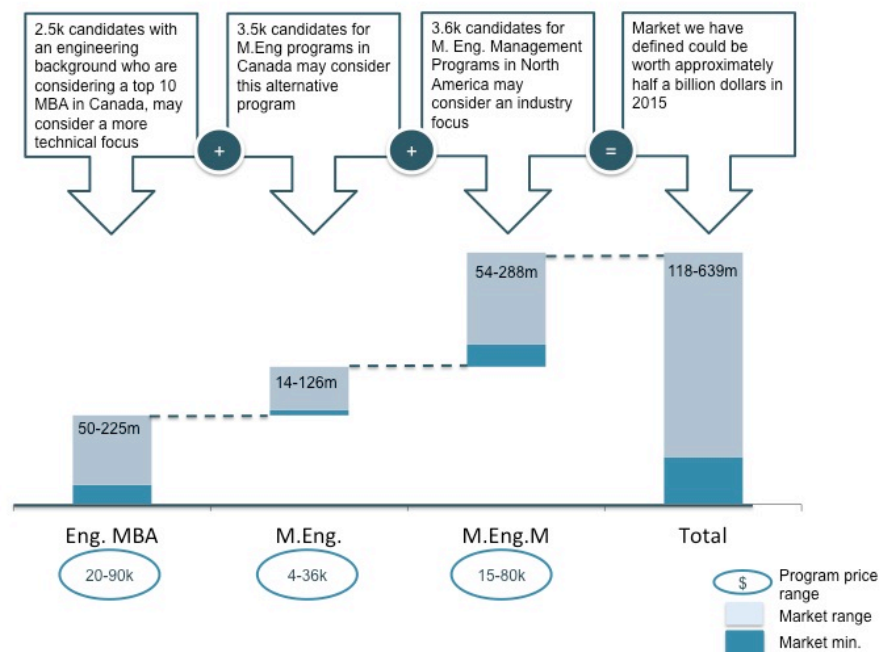


Figure 2 Estimated Market Size (\$ per year - Engineering)



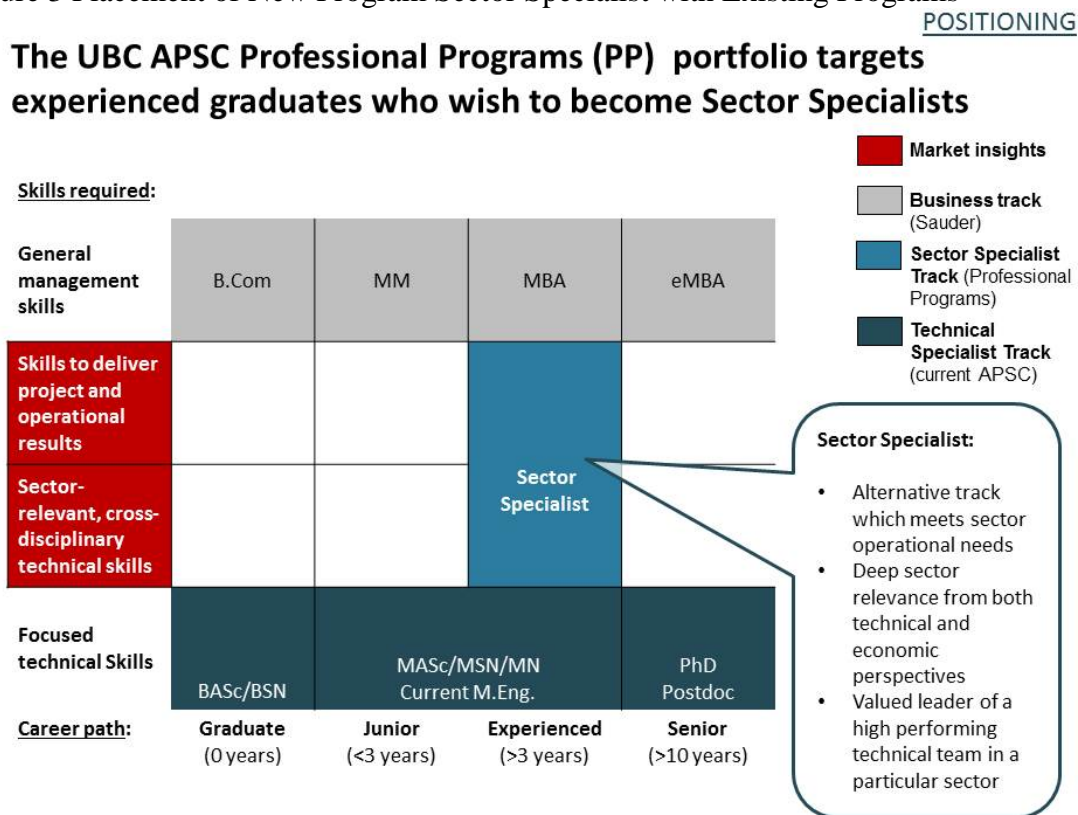
## 2.4. Program Overview

### 2.4.1. Mission

The program strives to provide students with a comprehensive and innovative education that will enable them to advance their career in a path that is different from the traditional APSC course-based master's or the Master of Business Administration (MBA). The program is structured to provide a combination of advanced technical skills, integrated with professional skills, which will enable graduates to practice these skills and advance their career trajectory in their chosen industries.

Climate change and the need to reduce our carbon footprint has provided an incentive to explore the manufacturing of products from renewable resources. This growing area of design and production includes the development of processes and technologies to craft and sustainable bio- products (materials, chemicals, etc.) from renewable bio-products. For example, research and development is underway worldwide to develop new materials and new products by breaking down pulp fibres from plants and trees into their elementary cellulose components. In general, these are manufactured through a combination of chemical and mechanical treatments in which the biomass is separated into its elementary components. The applications for these materials are becoming rapidly apparent with production of these new materials coming online. Other examples of products include biofuels, bioenergy, biodegradable plastics, building materials and chemicals. The professionals trained in this program will be the leaders in this rapidly emerging field.

Figure 3 Placement of New Program Sector Specialist with Existing Programs



## 2.4.2. Objectives of the Proposed Program

The intent is to produce engineering Program Managers who possess sufficient technical understanding to direct detailed engineering analyses. Some large corporations and government activities within the field find themselves deploying skilled business personnel to lead engineering teams. Often this results in a 'communications gap' between managers and technical staff thus impairing team effectiveness. The M.E.L. in Green BioProducts program will create Program Managers who are peers to their engineering team members, but whereas those team members may bring specialist skills in an engineering discipline, the graduate of this program will have specialist skills in program management. The program will:

1. Equip tomorrow's professionals with the critical thinking and practical skills necessary to make important contributions to their chosen sector and to make Canada a leader in the global market.
2. Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's companies to benefit from the minds of UBC's top graduate-level students.

3. Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with sector professionals in the Vancouver region.
4. Emerge as the leading institution for the continuing education of current leaders in the Green BioProducts sector and for the training of tomorrow's leaders.
5. Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.
6. Continue to develop a high profile faculty with international expertise in the theory and practice of the Green BioProducts area.

### **2.4.3 Program Learning Outcomes**

The learning outcomes of the M.E.L. in Green BioProducts program are to:

1. Develop an understanding of anatomy, physiology, and composition of forest biomass
2. Deconstruct forest biomass into its constituent parts
3. Strengthen a core discipline
4. Understand the spectrum of potential products, including BioPolymers, BioRefining, BioEnergy, Policy
5. Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability)
6. Use data appropriately for technical and business decision-making
7. Understand the critical components of how business works
8. Appreciate the impact of cross-cutting themes in industry

### **2.5. Contribution to UBC Mandate and Strategic Plan**

UBC is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning.

In *Place and Promise: The UBC Plan*, our vision statement is: "As one of the world's leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world."

The program will act as one route to the fulfillment of this promise. With the involvement of faculty from all areas in APSC, the Faculty of Forestry and the Faculty of Commerce

and Business Administration; the development of new laboratory facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored research topics, and co-op job placements, the program will offer an exceptional learning environment for students and for faculty undertaking research. In addition, the program will attract students from around the world to study in Vancouver's diverse environment and graduate students who will, in turn, be in demand across the globe.

When we speak of globalization today, it is a synthesis of exploration, learning, and the global exchange of resources and knowledge—not unlike the university itself. Accordingly, the program addresses many of the goals outlined in *The UBC Plan*:

### **2.5.1. Student Learning**

- The University provides the opportunity for transformative student learning through outstanding teaching and research, enriched educational experiences, and rewarding campus life.

The program will offer a comprehensive curriculum that draws upon the combined expertise of faculty in all areas of APSC, the Faculty of Forestry, the Faculty of Commerce and Business Administration and of sector professionals. The program will synthesize theory and practice through a challenging project-based learning experience that will equip students with the skills and experience needed to excel in the world's most important and fast-growing industries. The number and variety of courses available to students will be purposely limited, as will student enrolment, to ensure a robust and streamlined learning experience that is centered on the program objectives. As well, strong stakeholder support and existing relationships between UBC APSC and local companies promises students both a rich educational experience and employment opportunities after graduation.

### **2.5.2. Innovation Excellence**

- The University creates and advances knowledge and understanding, and improves the quality of life through the discovery, dissemination, and application of research within and across disciplines.

As a leading research and educational facility, UBC is expected to be a world leader, and *the* Canadian leader in the areas of the M.E.L. in Green BioProducts program, as we invest time and resources to create, sustain and grow for the future. By expanding UBC's current scholarship in the areas of this program, UBC will not only be a leader in the exchange of knowledge in these areas; it will also, by contributing to the involved industries, be a central part of the means by which people and knowledge are mobilized.

### **2.5.3. Community Engagement**

- The University serves and engages society to enhance economic, social, and cultural well-being.



Engaging with local governments, consulting companies and other organizations with regard to the needs of the green bioproducts sector is one of the key components of the program. With a curriculum grounded in collaborative community projects, a reciprocal and experiential learning environment will be created between students and local stakeholders.

#### **2.5.4. International Engagement**

- The University creates rich opportunities for international engagement for students, faculty, staff, and alumni, and collaborates and communicates globally.

The program will graduate students who will be in demand across the globe, from industries that will be based in Canada. It will graduate the trained professionals needed to ensure the self-sufficiency of Canada's sector-specific professionals, and the global influence of Canada itself. Strong industries, backed by highly qualified professionals, are key to securing Canada's global presence – to improving and sustaining Canada's innovation and economy, and strengthening Canada's contribution to the global market. By offering the program, UBC will therefore become an invaluable player in both national and international development.

#### **2.5.5. Sustainability**

- The University explores and exemplifies all aspects of economic, environmental, and social sustainability.

The program will play a role with the rest of the UBC community to meet society's needs without compromising those of future generations. Through the Platform courses that will have a focus on leadership and sustainability, to the activities and services provided both inside and outside of the classroom, the program is designed to be accountable and transparent in the use of available resources.

### **2.6. Support for New APSC Professional Master's Programs**

The University supports the formation of new professional master's programs having goals in alignment with that of the institution. Support and resources are available in a variety of forms including assistance with market research, budgeting, and curriculum development. We have and continue to take advantage of all assistance in the creation, development, delivery and evaluation of the program. As part of the Flexible Learning Initiative, targeted growth of professional master's programs is one of UBC's four priorities over the next five years. Continued support for the Flexible Learning Initiative has been confirmed by our new UBC President, Dr. Arvind Gupta. The strategic plan for flexible learning campus-wide is articulated in its own web space, which can be found here:

<http://flexible.learning.ubc.ca/what-is-flexible-learning/flexible-learning-goals/>

APSC has identified its professional master's programs as having the potential to benefit greatly from not only revitalization, but also expansion. This initiative has been led by the Dean's office and has received consistent support from the Provost's Office through the

Flexible Learning Initiative. An overarching goal of these new programs is to revitalize the APSC graduate program offerings which have not been systematically redeveloped for over 20 years. New Pillar courses will be available to all Ph.D., M.A.Sc. and Professional Master's students providing high quality, sector relevant, technically leading edge education for our graduate students. This objective is in line with the espoused goal of the Faculty of Graduate and Postdoctoral studies to rethink graduate education as a preparation not only for academe but also for service in a wide range of leadership opportunities in society.

### **2.6.1. Opportunity Identification**

It was felt that an opportunity may exist that had, as yet, not been explored in APSC. Given the unique structure of the Faculty, which is home to not only engineering programs, but also the School of Nursing, the School of Architecture and Landscape Architecture and the School of Community and Regional Planning, it was felt that the potential existed to create a suite of interdisciplinary master's degrees that were aligned with stakeholders in a way that a program housed in a single department or school could not. In order to establish the market for such opportunities, and to establish potential interdisciplinary themes to pursue, the following activities were undertaken:

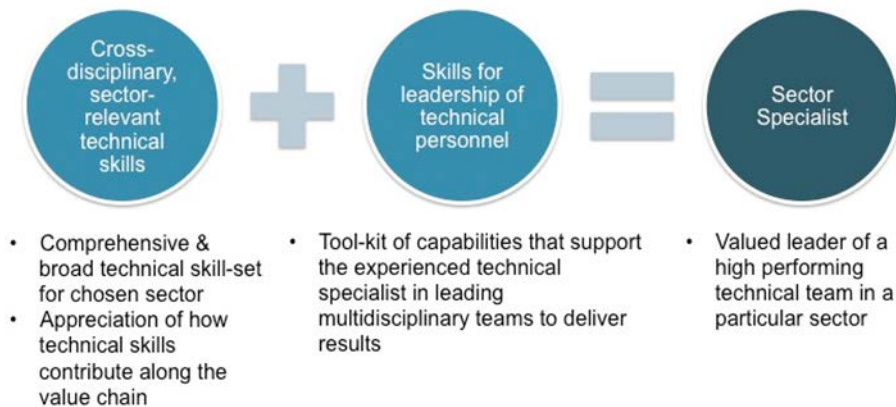
1. Competitor scans
2. Alumni tracking
3. Ongoing dialogue with stakeholders to identify skills gaps
4. Targeted market research / focus groups
5. Dialogue with faculty to shape opportunities and program champions
6. Initial feasibility assessment
7. Distillation of program concept(s) including clear objectives in launch
8. Straw man concept for new professional program, with clear student target

Figure 4 Relationship of Technical and Leadership Skills for a Sector Specialist

### VALUE PROPOSITION

**The Sector Specialist is equipped with the skills & perspective to effectively deliver cross-disciplinary projects and operational results**

Professional Program Distinctive Value Proposition



### 2.6.2. Program Development

Upon successful conclusion of the opportunity identification phase, program development initiated via the steps outlined below, with this document representing the basis of the material required for step 9. A key element that emerged from the opportunity identification phase was a program structure that featured a largely common Platform, comprising approximately 40% of each program, which would be the foundation for all new professional master's programs in APSC. The remaining 60% of the course content is then comprised of a set of courses drawn from across the Faculty that provide sector-specific technical content. The technical material is referred to as a Pillar. This structure was identified quite early on in the development process and it has been referred to internally as a 'Platform and Pillar' model from both the curriculum development and delivery perspectives.

1. Appointment of program Champion (Mark Martinez)
2. Discussions with advisory committee
3. Refinement of proposition, program design and pricing
4. Definition of operating model / formation of any partnerships
5. Financial modelling
6. Funding application
7. Planning for course (re)design (CTLT)
8. Development of project plan
9. Presentation to Faculty council, Senate, Board, Ministry – and plan refinement as needed
10. Full program design in place
11. Approval from the Senate, Board of Governors, and the Ministry of Advanced Education

### **2.6.3. Implementation**

In parallel with the approval process, implementation and launch of the new professional programs will require a significant effort well in advance of the commencement of the programs for the first cohort, which is anticipated for January 2016. Key activities are summarized here:

1. Development of course materials and flexible learning (FL) delivery / co-op modules
2. Development and launch of multi-touch marketing efforts (ideally at least 1 year in advance)
3. Set up in central systems (Enrolment Services, UBC IT)
4. Evaluation of applications (ideally application deadline 7 months in advance) and submission of accepted applications to Department and APSC Dean's Office for approval
5. Program ready to launch with inaugural group of students

### **2.6.4. Program Management**

Due to the intensive nature of the proposed programs and the expected audience, which would be primarily early career professionals, these programs will require dedicated resources within the Faculty to maintain high-quality, responsive service for administrative details surrounding their delivery (e.g. registration issues, scheduling details, facilitation of workshop activities, co-op placements, coordination of interdisciplinary capstone projects, etc.). Additionally, it is anticipated that there will be support for maintaining continuous program improvement, sufficient marketing efforts, ongoing development of community partners and stakeholder participants, and so on. The budget for these programs includes provisioning for the necessary staff, to be located in the Faculty, to ensure the ongoing support for the activities itemized below, which are regarded as necessary to deliver and maintain a program of the highest caliber:

1. Continuous feedback loop to improve delivery and learning outcomes
2. Refreshment of marketing materials, with relationships / channels fostered ongoing
3. Exploration / implementation of any content repurposing opportunities
4. Tracking of student success rates
5. Financial / operational management
6. Ongoing evolution of program to achieve learning, access, reputational and financial objectives

## **2.7. Relationship to Established Programs**

### **2.7.1. The University of British Columbia**

Many of the advanced topics that will be covered under the program are already available through programs in the involved departments and schools of APSC at UBC, but the program will synthesize this material and offer a more interdisciplinary approach.

Existing thesis based master's program:

Master of Applied Science (M.A.Sc.) Specialization in Materials Engineering

Faculty of Graduate and Postdoctoral Studies

The Department of Materials Engineering offers a thesis-based Master of Applied Science (M.A.Sc.) program requiring 18 credits of course work and a 12 Credit thesis. Research foci include Composites, Microstructure Engineering, Extractive Metallurgy, Solidification, Biomaterials & Ceramics. Nominal completion time for this program is 24 months. This research-based program is designed for students who are interested in a more theoretical, research based career path and is part of the typical academic path taken by students considering Ph.D. Studies. Eligible applicants are offered admission after recommendation by a proposed faculty supervisor in the department of Materials Engineering.

Existing professional program includes:

Master of Engineering (M.Eng.)

Faculty of Applied Science, Engineering

The Master of Engineering is a non-thesis, course-based program designed for students who would like to further their education without pursuing research, or individuals who wish to advance their careers with enhanced technical knowledge. It normally takes 12-16 months to complete 30 credits. Students register for the M.Eng. at the faculty level but generally complete courses within a specific department, and may take a collection of related courses that would be considered a 'Specialization', although the degree is somewhat generic in that it is simply granted as a M.Eng. in a specific department in most cases. The admission to the M.Eng. is not cohort-based, and the entry point may be either September or January. If there is a demonstrated demand to continue offering the M.Eng. in addition to the M.E.L., then it is within each individual department's discretion to do so.

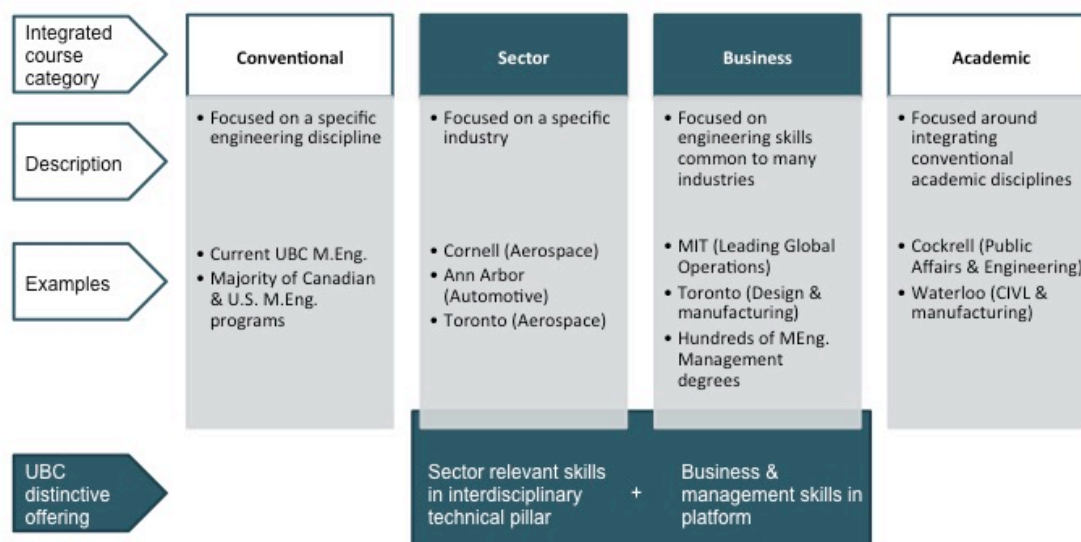
## 2.7.2. Other British Columbia and Canadian universities

There are currently no universities in British Columbia or in Canada that offer accredited *graduate* programs with the proposed Platform and Pillar structure. Some programs offer Biosystems, Biological and/or BioResource Engineering programs, but they are not focused towards Green BioProducts.

The following table lists some universities within Canada with related engineering degrees. The figure following illustrates the unique positioning of the proposed program.

University	Department	Program
Dalhousie University	Biological Engineering	M.Eng., M.A.Sc. and Ph.D.
McGill University	Biosystems and BioResource Engineering	M.Sc. (Thesis Option), M.Sc. (Non-Thesis Option),

Figure 5 Assessment of Categories of Professional Engineering Master's Programs



Source: US News, Top school websites (MIT, Stanford, Berkeley, CalTech, Carnegie Mellon, Georgia Tech, Urbana-Champaign, Purdue, Ann Arbor, Cockrell, Toronto, Waterloo), team

### 2.7.3. Level of support and recognition from other post-secondary institutions

As a new program, support and recognition from other post-secondary institutions is limited. However, it is anticipated that participation from faculty members outside of UBC delivering content in the program will promote further support from institutions that offer traditional graduate programs in Green BioProducts both nationally and internationally. UBC is one of the world's leading academic centers for bio-economy research. For example, the Bio-Economy Research, Innovation & Education (BERIE) network, which includes the program champion and numerous APSC and Forestry faculty, represents deep knowledge from the seeds of the trees, to cutting-edge bio-refining technologies, and novel bio-products. UBC has an exceptional group of researchers working on development of advanced biomaterials, ranging from specialty paper applications to fibre and fibril reinforced materials and carbon fibres from lignin. However, the differentiating factor of Bio-Economy Research at UBC is the high level of internal and external collaboration, with researchers and practitioners combining knowledge throughout a fully integrated 'seeds to solutions' bio-refining value chain. Furthermore, UBC has a strong history of professional training in the Green BioProducts area, including the Pulp and Paper Center and the Advanced Papermaking Initiative, led by program champion, Mark Martinez. Given UBC's history of expertise in Green BioProduct areas and the fact that UBC's engineering programs have been ranked second in the nation and among the top 50 worldwide (*Times*

*Higher Education*), it is expected that other post-secondary institutions both in Canada and abroad will recognize and support this program.

## **2.8. Demand for Program**

The demand for professionals with technical and integrated professional skills is growing rapidly, and Canada currently has neither the trained personnel required to meet the needs, nor the means of training them. There are currently *no* other Canadian institution that offer sector-focused (rather than research-oriented) training at the graduate level with the proposed Platform and Pillar structure.

Research and development is underway worldwide to develop new materials and new products by breaking down pulp fibres into their elementary cellulose components. In general, these are manufactured through a combination of chemical and mechanical treatments in which the biomass is separated into its elementary components. The applications for these materials are becoming rapidly apparent with production of these new materials coming online. The professionals trained in this program will be the leaders in this rapidly emerging field.

The demand for the suite of APSC professional master's programs comes from multiple sides: British Columbia has a large forestry sector and that is in significant need of transformation to extract maximum value from these resources to create jobs and opportunities throughout the province while protecting our natural environment. Canada also needs the proposed programs for the success of Green BioProducts industries to stay competitive with international markets. Given UBC's location, the active and internationally recognized research of current faculty in the BERIE network, and the recent achievements of UBC graduate and undergraduate students in Green BioProduct areas, it is appropriate that UBC be the institution to implement a graduate-level programs that are lacking in Canada and now more important than ever.

### **2.8.1. Enrolment Predictions and Capacity**

Significant demand is anticipated for the new programs. The desirability of an educational experience that can lead to rapid career progress upon graduation is reflected in the interest we have seen in the existing professional master's programs.

To maintain a vibrant learning environment and admit the best and brightest applicants, however, the cohort size will be purposely limited. The minimum initial cohort is anticipated to be 20 students increasing to 41 by 2020. The program will not impact the enrolment of existing professional master's programs such as the M.Eng. CHBE which attracts students who have obtained less than 3 years of relevant work experience since they finished their bachelor's program.

### **2.8.2. Tuition Rationale**

The program falls under the APSC "Guidelines for Professional Programs" (August 31, 2012) which stipulates that new professional programs in the Faculty, as of January 2009,

must generate revenue to cover a range of expenses including equipment, facilities and salaries of faculty and staff involved in course delivery and administration. The primary source of revenue for these programs is through the tuition flow-back from the University to the Faculty and unit delivering the program.

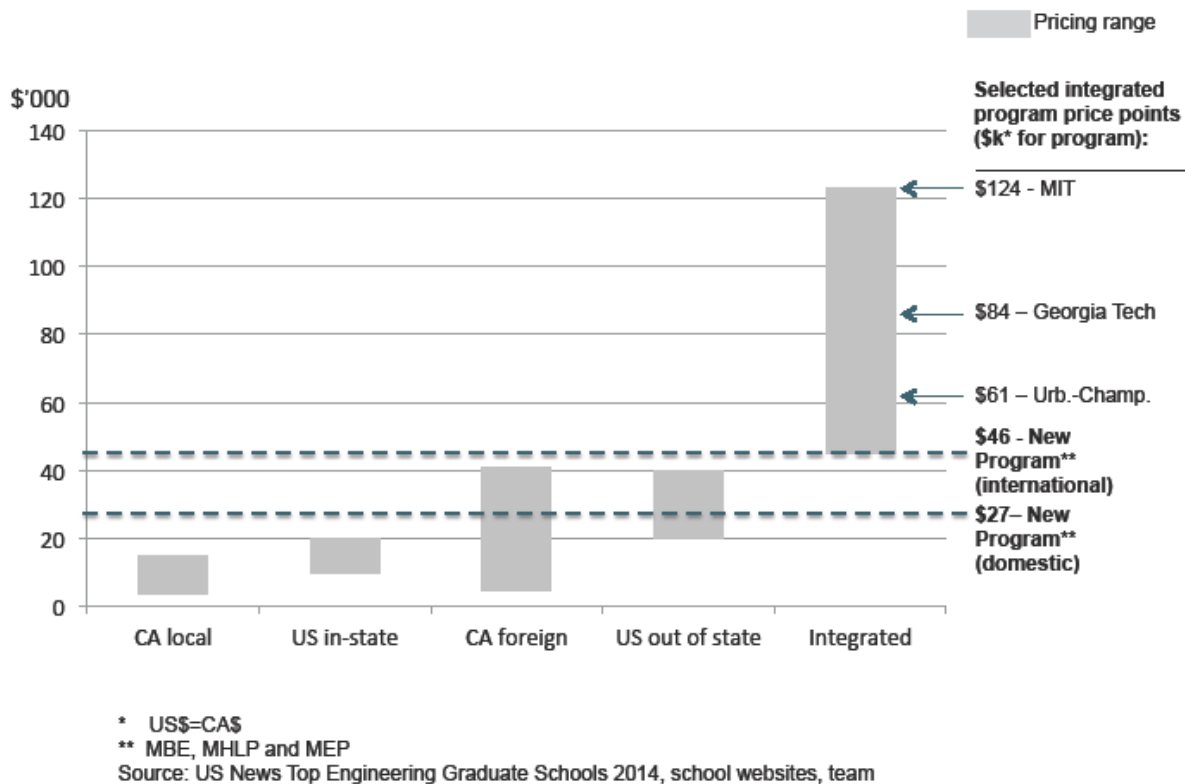
The starting tuition level requested for the program is \$27,000 CAD for the one-year program for Canadian citizens and Permanent Residents and \$46,000 CAD for the one-year program for international students requiring a Study Permit. Tuition is paid in three equal installments per year, normally in January, May and September. The student is required to pay a minimum of three installments of tuition in order to graduate, but if the program is extended by permission of the program Director, the student pays tuition installments until the program requirements are met. For domestic students, the continuing fee and the extension fee are set by the University. No part-time studies are allowed. Currently, tuition increases by 2% each year.

We are confident that the program can attract students to pay the proposed tuition for the following reasons:

1. Vancouver is an acknowledged centre for the Green BioProducts Pillar
2. A one-year program fits into the lifestyle framework for most of our potential students
3. The program will draw from an international pool of students
4. The tuition has been researched to be positioned in the lower cost bracket compared to programs at institutions such as MIT and Georgia Tech



Figure 6 Comparison of Tuition within Canada and the United States of America



### 2.8.3. Scholarships

We are concerned about getting the right students for the program and recognize that the tuition assessment may be prohibitive for some outstanding applicants. As a consequence, we intend to go to stakeholders in each sector seeking named scholarships. We have set aside 7.5 percent of the tuition revenue for financial need.

### 2.8.4. Potential Sectors of Employment for Graduates

Graduates of the program will have developed those skills and practices that stakeholders value most highly in experienced APSC professionals. They will be creative and visionary to see the potential to use the knowledge and training from the program effectively in their employment choices. Government and the private sector are hungry for experts to develop new processes and systems to explore and implement positive changes in their chosen area. Graduates can expect to find careers locally, nationally, and internationally.

### **2.8.5. Opportunities for Further Study**

The professional master's degree at UBC is generally not recommended for students who wish to continue on to a Ph.D., and the proposed program will conform to this. As such, it is anticipated that most or all of the graduating students will go on to or return to work in their chosen sector. It is possible, however, that a small number of students will continue to Ph.D.-level study at UBC or elsewhere.

## **3. Program Description and Specifications**

### **3.1. Admission Requirements**

This program is delivered jointly between the Department of Chemical & Biological Engineering (within the Faculty of Applied Science) and the Faculty of Forestry. Applicants must hold an undergraduate credential in Chemical and Biological Engineering, Forestry, Wood Products Processing, Chemistry or Plant Science, Biotechnology, Biochemistry, Biology or Biophysics or equivalent and 3 years relevant experience. Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the MEL GBPR are:

- TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 81
- PTE (Pearson Test of English - Academic): minimum overall score of 59
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 60

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

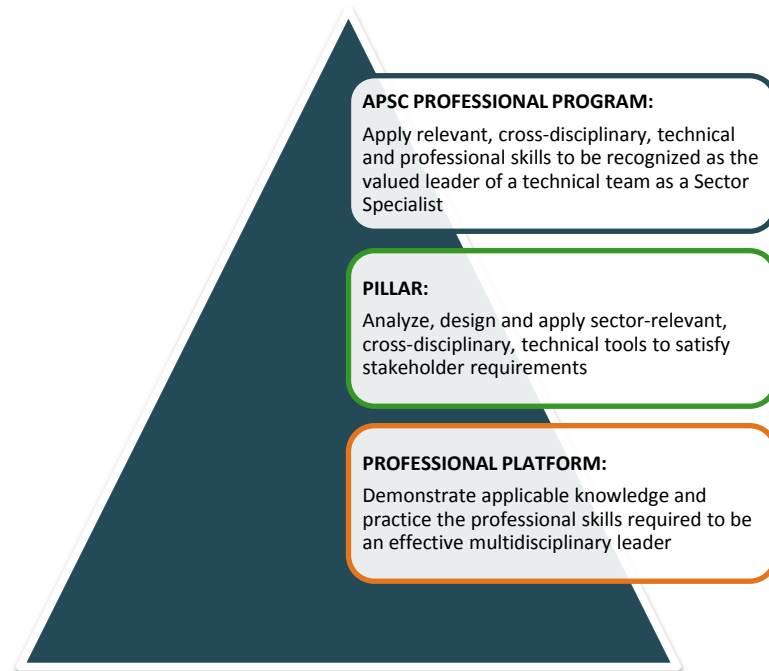
Lists of the required application documents are available on the program website. The Applied Science graduate program office is responsible for collection and assessment of application documents.

### **3.2. Program and Pillar Requirements**

The program requires a minimum of 30 credits of coursework. The distribution will be 12 credits dedicated to the Platform providing the professional skills required for an experienced graduate to be an effective technical manager and 18 credits dedicated to the Pillar advanced technical courses. Both the Platform and the Pillar have prescribed core courses. In general, where a program has a provision for elective choices, master's programs in the Faculty will allow a maximum of 6 credits of 300- or 400-level undergraduate coursework and 6 credits of 500-level directed studies. The program includes 3 credits of constrained electives that will be drawn from courses approved by the graduate program office. Example electives are listed in section 3.4 (overview of Pillar). A current list of approved electives will be on the M.E.L. in BioProducts program website. The program will be delivered as an intensive one-year program. It is anticipated that this will be favorable to post-professional students already in the workplace. The program courses will involve a combination of classroom learning and integrated hands-on training.

There are proposed seven Pillars leading to the degree of Master of Engineering Leadership at the UBC Vancouver campus (see Appendix 5 for prospective program curriculum). The Master of Health Leadership and Policy in Seniors Care at the UBC Vancouver campus will also utilize this Platform. These programs are distinct and each will be reviewed separately, but as all APSC Professional Programs are conceptualized as sharing a common goal of graduating students with enhanced disciplinary knowledge and business skills the proposed array of programs is listed in Appendix 5 for information only.

Figure 7 Learning Objectives Relevant to the Three Levels of the Program



### 3.3. Platform Structure utilized by the M.E.L. in Green BioProducts

#### 3.3.1. Leadership & Sustainability (4.5 credits total)

APPP 501 (1.5) Project Management and Leadership

APPP 502 (1.5) Sustainability and Leadership

APPP 503 (1.5) Organizational Leadership

##### *Learning Outcomes*

1. Lead multi-disciplinary teams to effectively deliver sustainable projects
2. Articulate ideas, progress and outcomes through oral and written communications
3. Plan & deliver multidisciplinary projects
4. Identify and apply sustainability concepts to influence the triple bottom-line
5. Apply leadership principles to organizational and social change

##### *Content*

1. Project management
2. Organizational behaviour and structure
3. Sustainability, ethics and policy
4. Personal and professional leadership effectiveness & communications
5. Application of concepts to trans-disciplinary challenges in organizational and social change
6. Fully integrated into technical streams through sector-relevant projects

#### 3.3.2. Business Foundations (3 credits)

**APPP 504 (3) Business Acumen for Technical Leaders***Learning Outcomes*

1. Gain broad knowledge of the structure and mechanics of business.
2. How to use data for decision-making
3. Articulate ideas, progress and outcomes through oral and written communication
4. Practical level of understanding in specific aspects of managerial accounting, strategy and performance, market evaluation, operations management, negotiations and contract management and business-case building and valuation

*Content*

1. Managerial accounting
2. Strategy and performance
3. Market evaluation
4. Operations management
5. Negotiations and contract management
6. Business-case building and evaluation
7. Communication skills

**3.3.3. Faculty of Commerce and Business Administration Electives (Select 1.5 credits total)***Learning Outcomes*

1. Gain exposure to non-technical issues and skills that impacts business and management

*Content (examples of Faculty of Commerce and Business Administration electives, credit values range from 0.7-1.5)*

1. BAEN 542 (0.8) Prototyping
2. BAEN 543 (0.7) Disruption
3. BAEN 544 (0.8) Pitching Your Idea
4. BAEN 545 (0.7) Qualitative Models
5. BAEN 546 (0.8) Social Entrepreneurship
6. BAEN 547 (0.7) Innovation and Sustainability
7. BAFI 540 (0.8) Finance
8. BAMA 540 (0.8) Marketing Fundamentals
9. BAMA 541 (0.8) Product Service Management
10. BASC 540 (0.7) Operations Fundamentals
11. BAEN 550 (1.5) Fundamentals in Entrepreneurship
12. BAPA 501 (1.5) Government and Business
13. BAPA 510 (1.5) Public Policy and the Environment
14. BASD 501 (1.5) Corporate Social Responsibility
15. BASD 505 (1.5) Environmental Economics, Management, and Technology
16. BASM 501 (1.5) Business Strategy
17. BAHHR 505 (1.5) Leadership
18. BAHHR 507 (1.5) Two-Party Negotiations

### 3.3.4. Analytics and Interpretation for Applied Sciences APPP 505 (3 credits)

Determined by each Pillar and will be used as part of the M.E.L. in BioProducts.

#### *Learning Outcomes*

1. Ensure competency to perform sector-relevant, deep analytical tasks
2. Recognize data visualization tools and understand how they were created
3. Develop a conceptual understanding of 'big data' and predictive analytics for applications in practice
4. Acquire strategies to build a corporate culture around analytics
5. Recognize potential ethics or privacy issues related to data collection or use

### 3.3.5. Professional Development

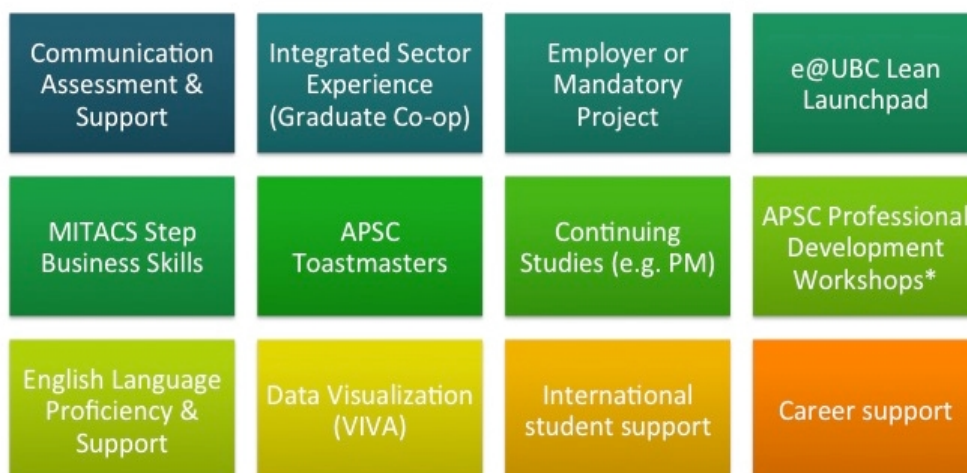
Provide support to candidates who wish to broaden their knowledge

1. Communication Assessment & Support
2. Integrated Sector-specific Experience (Graduate Cooperative Education Program)
3. Employer or Mandatory Sector-specific Project
4. e@UBC Lean Launchpad
5. MITACS Step Business Skills
6. APSC Toastmasters
7. Continuing Studies (PM)
8. APSC Professional Development Workshops
9. English Language Proficiency & Support
10. Data Visualization (VIVA)
11. International Student Support
12. Professional Development Employment Centre (PDEC)

Figure 8 Summary of PDEC Resources

PROFESSIONAL PLATFORM

**The APSC Professional Program Professional Platform also offers students optional opportunities to expand their skills through the Professional Development Employment Centre**



### 3.4 Overview of Pillar for the M.E.L. in Green BioProducts

#### Value Chain



#### Learning Outcomes

1. Develop an understanding of anatomy, physiology, and composition of forest biomass
  2. Deconstruct forest biomass into its constituent parts
  3. Strengthen a core discipline
  4. Understand the spectrum of potential products.
- Topics will include: BioPolymers, BioRefining, BioEnergy, Policy

	Credits
<b>Winter Session – Term 2 (January – April)</b>	
GBPR 500	6
GBPR 501	3
APPP 501	1.5
APPP 502	1.5
APPP 505	3
<b>Summer Session – Term 1 (May – June); Term 2 (July – August)</b>	
GBPR 502	3
APPP 503	1.5
APPP 504	3
APSC 412 (co-op placement) or an entrepreneurial experience (12 weeks)	6*
<b>Winter Session – Term 1 (September – December)</b>	
GBPR 503	3
Electives constrained	3
Electives (Faculty of Commerce and Business Administration – a current list of approved electives on the M.E.L. in BioProducts website)	1.5
<b>TOTAL CREDITS</b>	<b>30*</b>

\*Note: APSC 412 has a credit value of 6. Students choosing this option should note that these credits are non-additive, meaning they are not counted toward the 30 required program credits. The entrepreneurial experience options also do not have credits that count toward the required program credits. The choice of APSC 412 or an entrepreneurial experience will take place over a 12-week period. APPP 503, APPP 504 and GBPR 502 will be offered in an intense 4-week version before the APSC 412 or entrepreneurial experience, with self-study program and bi-weekly Webex meeting component for GBPR 502 following this 4-week period. The final exam for GBPR 502 will be held in September

so that students have the opportunity to reflect on and absorb the material over the 12-week placement period. Students will choose their schedule with the approval of the M.E.L. in BioProducts graduate program office.

Constrained Electives (3) A current list of approved electives will be on the M.E.L. in BioProducts program website.

CHBE 401 (3) Mechanical Pulping and Papermaking

CHBE 455 (3) Kinetics and Reactor Design

WOOD 461 (3) Globalization and Sustainability

WOOD 465 (3) Wood Industry Business Management

WOOD 487 (3) Wood Composites

Figure 9 Course Credit Distribution

**MASTER OF ENGINEERING LEADERSHIP IN GREEN BIOPRODUCTS**

APPP 501 (1.5)	APPP 503 (1.5)	APPP 504 (3)	APPP 505 ANALYTICS	GBPR 500 (6)	GBPR 501 (3)	GBPR 502 (3)	GBPR 503 (3)	ELECTIVE (3)
APPP 502 (1.5)	Sauder Elective (1.5)							
				PILLAR CAPSTONE COURSE				
PLATFORM (12 CREDITS)				PILLAR COURSES (18 CREDITS)				
Total Credit Load for MEL in GREEN BIOPRODUCTS is 30 Credits								

### 3.5. Supervision and Evaluation

Unlike the graduate-level research programs at UBC, a student in the program will not be assigned a single, dedicated supervisor, but will rather be supervised day-to-day in their work by the Pillar Directors and the APSC Professional Program Office. Coursework is evaluated through mini-projects, exams, homework assignments and in-class quizzes. For Pillars having a capstone project as a core component, supervision and evaluation will be provided by a professor and by sector-specific adjuncts, while a Cooperative Education placement will be supervised mainly by the sponsoring company, and given a final mark by a UBC faculty member involved in the professional program based on the company's report and the student's final report and presentation. Expectations of students will be formalized through individual course syllabi.



### **3.6. Policies on Program Management and Assessment**

The program will be administered under APSC. In delivering this new responsive model program it is essential that the Dean's Office, APSC Professional Program Office and Graduate Program Offices responsible for the Pillars collaborate and cooperate in an intimate fashion. The student should have access to all services and needs from within the same Faculty to ensure timely and comprehensive service of their academic and non-academic activities.

In parallel to internal reviews used to evaluate professional degrees conducted according to the APSC and UBC governance guidelines, the program will be evaluated and developed based on the recommendations of an Advisory Committee. This expert panel of outside professionals and academics will meet once per term. Committee membership will be approved by the Dean of APSC.

## **4. Calendar Statement - Program**

[Removed from this document and attached separately for purposes of Curriculum.]

## **5. Program Resources**

### **5.1. Program Funding and Budget**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020. This enrolment is not expected to have any impact on enrolment in existing related programs (i.e., M.Eng. in Chemical and Biological Engineering).

As this program is unique, and is directed at a sector where there is identified unmet need, impact on enrolment from existing programs or on opportunities for existing students is expected to be small.

### **5.2. Qualified Faculty**

Courses will be taught by a combination of faculty from all departments and schools in APSC and also from other faculties at UBC; visiting Professors, sector-specific adjuncts and guest lecturers will be involved.

### **5.3. Pillar Champions or Directors**

Each Pillar has a 'Champion', or in some cases more than one champion, who was instrumental in establishing the value proposition for the Pillar and also in the design of the curriculum. The Champion for Green BioProducts is Professor Mark Martinez. It is expected that this individual will continue to have an instrumental role in the administration and oversight of the Pillar upon program launch, and may become Program Director (see 5.5).

## 5.4. Library Resources

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support and the Platform courses requiring new resources will be funded by the APSC Dean's Office (see Appendix 2 & 3 and Appendix 7 Platform Proposal).

## 5.5. Administration

### • Program Directors

The Directors for each Pillar will be appointed by the Dean of APSC. The Director will lead the implementation of the program and oversee its evolution, growth and position within APSC. As well as assuming teaching and research commitments, the program Director will represent the program on university committees. The program Director will also be expected to lead the community outreach component of the program to secure co-op opportunities. The Director will take an active role in developing the necessary community and stakeholder linkages to establish a long-term and wide range of co-op placements. The Director will become the principal point of contact for community and stakeholder partners. The Director will report to the Head of the lead department or school as appointed by the Dean of APSC.

### • Program Manager

It is expected that the suite of professional programs will be managed on a day-to-day basis by one or more centrally located program managers. This program manager would assist in: student recruitment, student enquiries, website development and maintenance, applications and admissions, timetabling, classroom scheduling, extra-curricular events and workshops, and addressing registration inquiries or issues. Support for admissions and records will also be provided by the APSC Dean's Office.

## 5.6. Space Requirements

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

## 5.7. Consultations with University Units

Consultation requests were sent to the following (see Appendix 4):

1. Faculty of Forestry
2. Faculty of Land and Food Systems
3. UBC Sustainability Initiative
4. Faculty of Commerce and Business Administration
5. Faculty of Science

## 5.8. Contact Information

### Contact Person:

University of British Columbia, Faculty of Applied Science, Dean's Office

Elizabeth Croft, Associate Dean, Education & Professional Development  
[elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca) 604-822-6614

## **6 Appendices Accompanying Pillar Proposals**

[Removed for purposes of Curriculum; may be requested.]

**UBC Curriculum Proposal Form****Category: (1)**

<p><b>Faculty:</b> Faculty of Applied Science (APSC)  <b>Faculty Approval Date:</b> December 5, 2014  <b>Effective Session:</b> Winter, Term 2  <b>Year:</b> 2015-2016</p>	<p><b>Date:</b> December 19, 2014  <b>Contact Person(s):</b>  Faculty of Applied Science Dean's Office  <b>Deborah Feduik</b> (Manager, M.Eng. &amp; Graduate Programs)  Tel: 604-822-8386  Email: <a href="mailto:gradprog@apsc.ubc.ca">gradprog@apsc.ubc.ca</a></p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>Master of Engineering Leadership in Green BioProducts</b></p> <p><b>Program Overview</b></p> <p>The Master of Engineering Leadership (M.E.L.) in Green BioProducts is a program within the Faculty of Applied Science.</p> <p>The Green BioProducts program focuses on developing Highly Qualified Personnel (HQP) needed for the rapidly evolving lignocellulosic biomass (Green) products sector. This sector is seeing opportunities in the development of green, sustainable products and chemistries to replace oil-based products and fuels. UBC has an exceptional group of researchers working on development of advanced biomaterials, ranging from specialty paper applications to fibre and fibril reinforced materials and carbon fibres from lignin.</p> <p>Students will develop mastery of knowledge related to the chemistry and anatomy of the tree, lignocellulosic separation chemistry, and the production pathways for biocomposites and fuels.</p> <p><b>Admission Requirements</b></p> <p>This program is delivered jointly between the Department of Chemical &amp; Biological</p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,195,0,0">http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,195,0,0</a></p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new program.</p> <p><b>Rationale:</b>  The creation of this program has been driven, in part, by strong interest from the external community (whereby British Columbia will see a high level of activity over the next few decades), in part by a desire to collaborate between the Departments and Schools in the Faculty of Applied Science and in part to raise UBC's profile and to attract students (both within Canada and abroad), and to collaborate internationally.</p> <p>The Green BioProducts Pillar focuses on developing Highly Qualified Personnel (HQP) needed for the rapidly evolving lignocellulosic biomass (Green) products sector. This sector is seeing opportunities in the development of green, sustainable products and chemistries to replace oil-based products and fuels. UBC has an exceptional group of researchers working on development of advanced biomaterials, ranging from specialty paper applications to fibre and fibril reinforced materials and carbon fibres from lignin.</p> <p>Research and development is underway worldwide to develop new materials and new products by breaking down fibres into their</p>

<p>Engineering (within the Faculty of Applied Science) and the Faculty of Forestry. Applicants must hold an undergraduate credential in Chemical and Biological Engineering, Forestry, Wood Products Processing, Chemistry or Plant Science, Biotechnology, Biochemistry, Biology or Biophysics or equivalent and 3 years relevant experience. Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director.</p> <p>The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.</p> <p>The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).</p> <p>Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the M.E.L. in Green BioProducts are:</p> <ul style="list-style-type: none"> <li>• TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)</li> <li>• IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0</li> <li>• MELAB (Michigan English Language</li> </ul>	<p>elementary cellulose components. The applications for these materials are becoming rapidly apparent with production of these new materials coming online. The professionals trained in this program will be the leaders in this rapidly emerging field that is of critical importance to the British Columbia forest sector and to the green bioproduct sector worldwide.</p>
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<p>Assessment Battery): minimum overall score of 81</p> <ul style="list-style-type: none"><li>• PTE (Pearson Test of English - Academic): minimum overall score of 59</li><li>• CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L</li><li>• CAEL (Canadian Academic English Language Assessment): minimum overall score of 60</li></ul> <p>Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.</p> <p>Lists of the required application documents are available on the program website. The Applied Science graduate program office is responsible for collection and assessment of application documents.</p> <p><b>Transfer Credit</b></p> <p>1. Graduate students who have earned credits outside their current master's program (e.g., from a different university, in a different UBC master's program, as an undergraduate, or as an unclassified student) may transfer up to 12 credits or up to 40% of the total number of credits needed for completion of their current program (whichever is more), provided that:</p> <ul style="list-style-type: none"><li>• the courses were not used to satisfy the requirements of another credential;</li><li>• the courses were not used as a basis for admission to the graduate degree program;</li></ul>	
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- at least a B standing (UBC 74%) was obtained in courses considered for transfer;
- the courses considered for transfer credit have been taken within five years of commencement of the current degree program.

2. No more than 6 credits of transfer credit may be at the undergraduate level (300-/400-level).

3. The 12-credit (40%) restriction applies to students in UBC-approved Exchange Agreements established by the UBC Go Global Office.

4. Requests for transfer credit must be accompanied by a letter from the home graduate program addressed to the Dean of the Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis.

Courses taken as a UBC Access Studies (or non-degree) student may be approved for transfer toward a graduate program (in accordance with transfer credit regulations specified above) with the permission of the graduate program and the Dean of Applied Science.

### **Program Requirements**

Degree completion requires completion of 30 credits. This includes 18 credits of Pillar courses, including 3 credits of constrained electives, and 12 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master's programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the

<p>M.E.L. in Green BioProducts graduate program office. Students in the M.E.L. in Green BioProducts will choose in their second term between a Co-operative Education Placement (APSC 412; the credits are non-additive in that they are not counted toward the 30 required program credits).and an entrepreneurial experience. A complete list of the courses required for successful completion are available on the program website &lt;insert link&gt;.</p> <p><b>Financial Assistance</b></p> <p>Financial assistance based on academic merit and financial need may be available.</p> <p>Students should consult the M.E.L. in Green BioProducts program website for more information.</p> <p><b>Contact Information</b></p> <p>Faculty of Applied Science Dean's Office 5000-2332 Main Mall Vancouver, BC V6T 1Z4 Email: <a href="mailto:gradprog@apsc.ubc.ca">gradprog@apsc.ubc.ca</a> <a href="http://www.apsc.ubc.ca">www.apsc.ubc.ca</a></p>	
<p><b>Proposed Calendar Entry:</b></p> <p><b>GBPR</b> – Green BioProducts</p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course code</p> <p><b>Rationale for Proposed Change:</b> This new course code is being created to identify the new courses within the Master of Engineering Leadership (M.E.L.) Pillar in Green BioProducts.</p>
<p><b>Proposed Calendar Entry:</b></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b></p>



**GBPR 500 (6) Building Blocks of Forest Biomass**

Anatomy, physiology, composition, ultrastructure of the cell wall, molecular organization, and chemistry of forest biomass  
*This course is not eligible for Credit/D/Fail grading.*

N/A

**Type of Action:**

Create new course

**Rationale for Proposed Change:**

This new course is being created within the Master of Engineering Leadership (M.E.L.) in Green BioProducts program.

The area of green bioproducts is seeing opportunities in the development of green, sustainable products and chemistries to replace oil-based products and fuels. The curriculum is designed for the student to understand the chemistry and ultrastructure of forest biomass and the potential when the individual components are isolated. This course is the foundation material for the entire program. Here the students will learn, in detail, the chemistry and construction of the ultrastructure of forest biomass.

The course will introduce different renewable lignocellulosic biomass, the macroscopic and ultrastructural organization of the plant cell wall, including its chemical structure and arrangement of the array of polymers and soluble components synthesized by energy crops, as well as related characterization methods.

The learning objectives of GBPR 500 are aimed at the majority audience for this program: engineers, although persons with a plant or biological science credential are also included in the admission requirements. The goal for this course is to ensure that the students have mastery of knowledge related to the chemistry and construction of the ultrastructure of forest biomass, specifically relevant to designing new products and processes with biomaterials, such that they are able to apply this knowledge to the bioproduct implementation courses: fractionation (501), biomaterial production (502) and bioenergy/biorefining (503). We feel this course is essential for the academic success of engineering students returning to academic

	<p>studies who may not have this background, or who may have an incomplete background. As these topics are fundamental knowledge for the program, 6 credits of the program is dedicated to this task.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of GBPR 500 in the M.E.L. in Green BioProducts Program and to ensure that the content and assessments are reflective of professional graduate-level work. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>GBPR 501 (3) Biomass Fractionation Chemistry</b>  Extraction of soluble compounds and macromolecules. Chemical and technical processes in production of pulp. Bleaching. Fiber production from woody and herbaceous biomass. Production of reactive intermediates. <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b>  This new course is being created within the Master of Engineering Leadership (M.E.L.) in Green BioProducts program. It is the second technical Pillar course in the sequence of courses in this program. The course continues on the material presented in GBPR 500 in which we the students are exposed to a number of methodologies to separate the individual components of the wood ultrastructure. The work treats the chemistry and technology of biomass fractionation into its constituent components. The chemistry and technology of pulping, bleaching, fibrillation, and production of reactive intermediates (e.g. lignin macromolecules or soluble saccharides) will be examined. The course will also consider the changes in structure and properties of wood polymers and pulps in the pulping process. Novel conversion systems will be considered.</p>

	<p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of GBPR 501 in the M.E.L. in Green BioProducts Program and to ensure that the content and assessments are reflective of professional graduate-level work. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>GBPR 502 (3) Sustainable BioMaterial from Forest Biomass</b>          Properties of biopolymers/chemical and physical characterization. Fundamentals of polysaccharide chemistry and derivatives with industrial examples. Wood composites and biocomposites and carbon fiber from lignin. Biomimicry inspired functional products.  <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b>          This new course is being created within the Master of Engineering Leadership (M.E.L.) in Green BioProducts program. GBPR 502 is the third course in the sequence of four courses offered in this program. It is a direct extension of the course material covered in GPBR 500 and 501 and covers the production pathways for biomaterials. The course material focuses on the re-construction methodology of the separated components of the fibre into biopolymers and biomaterials.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of GBPR 502 in the M.E.L. in Green BioProducts Program and to ensure that the content and assessments are reflective of professional graduate-level work. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<b>Proposed Calendar Entry:</b>	<p><b>URL:</b> N/A</p>

**GBPR 503 (3) Bioenergy and Biorefinery**

Understanding technology of deriving biofuels and chemical feedstocks from forest biomass. Relating chemistry of biomass for production of liquid, solid and gaseous fuels. Processing options for value-added chemicals  
*This course is not eligible for Credit/D/Fail grading.*

**Present Calendar Entry:**

N/A

**Type of Action:**

Create new course

**Rationale for Proposed Change:**

This new course is being created within the Master of Engineering Leadership (M.E.L.) in Green BioProducts program.

This course is the final pillar specific technical course in this program and focuses on the development of green, sustainable products and chemistries to replace oil-based fuels. The course builds upon knowledge gained in GBPR 500, Building Blocks of Forest Biomass, which ensures that the students have mastery of knowledge related to the chemistry and construction of the ultrastructure of forest biomass, specifically relevant to designing new products and processes with biomaterials and GBPR 501, Biomass Conversion Chemistry, which treats the chemistry and technology of biomass fractionation into its constituent components. We have then the potential use of plant biomass into two categories: bio-materials (GBPR 502) and bio-energy and chemicals (GBPR 503). GBPR 503 is an outline of how bio-chemicals or energy are produced through oxidative or catalytic chemical reaction schemes. Through this series of courses, and by the end of the program the student have knowledge of the chemistry and anatomy of the tree, lignocellulosic separation chemistry, and the production pathways for biocomposites and fuels.

As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of GBPR 503 in the M.E.L. in Green BioProducts Program and to ensure that the content and assessments are reflective of professional graduate-level work. We will take into account the recommendations by the committee for this course proposal as the course materials are

	developed and finalized before delivery.
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18 March 2015

To: Vancouver Senate

From: Senate Curriculum & Admissions Committees

Re: Master of Engineering Leadership in Integrated Water Management  
(approval)

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The Senate Curriculum and Admissions Committees have reviewed the material forwarded to them by the Faculty of Applied Science and enclose those proposals they deem ready for approval.

The following is recommended to Senate:

**Motion:** *“That the new Master of Engineering Leadership (M.E.L.) in Integrated Water Management program and its associated new course code and new courses be approved.”*

Respectfully submitted,

Dr Peter Marshall, Chair, Senate Curriculum Committee  
Dr Robert Sparks, Chair, Senate Admissions Committee



## **FACULTY OF APPLIED SCIENCE**

*New program, course code, and courses*

Master of Engineering Leadership in Integrated Water Management; IWME (Integrated Water Management Engineering) Course Code; IWME 501 (3) Environmental Fluid Mechanics; IWME 502 (3) Engineering Hydrology; IWME 503 (3) Chemical and Biological Industrial Water Treatment Design; IWME 504 (3) Water and Wastewater Management Strategies; IWME 505 (3) Water Resources Systems Planning and Management



**a place of mind**  
THE UNIVERSITY OF BRITISH COLUMBIA

**Provost and Vice President Academic**  
Walter C. Koerner Library  
1958 Main Mall  
Vancouver, BC Canada V6T 1Z2

Phone 604 822 4948  
Fax 604 822 3134

**Memo**

**To:** Paul Harrison, Chair, Senate Academic Policy Committee

**From:** David Farrar, Provost and Vice-President Academic

A handwritten signature in black ink, appearing to read 'DAF', followed by a horizontal line.

**Date:** January 15, 2015

**Re:** **Administration of Master of Engineering Leadership Programs**

The Dean of the Faculty of Applied Science has requested that the proposed new graduate professional programs be officially designated as professional programs and that they be administered by the Faculty of Applied Science rather than by the Faculty of Graduate and Postdoctoral Studies.

The proposed programs are:

- Master of Engineering Leadership in Advanced Materials Manufacturing
  - Master of Engineering Leadership in Clean Energy Engineering
  - Master of Engineering Leadership in Dependable Software Systems
  - Master of Engineering Leadership in Green Bio-Products
  - Master of Engineering Leadership in Integrated Water Management
  - Master of Engineering Leadership in Naval Architecture and Marine Engineering
  - Master of Engineering Leadership in Urban Systems
  - Master of Health Leadership in Seniors Care
1. I am satisfied that these programs meet the criteria for designation as professional graduate programs.
  2. For the reasons outlined below, I support these programs being administered by the Faculty of Applied Science
    - a) All criteria laid out "Optional Transfer of Professional Graduate Programs from the Faculty of Graduate and Postdoctoral Studies to the Disciplinary Faculties" document, approved by Senate in January of 2005, have been met.
    - b) The Faculty of Applied Science has been successfully handling the administration of the Master of Engineering programs for nearly a decade. In that time, the Faculty of Applied Science gained considerable experience in effective graduate program administration. There is a healthy and productive relationship between the Faculty of Graduate and Postdoctoral Studies and Applied Science which all expect to continue.
    - c) The Faculty of Applied Science has the resources, including staff and financial resources, to provide the suite of services the Faculty of Graduate and Postdoctoral Studies provides for most graduate programs including financial support for students, student appeals, and matters relating to admissions and compliance with requirements for degree completion.



- d) This does not set a precedent. Decisions about the administration of future new graduate professional programs will be made in accordance with the guidelines approved by Senate in January, 2005.
- e) I have consulted with Vice-Provost and Dean, Graduate and Postdoctoral Studies, Dr. Susan Porter. She agrees to this request because the M.Eng. Programs are already administered by the Faculty of Applied Science, and the Masters of Engineering Leadership are closely related to the M.Eng. programs.

**Executive Summary**  
**MASTER OF ENGINEERING LEADERSHIP IN INTEGRATED WATER  
MANAGEMENT**  
**FACULTY OF APPLIED SCIENCE**  
**UNIVERSITY OF BRITISH COLUMBIA**  
**March 5, 2015**

**Overview**

The University of British Columbia is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. It creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning. The program strives to provide students with a comprehensive and innovative education that enables them to build on their past work experience and technical skills, adding leadership and interdisciplinary opportunities for learning and interaction with other students. Consultation with stakeholders has revealed that experienced engineers and early-career professionals in the chosen focus areas require sector-relevant, cross-disciplinary technical skills. They also require project management, communication and business skills to be effective leaders.

Urban environments around the world continue to grow as people continue to move to urban areas. In Canada, more than 80% of the population lived in cities by 2011, the highest proportion in 50 years. This trend will continue in the coming years. More people living in cities means an increase in the use of water and the need for better systems and processes to allocate this resource.

Because of increasing scarcity, water is a strategic resource. Access to clean and secure water resources is needed for economic growth and human wellbeing. The United Nations recently declared the Human Right to Water and Sanitation. Because of this, water is rising to the top of political and business agendas globally. Demand for better water systems has resulted in the need for a rapid expansion in scientific and engineering knowledge around water with many new technologies and practical solutions emerging. These include advanced treatments, sophisticated monitoring tools, powerful information technologies, deeper understanding of natural systems, efficient water use and reuse, and novel biotechnologies.

Water is a vital resource for industry. In 2009 Canadian manufacturing industries used 3,806.2 million cubic meters of water. These industries include papermaking, metal extraction, chemical and food production, and energy extraction (petroleum, coal and natural gas). Although industrial water is re-used, much of it is discharged to the environment (3,450 million cubic meters in 2009). Depending on the industry and process, most water requires several levels of treatment before it can be safely released. Due to increasingly stringent environmental regulations and the urgent need to improve stewardship of the pristine Canadian wilderness, technologies for reducing water use, improving monitoring and treatment are advancing rapidly.

Biological and tertiary treatment processes are being implemented at many sites. Canada is becoming a world leader in advancing these novel treatment processes and a burgeoning water industry is emerging. Training of highly qualified personnel for this industry is not adequate in all parts of Canada, and this professional master's program aims to fill this gap.

**Credential**

The credential awarded will be the Master of Engineering Leadership (M.E.L.) in Integrated Water Management (I.W.M.). The degree will be a master's degree with a balance between advanced engineering theories, interdisciplinary knowledge and real-world applications. The field of study will be advanced engineering technology and techniques for integrated water management applications.

**Location**

The Vancouver Campus of UBC is the main location for classroom education and administration. Course instruction and assignments will be achieved through collaborations among UBC, provincial and federal agencies and local private sector stakeholders involved in Integrated Water Management research and development.

**Faculty Offering Program**

The program will be offered formally, administered and delivered by the Faculty of Applied Science, UBC.

**Program Start Date**

The program will be offered in the 2015/2016 academic year, beginning in January 2016.

**Program Completion Time**

Anticipated time for completion of the program is 1 year of full-time academic study, including any work-term placements and non-academic activities.

**Objectives of the Proposed Program**

There has been a rapid expansion in scientific and engineering knowledge around water with many new technologies and practical solutions emerging. These include advanced treatments, sophisticated monitoring tools, powerful information technologies, deeper understanding of natural systems, efficient water use and reuse, and novel biotechnologies. To be competitive, the water professional of the future needs access to both the leadership and management training and the complex toolset of technical knowledge that this program aims to provide. The program will:

- Equip tomorrow's professionals with the critical thinking and practical skills necessary to make important contributions to their chosen sector and to make Canada a leader in the global market.
- Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's companies to benefit from the minds of UBC's top graduate-level students.
- Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with sector professionals in the Vancouver region.

- Emerge as the leading institution for the continuing education of current leaders in the Integrated Water Management sector and for the training of tomorrow's leaders.
- Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.
- Continue to develop a high profile faculty with international expertise in the theory and practice of the Integrated Water Management areas.

### **Program Learning Outcomes**

The learning outcomes of the M.E.L. in I.W.M. program are to:

- Develop a broad understanding of aquatic environment and water supplies and quality.
- Develop a thorough understanding of the transport of water and its constituents in the natural environment.
- Gain competency to apply physical, chemical, and biological unit operations and processes.
- Understand regulatory & environmental frameworks, & community relations.
- Assess and manage risk, apply appropriate policy and manage asset.
- Formulate, build and deploy simulation and optimization models and to structure and apply risk informed decision making frameworks.
- Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability).
- Use data appropriately for technical and business decision-making.
- Understand the critical components of how business works.
- Appreciate the impact of cross-cutting themes in industry.

### **Contribution to UBC's Mandate and Strategic Plan**

In *Place and Promise: The UBC Plan*, our vision statement is: "As one of the world's leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world." The program will act as one route to the fulfillment of this promise. With the involvement of faculty from all areas in APSC and the partnership of the Faculty of Commerce and Business Administration; the development of new facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored project topics, and co-op job placements, the program will offer an exceptional learning environment for students and faculty. In addition, the program will attract students from around the world to study in Vancouver's diverse environment and graduate students, who will, in turn, be in demand across the globe.

### **Delivery Methods**

The Faculty of Applied Science (APSC) has taken the lead in developing a conceptual framework for new Professional Programs comprising a common "Platform" that provides the professional skills required for an experienced graduate to be an effective professional leader, with "Pillars" of specialization courses in particular sectors relevant to APSC's educational mission and professional communities (the term Platform refers to foundation coursework focused on project management, data analysis, and leadership skills, while the term Pillar is equivalent to specialization). The program will be delivered as an intensive one-year program. It is anticipated that this program will be favourable to post-professional students already in the

workplace. The Platform will be delivered by faculty from APSC and the Faculty of Commerce and Business Administration.

The program requires a minimum of 30 credits of coursework. The distribution will be 9 credits dedicated to the Platform providing the professional skills required for an experienced graduate to be an effective technical manager and 21 credits dedicated to the Pillar in advanced technical courses. Both the Platform and the Pillar have prescribed core courses. For this program there will be 6 credits of constrained electives. The Pillar courses will be delivered collaboratively by the Departments of Chemical and Biological Engineering and Civil Engineering. The program courses will involve a combination of classroom learning and integrated hands-on training.

### **Linking Learning Outcomes and Curriculum Design, Optional Work-terms**

The number and variety of courses available to students is purposely limited to ensure a robust and streamlined learning experience that is centered on the program learning outcomes. Each of these outcomes corresponds to at least one of the core courses and summarizes the goal of that course. Work experience is an essential admission requirement and also a key feature of the optional co-op component.

### **Program Strengths**

The program offers a comprehensive curriculum that is grounded in collaborative projects embedded in the Platform coursework, and that draws upon the combined expertise of faculty in the participating units. The demand for this program comes from multiple sides: British Columbia and Canada need the proposed program for the success of the provincial and federal resource, agriculture, hydroelectric, municipal and consulting sector industries to stay competitive with international markets. Given UBC's location, the research of current faculty in this area, and the recent achievements of UBC graduate and undergraduate students water management (including recently hosting the highly successful Water & Environment Student Talks (WEST) at UBC), it is appropriate that UBC be the institution to implement a graduate-level program that is lacking in Canada and now more important than ever. The water management skillset is spread over many disciplines, with no one existing program having purview over all aspects. Hence the need for a new program encompassing the strengths of the many courses that UBC has to offer on water management. In industry, water management is no longer a branch of any existing discipline, but stands alone as a distinct profession.

### **Related Programs at UBC or other BC Post-secondary Institutions**

Existing graduate programs attract applicants from across Canada and around the world. It is common for visiting scholars and researchers to give seminars and teach modules within courses for graduate program credit. Given UBC's history of expertise in the area of water management, it is expected that the program will be widely recognized and supported both in Canada and abroad. A selection of courses offered through existing graduate programs will be used for the new program as well as the creation of new courses. There are currently no existing programs at UBC or within British Columbia that offer this program's combination of technical skills and advanced leadership training.

**Institutional Contact**

University of British Columbia

Faculty of Applied Science

Elizabeth Croft, Associate Dean, Education & Professional Development

604-822-6614 [elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca)

**Appendix to the Executive Summary (for internal UBC purposes only)****Budget and Funding**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020. Tuition is \$27,000 per year for domestic students and \$46,000 per year for international students. Enrolment in the M.E.L. in I.W.M. will not impact existing program such as the M.Eng. CHBE or M.Eng. CIVL that have different admission requirements and attract a different learner audience.

**Space Requirements**

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

**Library**

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support and the Platform courses requiring new resources will be funded by the APSC Dean's Office. (See Appendix 2 & 3 and Appendix 7 Platform Proposal)

## 1. Introduction

This proposal represents one of a suite of new professional programs to be offered at the master's level in the Faculty of Applied Science (APSC). The programs were developed in parallel and will be delivered in parallel: there will be a common start date and timeline for cohorts in all of the programs. A key feature of this suite of programs is that they are structured in two parts, which will be referred to as the "Platform" and the discipline-specific or "Pillar." The Platform is foundational coursework focused on project management, data analysis, and leadership skills. It is a largely common element accessible to the suite of new APSC professional programs. The Pillar is equivalent to a specialization. It contains technical material specific to the integrated water management sector. Students will develop: a knowledge base in aquatic environments, water supplies, and water quality; a thorough understanding of the transport of water and its constituents in the natural environment; the competency to apply physical, chemical, and biological unit operations and processes; the ability to understand and work within relevant regulatory & environmental frameworks; and an appreciation and respect for the importance of building and maintaining community relations as a key to successful project management.

Successful completion of the Platform and a Pillar will result in the granting of one degree. Details of the contents of both the Platform and the Integrated Water Management Pillar are documented in this proposal.

## 2. Program Rationale

### 2.1. Defining the Need for the Program

Over the past year, members of the University's Flexible Learning Initiative and the APSC Dean's office have formed and worked closely with a Program Advisory Committee consisting of faculty from all areas of APSC. The following program proposal is the result of collaborative planning on the part of this committee.

### 2.2. Professional Program Mission Statement and Context

*The University of British Columbia, Faculty of Applied Science, wishes to attract students into a **high quality, sector-focused, distinctive & integrated** Applied Science Professional Program that has resources to be delivered sustainably and fiscally meets the University's goals.*

1. **UBC continues to encourage innovative** learning approaches within the fiscal model of cost recovery.
2. **The Flexible Learning Strategy** introduced in 2014 lists the development of new Professional Programs as a priority.

UBC has the opportunity to deliver a distinctive APSC Program in line with the University's Professional Program objectives.

## **2.3. Applied Science Professional Program Approach**

### **2.3.1. Guiding Principles of the Program Advisory Committee**

1. There is meaningful engagement with stakeholders in market research, development, delivery and career opportunities.
2. Our target market is candidates who might consider either an M.B.A. or M.Eng. Management, but would prefer to develop both sector-relevant technical skills and management and leadership skills – our program will be distinctive in the market.
3. We take advantage of a standardization of core courses to improve quality of offering while reducing costs and complexity.
4. The program is positioned as a premium alternative to a conventional professional master's program by offering distinctive, high quality, cross-disciplinary technical and non-technical skills to the experienced professional who wants to become a Sector Specialist.
5. Pillars are developed around areas of unique research and teaching strength in APSC, where multiple program “Faculty Champions” are identified, that have strong relevance to our professional community and societal benefit, have strong learner demand, and have strong industry demand for people trained in this sector.
6. Graduate courses offered in the Integrated Water Management Pillar will be open to all APSC graduate students with the appropriate prerequisites, and similarly to students in other graduate programs, space permitting. This will allow APSC to revitalize our graduate program offerings around areas of research and teaching strength, build strong interdisciplinary sector training capacity, and improve our connections to our professional community.

### **2.3.2. Extensive Market Research was used to develop the Value Propositions**

In order to establish the viability of offering new programs, the following activities were undertaken to validate the structure and proposed Pillars. Market research information is provided in Appendix 6. The objectives and curriculum were developed in conjunction with meaningful stakeholder consultation in 3 phases.

1. Market research & concept development conducted through:
  - a. Multiple meetings of the Inter-Disciplinary Working Committee of Applied Science that included the following core members:
    - i. Elizabeth Croft (Associate Dean)
    - ii. James Olson (Associate Dean)
    - iii. Hugh Brock (Vice Provost)
    - iv. Reza Vaziri (Head of Civil Engineering)
    - v. Peter Englezos (Head of Chemical & Biological Engineering)
    - vi. Sathish Gopalakrishnan (Professor in Electrical Engineering)



- vii. Scott Dunbar (Head of Mining)
- viii. Walter Merida (Director of Clean Energy Research Centre)
- ix. Jon Mikkelsen (Director of Naval Architecture & Marine Engineering)
- x. Panos Nasiopoulos (Director of ICICS)
- b. Survey of current M.Eng. students and alumni (Appendix 6)
- c. Survey of APSC employers (via Co-op Database) (Appendix 6)
- d. Desktop research of comparable programs in Canada and the United States of America

## 2. Validation by external sector expert

Dean Shiskowski, Ph.D., P.Eng., VP Water Resource Recovery, Associated Engineering, Meeting on May 16, 2014

Recognized the value of training professional graduates with both business and leadership skills as well as strong technical competence. Emphasized that both the traditional technical stream and the professional stream were important.

## 3. Refinement through sector focus groups

Integrated Water Management

Focus Group: August 29, 2014

- Danny Higashitani (Water Treatment Engineer, Aboriginal and Northern Affairs Canada)
- Ted Molyneux, (Senior Water and Wastewater Engineer at Aboriginal and Northern Affairs Canada, Member, Board of Directors of the BC Water & Waste Association, Director, American Water and Waste Association )
- Troy Vassos, FEC, P.Eng. (Oil & Gas Sector Water Treatment Lead at Golder Associates Ltd.)

Specific findings of this group were:

1. The program has a potential to attract students
2. The proposed industry value chain captures the needs of industry and profession
3. The program should offer flexibility (when it comes to technical and industry specialized courses) so that students can take the full benefit of the program
4. The range of technical electives were good
5. The core courses should be presented so that they provide a broad perspective to the students (in terms of overall management of the water from source all the way to waste and reuse).

### 2.3.3. Market Insights

Consistently repeated messages, related to the potential student market and the relevance of the particular focus areas, were heard through all market research activities outlined above.

For example:

1. Experienced engineers in their chosen careers require sector-relevant, cross-disciplinary technical skills.
2. Engineers require project management, communication and business skills to be effective leaders.
3. Few, if any, schools in Canada or the United States of America offer this combination of skills in a technical master's program.
4. There is a demonstrated need for a program. (Figure 1)
5. Students are willing to apply to graduate-level programs that are relevant to the stakeholders in their chosen sector. (Figure 2)

Figure 1 Estimated Market Size (number of students per year - Engineering)

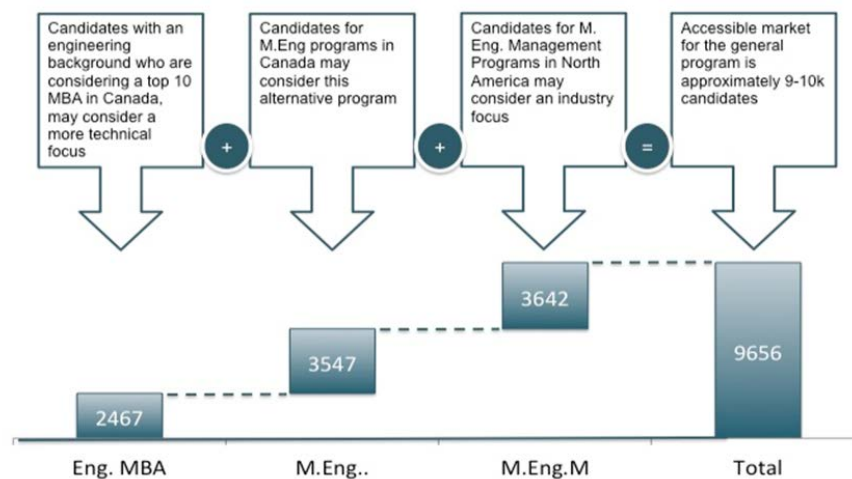
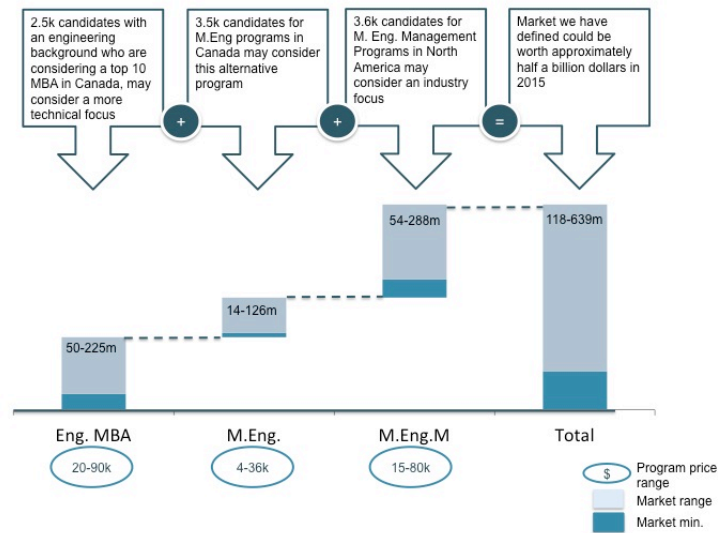


Figure 2 Estimated Market Size (\$ per year - Engineering)

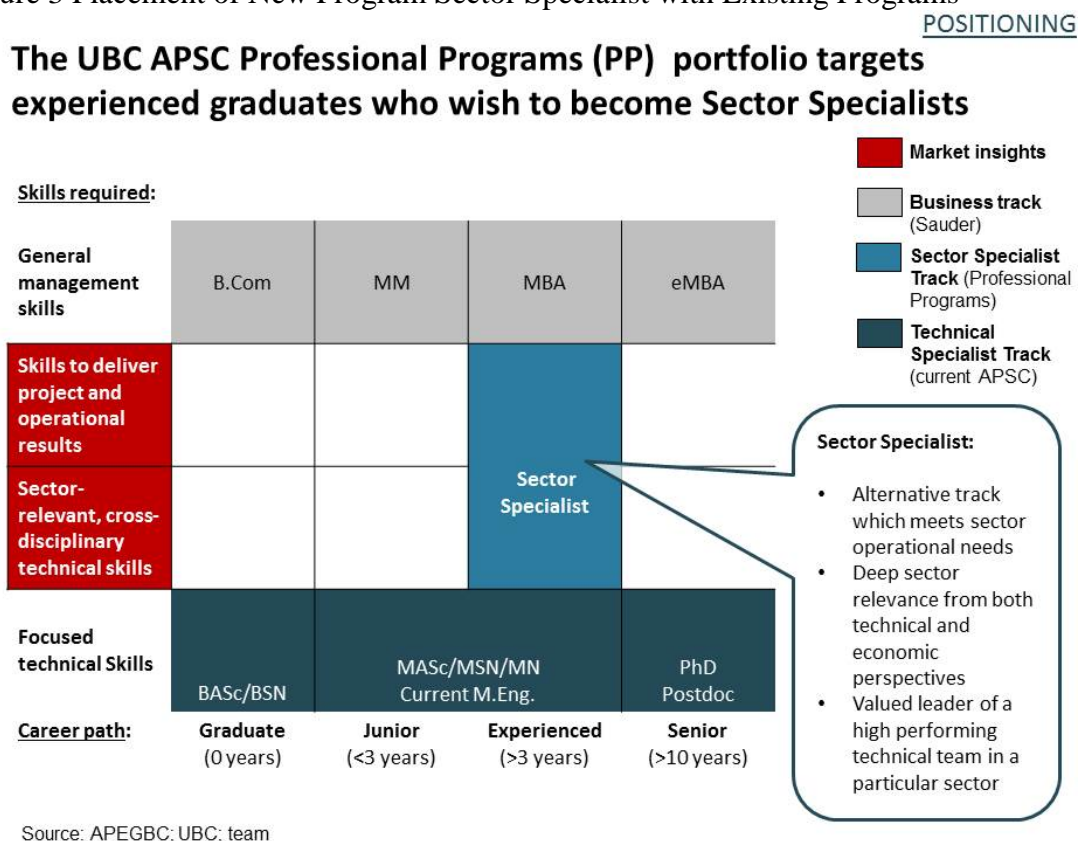


## 2.4. Program Overview

### 2.4.1. Mission

The program strives to provide students with a comprehensive and innovative education that will enable them to advance their career in a path that is different from the traditional APSC course-based master's or the Master of Business Administration (M.B.A.). The program is structured to provide a combination of advanced technical skills, integrated with professional skills, which will enable graduates to practice these skills and advance their career trajectory in their chosen industries.

Figure 3 Placement of New Program Sector Specialist with Existing Programs



## 2.4.2. Objectives of the Proposed Program

Urban environments around the world continue to grow as people continue to move to urban areas. In Canada, more than 80% of the population lived in cities by 2011, the highest proportion in 50 years. This trend will continue in the coming years. More people living in cities means an increase in the use of water and the need for better systems and processes to allocate this resource.

Because of increasing scarcity, water is a strategic resource. Access to clean and secure water resources is needed for economic growth and human wellbeing. The United Nations recently declared the Human Right to Water and Sanitation. Because of this, water is rising to the top of political and business agendas globally. Demand for better water systems has resulted in the need for a rapid expansion in scientific and engineering knowledge around water with many new technologies and practical solutions emerging. These include advanced treatments, sophisticated monitoring tools, powerful information technologies, deeper understanding of natural systems, efficient water use and reuse, and novel biotechnologies. This is increasing the demand for more professionals trained in water management.

Water is a vital resource for industry. In 2009 Canadian manufacturing industries used 3,806.2 million cubic meters of water. These industries include papermaking, metal extraction, chemical and food production, and energy extraction (petroleum, coal and

natural gas). Although industrial water is re-used, much of it is discharged to the environment (3,450 million cubic meters in 2009). Depending on the industry and process, most water requires several levels of treatment before it can be safely released. Due to increasingly stringent environmental regulations and the urgent need to improve stewardship of the pristine Canadian wilderness, technologies for reducing water use, improving monitoring and treatment are advancing rapidly. Biological and tertiary treatment processes are being implemented at many sites. Canada is becoming a world leader in advancing these novel treatment processes and a burgeoning water industry is emerging. Training of highly qualified personnel for this industry not adequate in all parts of Canada, and this professional master's program aims to fill this gap.

There has been a rapid expansion in scientific and engineering knowledge around water with many new technologies and practical solutions emerging. These include advanced treatments, sophisticated monitoring tools, powerful information technologies, deeper understanding of natural systems, efficient water use and reuse, and novel biotechnologies. To be competitive the water professional of the future needs access to both the leadership and management training and the complex toolset of technical knowledge that this program aims to provide. Accordingly, the M.E.L. in I.W.M. program will:

1. Equip tomorrow's professionals with the critical thinking and practical skills necessary to make important contributions to their chosen sector and to make Canada a leader in the global market.
2. Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's companies to benefit from the minds of UBC's top graduate-level students.
3. Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with sector professionals in the Vancouver region, in particular the very active BC Water and Waste Association.
4. Emerge as the leading institution for the continuing education of current leaders in the Integrated Water Management sector and for the training of tomorrow's leaders.
5. Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.
6. Continue to develop a high profile faculty with international expertise in the theory and practice of the integrated water management areas.

#### **2.4.3 Program Learning Outcomes**

The learning outcomes of the M.E.L. in I.W.M. program are to:

1. Develop a broad understanding of aquatic environment and water supplies and quality.
2. Develop a thorough understanding of the transport of water and its constituents in the natural environment.
3. Gain competency to apply physical, chemical, and biological unit operations and processes.
4. Understand regulatory & environmental frameworks, & community relations.
5. Assess and manage risk, apply appropriate policy and manage asset.
6. Formulate, build and deploy simulation and optimization models and to structure and apply risk informed decision making frameworks .
7. Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability).
8. Use data appropriately for technical and business decision-making.
9. Understand the critical components of how business works.
10. Appreciate the impact of cross-cutting themes in industry.

## 2.5. Contribution to UBC Mandate and Strategic Plan

UBC is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning.

In *Place and Promise: The UBC Plan*, our vision statement is: “As one of the world’s leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world.” <http://strategicplan.ubc.ca/the-plan/>

The program will act as one route to the fulfillment of this promise. With the involvement of faculty from all areas in APSC and from the Faculty of Commerce and Business Administration; the development of new laboratory facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored research topics, and coop job placements, the program will offer an exceptional learning environment for students and for faculty undertaking research. In addition, the program will attract students from around the world to study in Vancouver’s diverse environment and graduate students who will, in turn, be in demand across the globe.

When we speak of globalization today, it is a synthesis of exploration, learning, and the global exchange of resources and knowledge—not unlike the university itself. Accordingly, the program addresses many of the goals outlined in *The UBC Plan*:

### **2.5.1. Student Learning**

- The University provides the opportunity for transformative student learning through outstanding teaching and research, enriched educational experiences, and rewarding campus life.

The program will offer a comprehensive curriculum that draws upon the combined expertise of faculty in all areas of APSC, the Faculty of Commerce and Business Administration, and of sector professionals. The program will synthesize theory and practice through a challenging project-based learning experience that will equip students with the skills and experience needed to excel in the world's most important and fast-growing industries. The number and variety of courses available to students will be purposely limited, as will student enrolment, to ensure a robust and streamlined learning experience that is centered on the program objectives. As well, strong stakeholder support and existing relationships between UBC APSC and local companies promises students both a rich educational experience and employment opportunities after graduation.

### **2.5.2. Innovation Excellence**

- The University creates and advances knowledge and understanding, and improves the quality of life through the discovery, dissemination, and application of research within and across disciplines.

As a leading research and educational facility, UBC is expected to be a world leader, and *the* Canadian leader in the areas of the M.E.L. in I.W.M. program, as we invest time and resources to create, sustain and grow for the future. By expanding UBC's current scholarship in the areas of this program, UBC will not only be a leader in the exchange of knowledge in these areas; it will also, by contributing to the involved industries, be a central part of the means by which people and knowledge are mobilized.

### **2.5.3. Community Engagement**

- The University serves and engages society to enhance economic, social, and cultural well-being.

Engaging with local companies with regard to the needs of their sector is one of the key components of the program. With a curriculum grounded in collaborative community projects, a reciprocal and experiential learning environment will be created between students and local stakeholders.

### **2.5.4. International Engagement**

- The University creates rich opportunities for international engagement for students, faculty, staff, and alumni, and collaborates and communicates globally.

The program will graduate students who will be in demand across the globe, from

industries that will be based in Canada. It will graduate the trained professionals needed to ensure the self-sufficiency of Canada's sector-specific professionals, and the global influence of Canada itself. Strong industries, backed by highly qualified professionals, are key to securing Canada's global presence – to improving and sustaining Canada's innovation and economy, and strengthening Canada's contribution to the global market. By offering the program, UBC will therefore become an invaluable player in both national and international development.

#### **2.5.5. Sustainability**

- The University explores and exemplifies all aspects of economic, environmental, and social sustainability.

The program will play a role with the rest of the UBC community to meet society's needs without compromising those of future generations. Through the Platform courses that will have a focus on leadership and sustainability, to the activities and services provided both inside and outside of the classroom, the program is designed to be accountable and transparent in the use of available resources.

Water management is an essential component of economic security, as well as environmental and social sustainability. The development of this program will significantly increase UBC's contribution and profile in this arena.

#### **2.6. Support for New APSC Professional Master's Programs**

The University supports the formation of new professional master's programs having goals in alignment with that of the institution. Support and resources are available in a variety of forms including assistance with market research, budgeting, and curriculum development. We have and continue to take advantage of all assistance in the creation, development, delivery and evaluation of the program. As part of the Flexible Learning Initiative, targeted growth of professional master's programs is one of UBC's four priorities over the next five years. Continued support for the Flexible Learning Initiative has been confirmed by our new UBC President, Dr. Arvind Gupta. The strategic plan for flexible learning campus-wide is articulated in its own web space, which can be found here:

<http://flexible.learning.ubc.ca/what-is-flexible-learning/flexible-learning-goals/>

APSC has identified its professional master's programs as having the potential to benefit greatly from not only revitalization, but also expansion. This initiative has been led by the Dean's office and has received consistent support from the Provost's Office through the Flexible Learning Initiative. An over-arching goal of these new programs is to revitalize the APSC graduate program offerings which have not been systematically redeveloped for over 20 years. New Pillar courses will be available to all Ph.D., M.A.Sc. and Professional Master's students providing high quality, sector relevant, technically leading edge education for our graduate students. This objective is in line with the espoused goal of the Faculty of Graduate and Postdoctoral studies to rethink graduate education as a preparation not only for academe but also for service in a wide range of leadership opportunities in society.

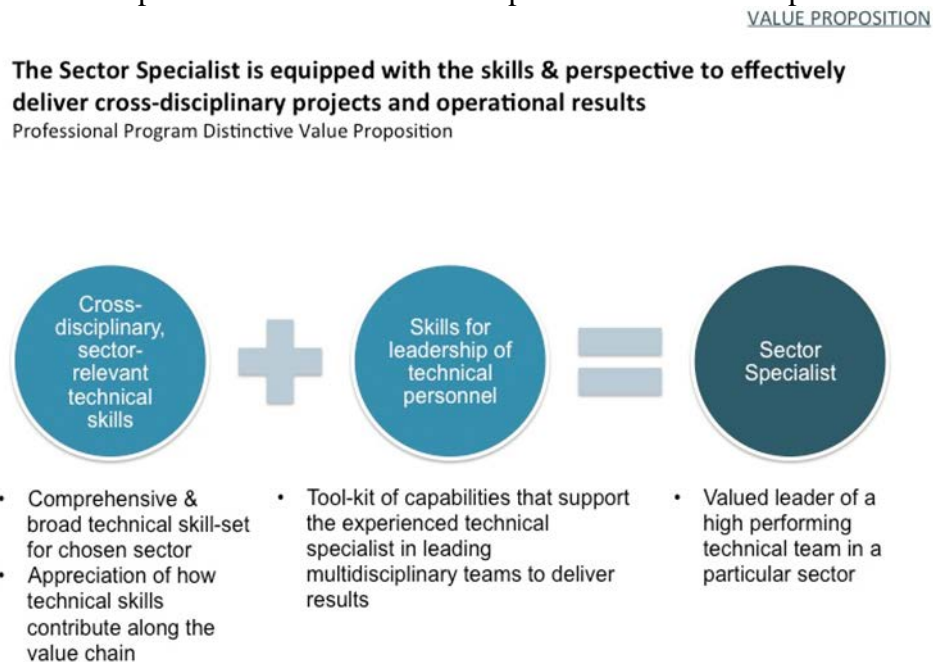


### 2.6.1. Opportunity Identification

It was felt that an opportunity may exist that had, as yet, not been explored in APSC. Given the unique structure of the Faculty, which is home to not only engineering programs, but also the School of Nursing, the School of Architecture and Landscape Architecture and the School of Community and Regional Planning, it was felt that the potential existed to create a suite of interdisciplinary master's degrees that were aligned with stakeholders in a way that a program housed in a single department or school could not. In order to establish the market for such opportunities, and to establish potential interdisciplinary themes to pursue, the following activities were undertaken:

1. Competitor scans
2. Alumni tracking
3. Ongoing dialogue with stakeholders to identify skills gaps
4. Targeted market research / focus groups
5. Dialogue with faculty to shape opportunities and program champions
6. Initial feasibility assessment
7. Distillation of program concept(s) including clear objectives in launch
8. Straw man concept for new professional program, with clear student target

Figure 4 Relationship of Technical and Leadership Skills for a Sector Specialist



### 2.6.2. Program Development

Upon successful conclusion of the opportunity identification phase, program development initiated via the steps outlined below, with this document representing the basis of the material required for step 9. A key element that emerged from the opportunity identification phase was a program structure that featured a largely common Platform,

comprising approximately 40% of each program, which would be the foundation for all new professional master's programs in APSC. The remaining 60% of the course content is then comprised of a set of courses drawn from across the faculty that provide sector-specific technical content. The technical material is referred to as a Pillar. This structure was identified quite early on in the development process, it has been referred to internally as a 'Platform and Pillar' model from both the curriculum development and delivery perspectives. (Note that for the final I.W.M. program, the final distribution was 30% common platform and 70% sector-specific technical content.)

1. Appointment of program Champions (Susan Baldwin, Greg Lawrence, Madjid Mohseni)
2. Discussions with advisory committee
3. Refinement of proposition, program design and pricing
4. Definition of operating model / formation of any partnerships
5. Financial modelling
6. Funding application
7. Planning for course (re)design (CTLT)
8. Development of project plan
9. Presentation to Faculty council, Senate, Board, Ministry – and plan refinement as needed
10. Full program design in place
11. Approval from the Senate, Board of Governors, and the Ministry of Advanced Education

### **2.6.3. Implementation**

In parallel with the approval process, implementation and launch of the new professional programs will require a significant effort well in advance of the commencement of the programs for the first cohort, which is anticipated for January 2016. Key activities are summarized here:

1. Development of course materials and flexible learning (FL) delivery/co-op modules
2. Development and launch of multi-touch marketing efforts (ideally at least 1 year in advance)
3. Set up in central systems (Enrolment Services, UBC IT)
4. Evaluation of applications (ideally application deadline 7 months in advance) and submission of accepted applications to Department and APSC Dean's Office for approval
5. Program ready to launch with inaugural group of students

### **2.6.4. Program Management**

Due to the intensive nature of the proposed programs and the expected audience, which would be primarily early-career professionals, these programs will require dedicated resources within the Faculty to maintain high-quality, responsive service for administrative details surrounding their delivery (e.g. registration issues, scheduling details, facilitation of workshop activities, optional co-op placements, coordination of interdisciplinary capstone

projects, etc.). Additionally, it is anticipated that there will be support for maintaining continuous program improvement, sufficient marketing efforts, ongoing development of community partners and stakeholder participants, and so on. The budget for these programs includes provisioning for the necessary staff, to be located in the Faculty, to ensure the ongoing support for the activities itemized below, which are regarded as necessary to deliver and maintain a program of the highest caliber:

1. Continuous feedback loop to improve delivery and learning outcomes
2. Refreshment of marketing materials, with relationships / channels fostered ongoing
3. Exploration / implementation of any content repurposing opportunities
4. Tracking of student success rates
5. Financial / operational management
6. Ongoing evolution of program to achieve learning, access, reputational and financial objectives

## **2.7. Relationship to Established Programs**

### **2.7.1. The University of British Columbia**

Many of the advanced topics that will be covered under the program are already available through programs in the involved departments and schools of APSC at UBC, but the program will synthesize this material and offer a more interdisciplinary approach.

Existing thesis-based master's program:

Master of Applied Science (M.A.Sc.) Specialization in Materials Engineering  
Faculty of Graduate and Postdoctoral Studies

The Department of Materials Engineering offers a thesis-based Master of Applied Science (M.A.Sc.) program requiring 18 credits of course work and a 12 Credit thesis. Research foci include Composites, Microstructure Engineering, Extractive Metallurgy, Solidification, Biomaterials & Ceramics. Nominal completion time for this program is 24 months. This research-based program is designed for students who are interested in a more theoretical, research based career path and is part of the typical academic path taken by students considering Ph.D. Studies. Eligible applicants are offered admission after recommendation by a proposed faculty supervisor in the department of Materials Engineering.

Existing professional program includes:

Master of Engineering (M.Eng.)  
Faculty of Applied Science, Engineering

The Master of Engineering is a non-thesis, course-based program designed for students who would like to further their education without pursuing research, or individuals who wish to advance their careers with enhanced technical knowledge. It normally takes 12-16 months to complete 30 credits. Students register for the M.Eng. at the faculty level but generally complete courses within a specific department, and may take a collection of related courses that would be considered a 'Specialization', although the degree is somewhat generic in that it is simply granted as a M.Eng. in a specific department in most

cases. The admission to the M.Eng. is not cohort-based, and the entry point may be either September or January. If there is a demonstrated demand to continue offering the M.Eng. in addition to the M.E.L., then it is within each individual department's discretion to do so.

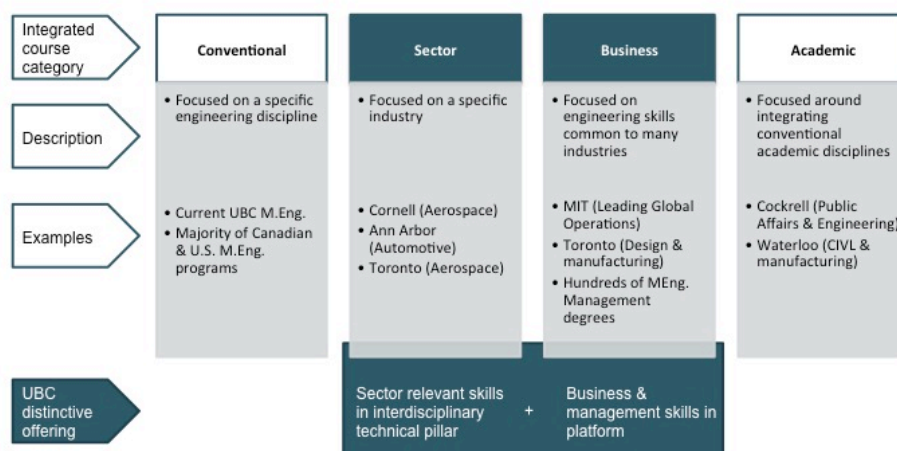
## 2.7.2. Other British Columbia and Canadian universities

There are currently no universities in British Columbia or in Canada that offer accredited *graduate* programs with the proposed Platform and Pillar structure.

A selection of courses offered through existing graduate programs will be used for the new program as well as the creation of new courses. Some related programs in Canada:

M.Eng. in Advanced Water Technologies & Process Design	University of Toronto <a href="http://gradstudies.engineering.utoronto.ca/professional-degrees/advanced-water-technologies-process-design/">http://gradstudies.engineering.utoronto.ca/professional-degrees/advanced-water-technologies-process-design/</a>
M.Eng. in Water Resources Engineering	University of Guelph <a href="http://www.uoguelph.ca/engineering/graduate-meng-water">http://www.uoguelph.ca/engineering/graduate-meng-water</a>
Graduate Certificate in Environmental Engineering	Concordia University ( <a href="http://www.concordia.ca/encs/bcee/programs/graduate/environmental-engineering-certificate.html">http://www.concordia.ca/encs/bcee/programs/graduate/environmental-engineering-certificate.html</a> )
1-Year M.Sc. in Integrated Water Resources Management (IWRM)	McGill Univ. Non Thesis Option (45 credits), <a href="http://www.mcgill.ca/iwr/iwr-program">http://www.mcgill.ca/iwr/iwr-program</a>
Integrated Water Management	University of Waterloo, The Water Institute Program <a href="http://water.uwaterloo.ca/IWM_program.aspx?AspxAutoDetectCookieSupport=1">http://water.uwaterloo.ca/IWM_program.aspx?AspxAutoDetectCookieSupport=1</a>
Global Integrated Water Management Network	U. Alberta <a href="http://www.mece.ualberta.ca/Water/">http://www.mece.ualberta.ca/Water/</a>
Integrated Water Management, Master's and Doctoral Levels	University of Waterloo, (Collaborative Program), <a href="http://oucqa.ca/program-approvals-menu/program-approvals/?institution=24">http://oucqa.ca/program-approvals-menu/program-approvals/?institution=24</a>

Figure 5 Assessment of Categories of Professional Engineering Master's Programs



Source: US News, Top school websites (MIT, Stanford, Berkeley, CalTech, Carnegie Mellon, Georgia Tech, Urbana-Champaign, Purdue, Ann Arbor, Cockrell, Toronto, Waterloo), team

### 2.7.3. Level of support and recognition from other post-secondary institutions

As a new program, support and recognition from other post-secondary institutions is limited. However, it is anticipated that participation from faculty members outside of UBC delivering content in the program will promote further support from institutions that offer traditional graduate programs in water management both nationally and internationally. UBC has a strong history of expertise in water management, including the current hosting of the NSERC Res'au WaterNet Strategic Network at UBC (lead by Pillar co-Champion, Madjid Mohseni in Chemical and Biological Engineering at UBC and including a number of other UBC faculty from APSC as well as other faculties). This strategic network involves eight other Canadian university partners which demonstrates UBC's leadership in this area. Further, UBC's engineering programs have been ranked second in the nation and among the top 50 worldwide (*Times Higher Education*), it is expected that other post-secondary institutions both in Canada and abroad will recognize and support this program.

## 2.8. Demand for Program

The demand for professionals with technical and integrated professional skills is growing rapidly, and Canada currently has neither the trained personnel required to meet the needs, nor the means of training them. There are currently *no* other Canadian institutions that offer sector-focused (rather than research-oriented) training at the graduate level with the proposed Platform leadership skills and Integrated Water Management Pillar structure.

The demand for the suite of APSC professional master's programs comes from multiple sides: British Columbia and Canada need the proposed programs for the success of the

provincial and federal resource, agriculture, hydroelectric, municipal and consulting sector industries to stay competitive with international markets. Given UBC's location, the research of current faculty in this area, and the recent achievements of UBC graduate and undergraduate students water management (including recently hosting the highly successful Water & Environment Student Talks (WEST) at UBC), it is appropriate that UBC be the institution to implement a graduate-level programs that are lacking in Canada and are now more important than ever.

With respect to the specific demand for the M.E.L. in I.W.M., the water management skillset is spread over many disciplines, with no one existing program having purview over all aspects. Hence the need for a new program encompassing the strengths of the many courses that UBC has to offer on water management. In industry, water management is no longer a branch of any existing discipline, but stands alone as a distinct profession.

### **2.8.1. Enrolment Predictions and Capacity**

Significant demand is anticipated for the new programs. The desirability of an educational experience that can lead to rapid career progress upon graduation is reflected in the interest we have seen in the existing professional master's programs. The M.E.L. in I.W.M. will not impact existing programs such as the M.Eng CHBE or M.Eng CIVL because they have different admission requirements and will attract a different learner audience.

To maintain a vibrant learning environment and admit the best and brightest applicants, however, the cohort size will be purposely limited. The minimum initial cohort is anticipated to be 20 students increasing to 41 by 2020.

### **2.8.2. Tuition Rationale**

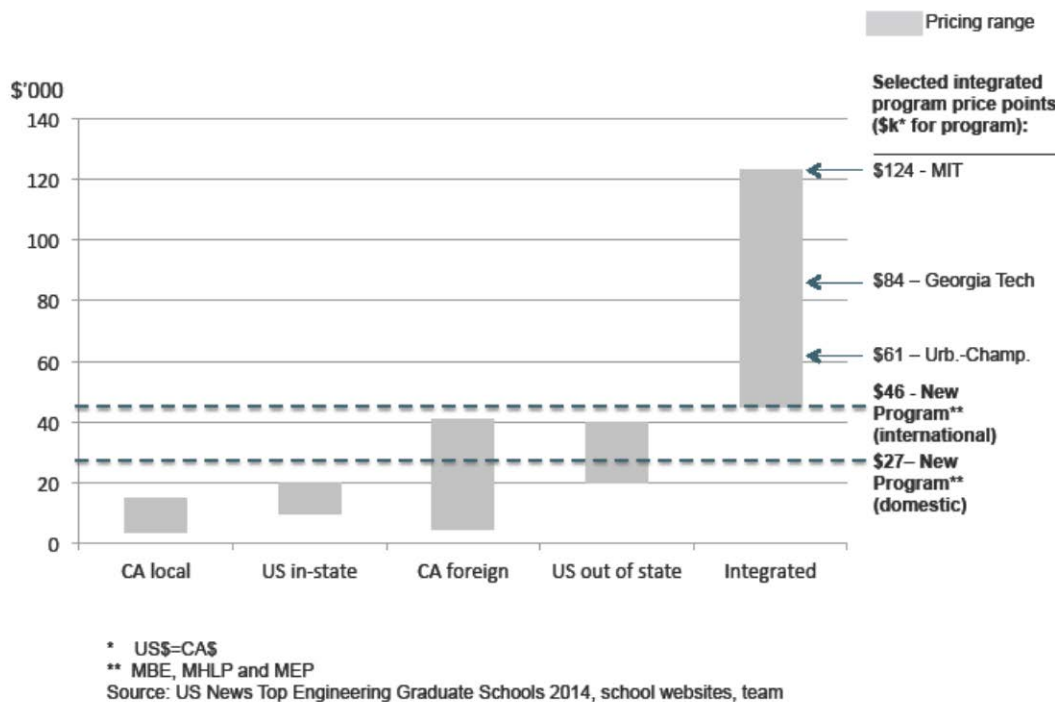
The program falls under the APSC "Guidelines for Professional Programs" (August 31, 2012) which stipulates that new professional programs in the Faculty, as of January 2009, must generate revenue to cover a range of expenses including equipment, facilities and salaries of faculty and staff involved in course delivery and administration. The primary source of revenue for these programs is through the tuition flow-back from the University to the Faculty and unit delivering the program.

The starting tuition level requested for the program is \$27,000 CAD for the one-year program for Canadian citizens and Permanent Residents and \$46,000 CAD for the one-year program for international students requiring a Study Permit. Tuition is paid in three equal installments per year, normally in January, May and September. The student is required to pay a minimum of three installments of tuition in order to graduate, but if the program is extended by permission of the program Director, the student pays tuition installments until the program requirements are met. For domestic students, the continuing fee and the extension fee are set by the University. No part-time studies are allowed. Currently, tuition increases by 2% each year.

We are confident that the program can attract students to pay the proposed tuition for the following reasons:

1. Vancouver is an acknowledged centre for integrated water management with a healthy municipal engineering and water/wastewater consulting industry with a strong international reputation.
2. A one-year program fits into the lifestyle framework for most of our potential students
3. The program will draw from an international pool of students
4. The tuition has been researched to be positioned in the lower cost bracket compared to programs at institutions such as MIT and Georgia Tech

Figure 6 Comparison of Tuition within Canada and the United States of America



### 2.8.3. Scholarships

We are concerned about getting the right students for the program and recognize that the tuition assessment may be prohibitive for some outstanding applicants. As a consequence, we intend to go to stakeholders in each sector seeking named scholarships. We have set aside 7.5 percent of the tuition revenue for financial need.

### 2.8.4. Potential Sectors of Employment for Graduates

Graduates of the program will have developed those skills and practices that stakeholders value most highly in experienced APSC professionals. They will be creative and visionary to see the potential to use the knowledge and training from the program effectively in their employment choices. Government and the private sector are hungry for experts to develop

new processes and systems to explore and implement positive changes in their chosen area. Graduates can expect to find careers locally, nationally, and internationally.

### **2.8.5. Opportunities for Further Study**

The professional master's degree at UBC is generally not recommended for students who wish to continue on to a Ph.D., and the proposed program will conform to this. As such, it is anticipated that most or all of the graduating students will go on to or return to work in their chosen sector. It is possible, however, that a small number of students will continue to Ph.D.-level study at UBC or elsewhere.

## **3. Program Description and Specifications**

### **3.1. Admission Requirements**

Applicants must hold an undergraduate credential in Chemical & Biological Engineering, Civil Engineering, Geological Engineering or related discipline in engineering, Environmental Sciences, Geology, Fluid Mechanics, Hydrology, Biotechnology, Biology, Biogeography (physical geography) or Microbiology or equivalent, 3 years relevant experience. Applicants lacking a background in these subject areas may be required to complete additional coursework on the recommendation of the Program Director.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the MEL IWM are:

- TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 81
- PTE (Pearson Test of English - Academic): minimum overall score of 59
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 60



Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website. The graduate program office in an area of Specialization is responsible for collection and assessment of application documents.

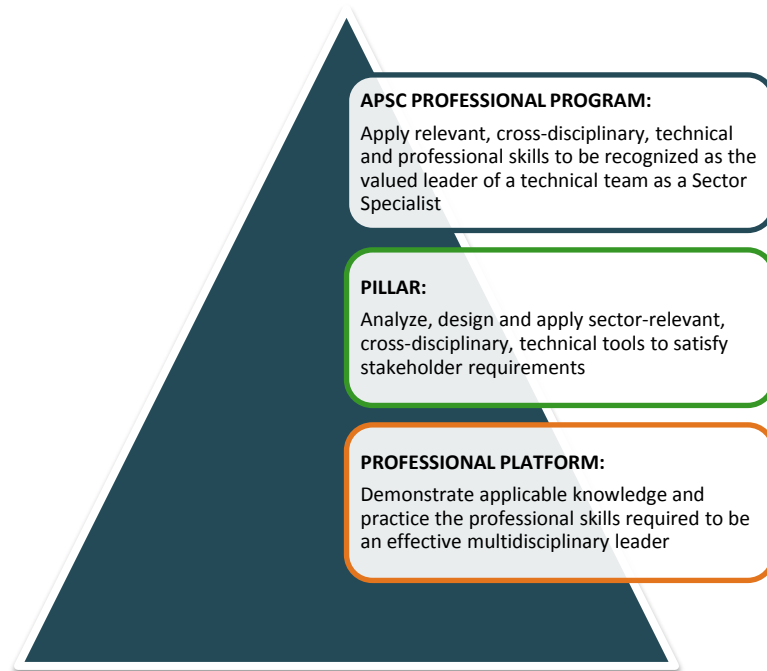
### 3.2. Program and Pillar Requirements

The program requires a minimum of 30 credits of coursework. The distribution will be 9 credits dedicated to the Platform providing the professional skills required for an experienced graduate to be an effective technical manager and 21 credits dedicated to the Integrated Water Management advanced technical courses. Both the Platform and the I.W.M. Pillar have prescribed core courses. In general, where a program has a provision for elective choices, master's programs in the Faculty will allow a maximum of 6 credits of 300- or 400-level undergraduate coursework and 6 credits of 500-level directed studies. The program includes 6 credits of constrained electives that will be drawn from courses approved by the graduate program office. Example electives are listed in Section 3.4 (Overview of Pillar), below the table of program requirements. A current list of approved electives will be on the M.E.L. in I.W.M. program website. The program will be delivered as an intensive one-year program. It is anticipated that this will be favorable to post-professional students already in the workplace. The program courses will involve a combination of classroom learning and integrated hands-on training.

The students will move through the program as a cohort, to build a community of learners, to challenge assumptions and to support each other's achievement of the program goals. We will adopt a 'hybrid' – flexible delivery model. The learning experiences will include face to face and online learning elements and scheduling will be refined with input from sector experts and the target population of students. We anticipate that there will be intensive sessions in summer term; weekly classes in particular terms and in addition to fieldwork experiences there will be a co-op or practicum option available.

There are seven proposed Pillars leading to the degree of Master of Engineering Leadership at the UBC Vancouver campus (see Appendix 5 for prospective program curriculum). The Master of Health Leadership and Policy in Seniors Care at the UBC Vancouver campus will also utilize this Platform. These programs are distinct and each will be reviewed separately, but as all APSC Professional Programs are conceptualized as sharing a common goal of graduating students with enhanced disciplinary knowledge and business skills, the proposed array of programs is listed in Appendix 5 for information only.

Figure 7 Learning Objectives Relevant to the Three Levels of the Program



### 3.3. Platform Structure utilized by the Integrated Water Management Program

#### 3.3.1. Leadership & Sustainability (4.5 credits total)

APPP 501 (1.5) Project Management and Leadership

APPP 502 (1.5) Sustainability and Leadership

APPP 503 (1.5) Organizational Leadership

##### *Learning Outcomes*

1. Lead multi-disciplinary teams to effectively deliver sustainable projects
2. Articulate ideas, progress and outcomes through oral and written communications
3. Plan & deliver multidisciplinary projects
4. Identify and apply sustainability concepts to influence the triple bottom-line
5. Apply leadership principles to organizational and social change

##### *Content*

1. Project management
2. Organizational behaviour and structure
3. Sustainability, ethics and policy
4. Personal and professional leadership effectiveness & communications
5. Application of concepts to trans-disciplinary challenges in organizational and social change
6. Fully integrated into technical streams through sector-relevant projects

#### 3.3.2. Business Foundations (3 credits)

**APPP 504 (3) Business Acumen for Technical Leaders***Learning Outcomes*

1. Gain broad knowledge of the structure and mechanics of business.
2. How to use data for decision-making
3. Articulate ideas, progress and outcomes through oral and written communication
4. Practical level of understanding in specific aspects of managerial accounting, strategy and performance, market evaluation, operations management, negotiations and contract management and business-case building and valuation

*Content*

1. Managerial accounting
2. Strategy and performance
3. Market evaluation
4. Operations management
5. Negotiations and contract management
6. Business-case building and evaluation
7. Communication skills

**3.3.3. Faculty of Commerce and Business Administration Electives (Select 1.5 credits total)***Learning Outcomes*

1. Gain exposure to non-technical issues and skills that impacts business and management

*Content (examples of Faculty of Commerce and Business Administration electives, credit values range from 0.7-1.5)*

1. BAEN 542 (0.8) Prototyping
2. BAEN 543 (0.7) Disruption
3. BAEN 544 (0.8) Pitching Your Idea
4. BAEN 545 (0.7) Qualitative Models
5. BAEN 546 (0.8) Social Entrepreneurship
6. BAEN 547 (0.7) Innovation and Sustainability
7. BAFI 540 (0.8) Finance
8. BAMA 540 (0.8) Marketing Fundamentals
9. BAMA 541 (0.8) Product Service Management
10. BASC 540 (0.7) Operations Fundamentals
11. BAEN 550 (1.5) Fundamentals in Entrepreneurship
12. BAPA 501 (1.5) Government and Business
13. BAPA 510 (1.5) Public Policy and the Environment
14. BASD 501 (1.5) Corporate Social Responsibility
15. BASD 505 (1.5) Environmental Economics, Management, and Technology
16. BASM 501 (1.5) Business Strategy
17. BAHHR 505 (1.5) Leadership
18. BAHHR 507 (1.5) Two-Party Negotiations

### 3.3.4. Professional Development

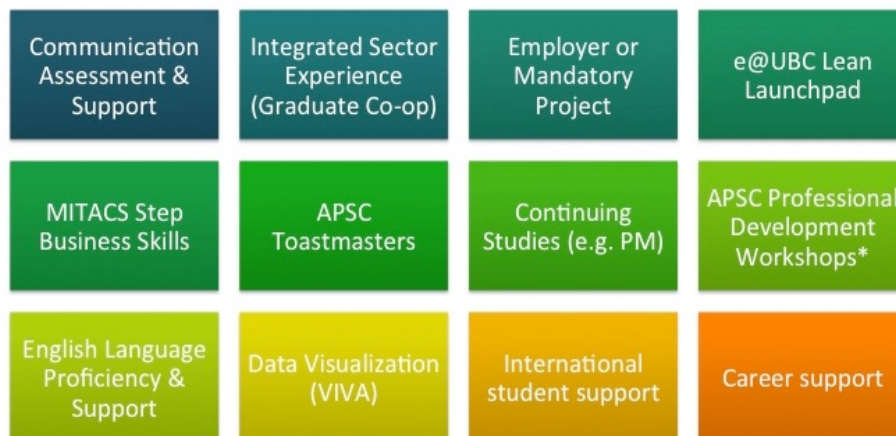
Provide support to candidates who wish to broaden their knowledge

1. Communication Assessment & Support
2. Integrated Sector-specific Experience (Graduate Cooperative Education Program)
3. Employer or Mandatory Sector-specific Project
4. e@UBC Lean Launchpad
5. MITACS Step Business Skills
6. APSC Toastmasters
7. Continuing Studies (PM)
8. APSC Professional Development Workshops
9. English Language Proficiency & Support
10. Data Visualization (VIVA)
11. International Student Support
12. Professional Development Employment Centre (PDEC)

Figure 8 Summary of PDEC Resources

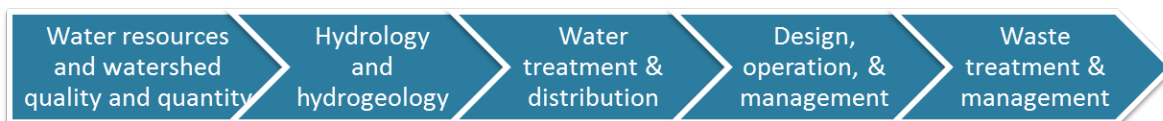
PROFESSIONAL PLATFORM

**The APSC Professional Program Professional Platform also offers students optional opportunities to expand their skills through the Professional Development Employment Centre**



### 3.4 Overview of Pillar for M.E.L. for Integrated Water Management

***Value Chain***



### ***Learning Outcomes***

1. Develop a broad understanding of aquatic environment and water supplies and quality
2. Develop a thorough understanding of the transport of water and its constituents in the natural environment
3. Gain competency to apply physical, chemical, and biological unit operations and processes
4. Understand regulatory & environmental frameworks, & community relations
5. Assess and manage risk, apply appropriate policy and manage asset
6. Formulate, build and deploy simulation and optimization models and to structure and apply risk informed decision making frameworks

	<b>Credits</b>
<b>Winter Session – Term 2 (January – April)</b>	
IWME 501	3
IWME 502	3
IWME 503	3
APPP 501	1.5
APPP 502	1.5
Electives constrained	3
<b>Summer Session – Term 1 (May – June); Term 2 (July – August)</b>	
IWME 505	3
APPP 503	1.5
APPP 504	3
APSC 412 (co-op placement) or an entrepreneurial experience (12 weeks)	6*
<b>Winter Session – Term 1 (September – December)</b>	
IWME 504	3
Electives (Faculty of Commerce and Business Administration - current list of approved electives on M.E.L. in I.W.M. website)	1.5
Electives constrained	3
<b>TOTAL CREDITS</b>	<b>30*</b>

\*Note: APSC 412 has a credit value of 6. Students choosing this option should note that these credits are non-additive, meaning they are not counted toward the 30 required program credits. The entrepreneurial experience options also have credits that do not count toward the required program credits (It is the practice of the Faculty to use an existing co-op course code such as APSC 411 or APSC 412 to log a student's participation in an

entrepreneurial experience. Detailed application and registration requirements are available on the UBC Engineering Co-op website.). The choice of APSC 412 or an entrepreneurial experience will take place over a 12-week period. APPP 503, APPP 504 and IWME 505 will be offered in an intense 4-week version before the APSC 412 or entrepreneurial experience, with self-study program and bi-weekly Webex meeting component for IWME 505 following this 4-week period. The project presentations and final exam for IWME 505 will be held in September so that students have the opportunity to complete the project and reflect on and absorb the material over the 12-week placement period. Students will choose their schedule with the approval of the M.E.L. in I.W.M.. graduate program office.

Constrained electives (6) [list not exclusive, requires approval of Program Director] A current list of approved electives will be on the M.E.L. in I.W.M. program website.

CHBE 550 (3) Advanced Reactor Design

CHBE 575 (3) Air Pollution Control

RMES 515 (3) Integrated Watershed Management

CIVL 540 (3) Advanced Coastal Engineering

CIVL 542 (3) Physical Limnology

Figure 9 Course Credits Distribution

#### MASTER OF ENGINEERING LEADERSHIP IN INTEGRATED WATER MANAGEMENT

APPP 501 (1.5)	APPP 503 (1.5)	APPP 504 (3)								
APPP 502 (1.5)	Sauder Elective (1.5)		IWME 501 (3)	IWME 502 (3)	IWME 503 (3)	IWME 504 (3)	IWME 505 (3)	ELECTIVE (3)	ELECTIVE (3)	
PLATFORM (9 CREDITS)			PILLAR COURSES (21 CREDITS)							
Total Credit Load for MEL in INTEGRATED WATER MANAGEMENT is 30 Credits										

### 3.5. Supervision and Evaluation

Unlike the graduate-level research programs at UBC, a student in the program will not be assigned a single, dedicated supervisor, but will rather be supervised day-to-day in their work by the Pillar Directors and the APSC Professional Program Office. Coursework is evaluated through mini-projects, exams, homework assignments and in-class quizzes. For Pillars having a capstone project as a core component, supervision and evaluation will be provided by a professor and by sector-specific adjuncts, while a Cooperative Education placement will be supervised mainly by the sponsoring company, and given a final mark by a UBC faculty member involved in the professional program based on the company's

report and the student's final report and presentation. Expectations of students will be formalized through individual course syllabi.

### **3.6. Policies on Program Management and Assessment**

The program will be administered under APSC. In delivering this new responsive model program it is essential that the Dean's Office, APSC Professional Program Office and Graduate Program Offices responsible for the Pillars collaborate and cooperate in an intimate fashion. The student should have access to all services and needs from within the same Faculty to ensure timely and comprehensive service of their academic and non-academic activities.

In parallel to internal reviews used to evaluate professional degrees conducted according to the APSC and UBC governance guidelines, the program will be evaluated and developed based on the recommendations of an Advisory Committee. This expert panel of outside professionals and academics will meet once per term; Committee membership will be approved by the Dean of APSC.

## **4. Calendar Statement - Program**

[Removed from this document and attached separately for purposes of Curriculum.]

## **5. Program Resources**

### **5.1. Program Funding and Budget**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020.

As this program is unique, and is directed at a sector where there is identified unmet need, impact on enrolment from existing programs or on opportunities for existing students is expected to be small.

### **5.2. Qualified Faculty**

Courses will be taught by a combination of faculty from all departments and schools in APSC and also from other faculties at UBC; visiting Professors, sector-specific adjuncts and guest lecturers will be involved.

### **5.3. Pillar Champions or Directors**

Each Pillar has a 'Champion', or in some cases more than one champion, who was instrumental in establishing the value proposition for the Pillar and also in the design of the curriculum. The co-Champions for the Integrated Water Management program are Professors Madjid Mohseni (Chemical and Biological Engineering), Susan Baldwin (Chemical and Biological Engineering) and Greg Lawrence (Civil Engineering). It is

expected that these individuals will continue to have an instrumental role in the administration and oversight of the Pillar upon program launch, and may become Program Directors (see Section 5.5).

#### 5.4. Library Resources

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support and the Platform courses requiring new resources will be funded by the APSC Dean's Office (see Appendix 2 & 3 and Appendix 7 Platform Proposal).

#### 5.5. Administration

- **Program Directors**

The Directors for each Pillar will be appointed by the Dean of APSC. The Director will lead the implementation of the program and oversee its evolution, growth and position within APSC. As well as assuming teaching and research commitments, the program Director will represent the program on university committees. The program Director will also be expected to lead the community outreach component of the program to secure coop opportunities. The Director will take an active role in developing the necessary community and stakeholder linkages to establish a long-term and wide range of coop placements. The Director will become the principal point of contact for community and stakeholder partners. The Director will report to the Head of the lead department or school as appointed by the Dean of APSC.

- **Program Manager**

It is expected that the suite of professional programs will be managed on a day-to-day basis by one or more centrally located program managers. This program manager would assist in: student recruitment, student enquiries, website development and maintenance, applications and admissions, timetabling, classroom scheduling, extra-curricular events and workshops, and addressing registration inquiries or issues. Support for admissions and records will also be provided by the APSC Dean's Office.

#### 5.6. Space Requirements

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

#### 5.7. Consultations with University Units

Consultation requests were sent to the following (see Appendix 4):

1. Faculty of Forestry
2. Faculty of Land and Food Systems
3. UBC Sustainability Initiative
4. Faculty of Commerce and Business Administration
5. Faculty of Science



## 5.8. Contact Information

**Contact Person:**

University of British Columbia, Faculty of Applied Science, Dean's Office  
Elizabeth Croft, Associate Dean, Education & Professional Development  
[elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca) 604-822-6614

## 6 Appendices Accompanying Pillar Proposals

[Removed for purposes of Curriculum; may be requested.]

**UBC Curriculum Proposal Form****Category: (1)**

<b>Faculty:</b> Faculty of Applied Science (APSC) <b>Faculty Approval Date:</b> December 5, 2014 <b>Effective Session:</b> Winter, Term 2 <b>Year:</b> 2015-2016	<b>Date:</b> December 19, 2014 <b>Contact Person(s):</b> Faculty of Applied Science Dean's Office <b>Deborah Feduik</b> (Manager, M.Eng & Graduate Programs) Tel: 604-822-8386 Email: <a href="mailto:gradprog@apsc.ubc.ca">gradprog@apsc.ubc.ca</a>
<b>Proposed Calendar Entry:</b>  <b>Master of Engineering Leadership in Integrated Water Management</b>  <b>Program Overview</b>  The Master of Engineering Leadership in Integrated Water Management (M.E.L. in I.W.M.) is a program within the Faculty of Applied Science.  There has been a rapid expansion in scientific and engineering knowledge around water with many new technologies and practical solutions emerging. These include advanced treatments, sophisticated monitoring tools, powerful information technologies, deeper understanding of natural systems, efficient water use and reuse, and novel biotechnologies. Students will learn necessary elements of environmental fluid dynamics, hydrology, chemical and biological treatment processes, water and wastewater management required of a professional working in water resource systems planning and management.  <b>Admission Requirements</b>  Applicants must hold an undergraduate credential in Chemical & Biological Engineering, Civil Engineering, Geological Engineering or related discipline in	<b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,195,0,0">http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,195,0,0</a>  <b>Present Calendar Entry:</b> N/A  <b>Type of Action:</b> Create new program.  <b>Rationale:</b>  The creation of this program has been driven, in part, by strong interest from the external community (whereby British Columbia will see a high level of activity over the next few decades), in part by a desire to collaborate between the Departments and Schools in the Faculty of Applied Science and in part to raise UBC's profile and to attract students (both within Canada and abroad), and to collaborate internationally.  There has been a rapid expansion in scientific and engineering knowledge around water with many new technologies and practical solutions emerging. These include advanced treatments, sophisticated monitoring tools, powerful information technologies, deeper understanding of natural systems, efficient water use and reuse, and novel biotechnologies.  The demand for this program comes from multiple sides. British Columbia and Canada need the proposed program for the success of the provincial and federal resource, agriculture, hydroelectric, municipal and consulting sector industries to stay competitive with international markets. Given UBC's location, the research of

<p>engineering, Environmental Sciences, Geology, Fluid Mechanics, Hydrology, Biotechnology, Biology, Biogeography (physical geography) or Microbiology or equivalent, 3 years relevant experience. Applicants lacking a background in these subject areas may be required to complete additional coursework on the recommendation of the Program Director.</p> <p>The minimum admission requirement for students with degrees from institutions in Canada or the United States is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.</p> <p>The minimum admission requirement for applicants with degrees from outside Canada and the United States is an overall degree average of 76% (UBC-equivalency).</p> <p>Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the M.E.L. in I.W.M. are:</p> <ul style="list-style-type: none"> <li>• TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)</li> <li>• IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0</li> <li>• MELAB (Michigan English Language Assessment Battery): minimum overall score of 81</li> <li>• PTE (Pearson Test of English - Academic): minimum overall score of</li> </ul>	<p>current faculty in this area, and the recent achievements of UBC graduate and undergraduate students water management (including recently hosting the highly successful Water &amp; Environment Student Talks (WEST) at UBC), it is appropriate that UBC be the institution to implement a graduate-level program that is lacking in Canada and now more important than ever.</p> <p>The water management skillset is spread over many disciplines, with no one existing program having purview over all aspects. Hence the need for a new program encompassing the strengths of the many courses that UBC has to offer on water management. In industry, water management is no longer a branch of any existing discipline, but stands alone as a distinct profession.</p>
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- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 60

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website. The graduate program office in an area of Specialization is responsible for collection and assessment of application documents.

### **Transfer Credit**

1. Graduate students who have earned credits outside their current master's program (e.g., from a different university, in a different UBC master's program, as an undergraduate, or as an unclassified student) may transfer up to 12 credits or up to 40% of the total number of credits needed for completion of their current program (whichever is more), provided that:

- the courses were not used to satisfy the requirements of another credential;
- the courses were not used as a basis for admission to the graduate degree program;
- at least a B standing (UBC 74%) was obtained in courses considered for transfer;
- the courses considered for transfer

<p>credit have been taken within five years of commencement of the current degree program.</p> <p>2. No more than 6 credits of transfer credit may be at the undergraduate level (300-/400-level).</p> <p>3. The 12-credit (40%) restriction applies to students in UBC-approved Exchange Agreements established by the UBC Go Global Office.</p> <p>4. Requests for transfer credit must be accompanied by a letter from the home graduate program addressed to the Dean of the Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis.</p> <p>Courses taken as a UBC Access Studies (or non-degree) student may be approved for transfer toward a graduate program (in accordance with transfer credit regulations specified above) with the permission of the graduate program and the Dean of Applied Science.</p> <p><b>Program Requirements</b></p> <p>Degree completion requires completion of 30 credits. This includes 21 credits of Pillar courses, including 6 credits of constrained electives and 9 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master's programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the M.E.L. in I.W.M. graduate program office. Students in the M.E.L. in I.W.M. will choose in their second term between a Co-operative Education Placement (APSC 412; the credits</p>	
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<p>are non-additive in that they are not counted toward the 30 required program credits) and an entrepreneurial experience. A complete list of the courses required for successful completion are available on the program website &lt;insert link&gt;.</p> <p><b>Financial Assistance</b></p> <p>Financial assistance based on academic merit and financial need may be available.</p> <p>Students should consult the program website for more information.</p> <p><b>Contact Information</b></p> <p>Faculty of Applied Science Dean's Office 5000-2332 Main Mall Vancouver, BC V6T 1Z4 Email : gradprog@apsc.ubc.ca www.apsc.ubc.ca</p>	
<p><b>Proposed Calendar Entry:</b></p> <p><b>IWME – Integrated Water Management Engineering</b></p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code</a></p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course code</p> <p><b>Rationale for Proposed Change:</b> This new course code is being created to identify the new courses within the Master of Engineering Leadership (M.E.L.) Pillar in Integrated Water Management.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>IWME 501 (3) Environmental Fluid Mechanics</b></p> <p>Governing equations for incompressible, non-rotating flows of variable density; Equations of</p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p>

<p>motion for stratified fluids; Selective withdrawal; Flow over topography; Estuarine and exchange flows; Hydrodynamic stability  <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>Rationale for Proposed Change:</b>  This new course is being created within the Master of Engineering Leadership (M.E.L.) in Integrated Water Management program. The course will introduce the students to the basic principles of environmental fluid mechanics with emphasis on the effects of density stratification on flows in the environment. An understanding of the water quality, chemistry and biology of aquatics systems is not possible without a thorough grasp of the fluid mechanics of those systems. Students will be exposed to case studies emphasizing the fundamental importance of environmental fluid mechanics to the management of aquatic systems.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of IWME 501 in the M.E.L. in I.W.M. Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>IWME 502 (3) Engineering Hydrology</b></p> <p>Water cycle and role of water in the environment and environmental engineering. Physical and statistical prediction methods for design related to hydrologic systems; precipitation; evaporation; snow hydrology; infiltration and base flow; surface runoff; channel and storage routing; unit hydrograph methods.  <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b>  N/A</p> <p><b>Present Calendar Entry:</b>  N/A</p> <p><b>Type of Action:</b>  Create new course</p> <p><b>Rationale for Proposed Change:</b>  This new course is being created within the Master of Engineering Leadership (M.E.L.) in Integrated Water Management program. The course will introduce the students to the basic principles of water in the atmosphere (evaporation and precipitation); water on the land surface; water below the surface; statistical hydrology. A course of this nature at the graduate level does not currently exist. This course provides comprehensive coverage of the mechanisms governing water flow in a</p>

	<p>full suite of environmental situations. Examples from professional practice will be discussed.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of IWME 502 in the M.E.L. in I.W.M. Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
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<p><b>Proposed Calendar Entry:</b></p> <p><b>IWME 503 (3) Chemical and Biological Industrial Water Treatment Design</b></p> <p>Fundamental principles of process design for chemical and biological systems to treat water used in and effluents generated from industrial processes. Industry application examples: Mining, oil sands, oil and gas, pulp and paper, agriculture, food and beverage.</p> <p><i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b> This new course is being created within the Master of Engineering Leadership (M.E.L.) in Integrated Water Management program.</p> <p>Many industries use large quantities of water, in which certain constituents may concentrate. Since some of these constituents may be toxic to aquatic life, they must be removed before excess water is released into the receiving environment. This course introduces students to chemical and biological technologies used for treating industrial wastewater. A basic understanding of the chemistry of industrial wastewater is fundamental to selection of the appropriate technology for treatment. Additionally the course instructs students on how to select, design, model and optimize a variety of processes for removing constituents of concern from wastewater produced in industries such as mining, oil and gas, pulp and paper, agriculture, food and beverage.</p> <p>As recommended by the GNPCC, the Faculty of</p>
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	<p>Applied Science accepts the delegated responsibility for further review of IWME 503 in the M.E.L. in I.W.M. Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>IWME 504 (3) Water and Wastewater Management Strategies</b></p> <p>Chemical and microbiological quality and contaminations, techniques and analytical procedures for assessing and monitoring chemical and microbiological water quality; Water and wastewater quality standards, pollution prevention strategies and policies; Risk analysis; Asset management.  <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b>  This new course is being created within the Master of Engineering Leadership (M.E.L.) in Integrated Water Management program.</p> <p>An understanding of microbial and chemical water quality is essential for any professional who wants to practice in the field. More importantly, those professionals who are to take the leading role in industry must understand the nature of contaminants, their sources, and methods/strategies to quantify them. Equally important is a thorough understanding of water quality standards, current regulations around water and wastewater. Moreover, ability to understand, analyze, and quantify risk is a crucial knowledge and skill set that every water professional must have.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of IWME 504 in the M.E.L. in I.W.M. Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>IWME 505 (3) Water Resources Systems Planning and Management</b></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p>

Art and science of modelling for integrated water resources planning and management; Practice of developing and deploying simulation and optimization models to solve water problems; Risk informed decision making frameworks and stakeholder processes for analysis of water resources systems.

*This course is not eligible for Credit/D/Fail grading.*

**Rationale for Proposed Change:**

This new course is being created within the Master of Engineering Leadership (M.E.L.) in Integrated Water Management program. Many companies, research programs and government agencies are integrating simulation and optimization technologies and risk management techniques into their day-to-day operations. Applying these technologies and mastering the systems approach to structure risk-informed decision making frameworks in stakeholder processes in various contexts is becoming an increasingly sought after skill. Students will learn: key aspects of optimization theory; currently used modeling technologies; strategies and techniques for problem formulation, design, validation and implementation of practical simulation and optimization models; and risk-informed decision making frameworks in stakeholder processes using real-life examples and applications.

As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of IWME 505 in the M.E.L. in I.W.M. Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.



18 March 2015

To: Vancouver Senate

From: Senate Curriculum & Admissions Committees

Re: Master of Engineering Leadership in Urban Systems (approval)

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The Senate Curriculum and Admissions Committees have reviewed the material forwarded to them by the Faculty of Applied Science and enclose those proposals they deem ready for approval.

The following is recommended to Senate:

**Motion:** *“That the new Master of Engineering Leadership (M.E.L.) in Urban Systems program and its associated new course code and new courses be approved.”*

Respectfully submitted,

Dr Peter Marshall, Chair, Senate Curriculum Committee  
Dr Robert Sparks, Chair, Senate Admissions Committee



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THE UNIVERSITY OF BRITISH COLUMBIA

## **FACULTY OF APPLIED SCIENCE**

*New program, course code, and courses*

Master of Engineering Leadership in Urban Systems; URSY (Urban Systems) Course Code; URSY 510 (3) Urban Systems and Society; URSY 520 (3) Urban Systems Planning; URSY 530 (3) Urban Systems Engineering; URSY 540 (3) Urban Systems Project Delivery and Economics; URSY 550 (3) Infrastructure Asset Management



**a place of mind**  
**THE UNIVERSITY OF BRITISH COLUMBIA**

**Provost and Vice President Academic**  
Walter C. Koerner Library  
1958 Main Mall  
Vancouver, BC Canada V6T 1Z2

Phone 604 822 4948  
Fax 604 822 3134

**Memo**

**To:** Paul Harrison, Chair, Senate Academic Policy Committee

**From:** David Farrar, Provost and Vice-President Academic

A handwritten signature in black ink, appearing to read 'DAF', followed by a horizontal line.

**Date:** January 15, 2015

**Re: Administration of Master of Engineering Leadership Programs**

The Dean of the Faculty of Applied Science has requested that the proposed new graduate professional programs be officially designated as professional programs and that they be administered by the Faculty of Applied Science rather than by the Faculty of Graduate and Postdoctoral Studies.

The proposed programs are:

- Master of Engineering Leadership in Advanced Materials Manufacturing
  - Master of Engineering Leadership in Clean Energy Engineering
  - Master of Engineering Leadership in Dependable Software Systems
  - Master of Engineering Leadership in Green Bio-Products
  - Master of Engineering Leadership in Integrated Water Management
  - Master of Engineering Leadership in Naval Architecture and Marine Engineering
  - Master of Engineering Leadership in Urban Systems
  - Master of Health Leadership in Seniors Care
1. I am satisfied that these programs meet the criteria for designation as professional graduate programs.
  2. For the reasons outlined below, I support these programs being administered by the Faculty of Applied Science
    - a) All criteria laid out "Optional Transfer of Professional Graduate Programs from the Faculty of Graduate and Postdoctoral Studies to the Disciplinary Faculties" document, approved by Senate in January of 2005, have been met.
    - b) The Faculty of Applied Science has been successfully handling the administration of the Master of Engineering programs for nearly a decade. In that time, the Faculty of Applied Science gained considerable experience in effective graduate program administration. There is a healthy and productive relationship between the Faculty of Graduate and Postdoctoral Studies and Applied Science which all expect to continue.
    - c) The Faculty of Applied Science has the resources, including staff and financial resources, to provide the suite of services the Faculty of Graduate and Postdoctoral Studies provides for most graduate programs including financial support for students, student appeals, and matters relating to admissions and compliance with requirements for degree completion.

- d) This does not set a precedent. Decisions about the administration of future new graduate professional programs will be made in accordance with the guidelines approved by Senate in January, 2005.
- e) I have consulted with Vice-Provost and Dean, Graduate and Postdoctoral Studies, Dr. Susan Porter. She agrees to this request because the M.Eng. Programs are already administered by the Faculty of Applied Science, and the Masters of Engineering Leadership are closely related to the M.Eng. programs.

## **Executive Summary**

Master of Engineering Leadership in Urban Systems

Faculty of Applied Science

University of British Columbia

March 5, 2015

### **Overview**

The University of British Columbia is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. It creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning. The program strives to provide students with a comprehensive and innovative education that enables them to build on their past work experience and technical skills, adding leadership and interdisciplinary opportunities for learning and interaction with other students. Consultation with stakeholders has revealed that experienced engineers and early-career professionals in the chosen focus areas require sector-relevant, cross-disciplinary technical skills. They also require project management, communication and business skills to be effective leaders.

UBC offers several programs to train the professionals that plan, design, operate, and manage the infrastructure systems that underpin modern society—transportation, water, waste, power, data, etc.—but these programs are distributed across many different units and academic disciplines (the School of Community and Regional Planning, several engineering departments, the School of Architecture and Landscape Architecture, the Faculty of Commerce and Business Administration, etc.). For the first time, the proposed Master of Engineering Leadership (M.E.L.) in Urban Systems will bring together the major disciplines to provide professionals with a comprehensive and integrated knowledge base for developing and managing our public infrastructure.

Urban systems provide essential services to cities and regions -- services such as energy, water, sanitation, transportation, telecommunications, and aspects of healthcare delivery. Employers in this sector include municipalities and other levels of government, utility companies, and transportation providers, as well as the consulting engineering firms that these organizations engage for their technical expertise. The sector requires professionals who are versed in both engineering and other technical disciplines (urban planning, architecture) and who have the managerial competence required to work effectively in multidisciplinary teams. These professionals must understand the breadth and complexity of urban systems problems and innovative solutions, from the societal context and role of urban planning to engineering design and implementation, in order to address the complex challenges of providing infrastructure services that are not only adequate, safe, affordable, and reliable, but also environmentally sustainable, adaptable over long time horizons, and resilient to disasters and other pressures.

**Credential**

The credential awarded will be the Master of Engineering Leadership (M.E.L.) in Urban Systems. The degree will be a master's degree with a balance between advanced engineering theories, interdisciplinary knowledge and real-world applications. The field of study will be advanced engineering technology and techniques for urban systems applications.

**Location**

The Vancouver Campus of UBC is the main location for classroom education and administration. Course instruction and assignments will be achieved through collaborations among UBC, provincial and federal agencies and local private sector stakeholders involved in urban systems research and development.

**Faculty Offering Program**

The program will be offered formally, administered and delivered by the Faculty of Applied Science, UBC.

**Program Start Date**

The program will be offered in the 2015/2016 academic year, beginning in January 2016.

**Program Completion Time**

Anticipated time for completion of the program is 1 year of full-time academic study, including any work-term placements and non-academic activities.

**Objectives of the Proposed Program**

The program is targeted at students that have previous training in specific disciplines related to urban systems (for example, in civil engineering). The objective is to prepare these students to take on professional responsibilities for overseeing all aspects of urban systems by extending their skills in the following areas:

1. Comprehensive and integrated understanding of the broad range of professional roles and technologies involved in supporting urban infrastructure systems, introducing students to disciplines outside of their undergraduate education. A typical example of this is to introduce the principles of urban planning to students with engineering backgrounds.
2. Engineering management and leadership to equip students that have technical training with the professional skills required to take on the central role in developing and overseeing urban infrastructure systems.
3. Deep technical expertise in selected areas, such as transportation or power systems.
4. High-level critical thinking and practical, professional skills to enable students to move into positions of leadership within municipal governments and other organizations that support urban systems.

The program will:

1. Equip tomorrow's professionals with the critical thinking and practical skills necessary to make important contributions to their chosen sector and to make Canada a leader in the global market.



2. Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's companies to benefit from the minds of UBC's top graduate-level students.
3. Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with sector professionals in the Vancouver region.
4. Emerge as the leading institution for the continuing education of current leaders in the urban systems sector and for the training of tomorrow's leaders.
5. Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.
6. Continue to develop a high profile faculty with international expertise in the theory and practice of urban systems.

### **Program Learning Outcomes**

In the M.E.L. in Urban Systems program, students will gain knowledge, skills, and capabilities to:

- Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability)
- Use data appropriately for technical and business decision-making
- Understand the critical components of how business works
- Understand the impact of cross-cutting themes in industry
- Identify major ways in which urban systems provision and performance affect society, including linkages to environment, health, quality of life, and economy
- Describe how urban planning (e.g., land-use planning) and urban systems are related
- Illustrate the implications of systems thinking, sustainability and resiliency considerations, and risk issues to design and operation of infrastructure.
- Model and analyze large scale infrastructure projects from multiple perspectives to support strategic-level decision-making.
- Apply principles of engineering economics to the modeling, valuation, and analysis of infrastructure projects.
- Summarize major asset management practices that are important to different types of engineering works. Identify and classify asset management practices within a variety of organizations.
- Discuss innovative approaches to the provision of urban infrastructure services and how they address challenges of sustainability and resilience

### **Contribution to UBC's Mandate and Strategic Plan**

In *Place and Promise: The UBC Plan*, our vision statement is: "As one of the world's leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world." The program will act as one route to the fulfillment of this promise. With the

involvement of faculty from all areas in APSC and the partnership of the Faculty of Commerce and Business Administration; the development of new facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored project topics, and co-op job placements, the program will offer an exceptional learning environment for students and faculty. In addition, the program will attract students from around the world to study in Vancouver's diverse environment and graduate students, who will, in turn, be in demand across the globe.

### **Delivery Methods**

The Faculty of Applied Science (APSC) has taken the lead in developing a conceptual framework for new Professional Programs comprising a common "Leadership Platform" that provides the professional skills required for an experienced graduate to be an effective professional leader, with "Technical Pillars" of specialization courses in particular sectors relevant to APSC's educational mission and professional communities. (The term Platform refers to foundation coursework focused on project management, data analysis, and leadership skills, while the term Pillar is equivalent to specialization.) The program will be delivered as an intensive one-year program. It is anticipated that this program will be favourable to post-professional students already in the workplace. The Platform will be delivered by faculty from APSC and the Faculty of Commerce and Business Administration. The Pillar courses will be delivered by faculty from the Department of Civil Engineering (CIVL) and the School of Community and Regional Planning (SCARP). The program requires a minimum of 30 credits of coursework. The distribution will be 9 credits dedicated to the Platform providing the professional skills required for an experienced graduate to be an effective technical manager and 21 credits dedicated to the Pillar in advanced technical courses. Both the Leadership Platform and the Technical Pillar have prescribed core courses. For this program there will be 6 credits of constrained electives.

### **Linking Learning Outcomes and Curriculum Design, Optional Work-terms**

The number and variety of courses available to students is purposely limited to ensure a robust and streamlined learning experience that is centered on the program learning outcomes. Each of these program outcomes corresponds to at least one of the core courses and summarizes the goal of that course. Work experience is an essential admission requirement and also a key feature of the optional co-op component.

### **Program Strengths**

The Master of Engineering Leadership (M.E.L.) program in Urban Systems offers a comprehensive curriculum that is grounded in collaborative projects embedded in the Platform coursework, and that draws upon the combined expertise of faculty in the participating units, in particular, the Department of Civil Engineering and the School of Community and Regional Planning. The program provides an integrated perspective on the infrastructure systems that provide essential services to cities and regions – services such as energy, water, sanitation, transportation, telecommunications and aspects of healthcare delivery. It will provide students with an understanding of the breadth and complexity of urban systems problems and innovative solutions, from the societal context and role of urban planning to engineering design and implementation. UBC's Faculties possess world-

leading expertise and training in several academic disciplines related to urban infrastructure systems, but these tend to fall into traditional disciplinary silos, and students are rarely exposed to the full range of expertise that must come together in the leadership roles responsible for our modern municipal infrastructure systems. The program is tailored at providing an exceptional education that is perfectly suited to the requirements of this industry. It combines UBC's established subject-matter expertise with a new, innovative approach to program curricular design and pedagogy.

### **Related Programs at UBC or other BC Post-secondary Institutions**

The Master of Engineering Leadership (M.E.L.) program in Urban Systems is unique in British Columbia and distinct from similar programs in Canada and internationally. In this program, engineering and urban planning are integrated, content is relevant to the urban systems industry, and technical skills are developed along with management and leadership skills. The M.E.L. in Urban Systems is not envisioned to be an accredited degree program. These features distinguish the M.E.L. from UBC's M.Eng. and Master of Community and Regional Planning (M.C.R.P.) programs, which do not feature this integration (the M.C.R.P. program is accredited by professional bodies in planning). A small number of similar programs have also been emerging in Canada and internationally. In 2013, the University of Toronto (U of T) initiated a 16-month Master of Engineering program in Cities Engineering and Management (M.EngCEM), offered by the Civil Engineering department. Like the M.E.L. in Urban Systems, it seeks to provide technical expertise and cross-disciplinary understanding of complex urban issues. The proposed M.E.L. in Urban Systems differs from the U of T program, however, in providing a much stronger interdisciplinary basis (through co-hosting by SCARP and a broader range of electives) and in integrating a substantial professional management Platform. In the U of T program, management is covered only through a single elective course.

### **Institutional Contact**

University of British Columbia

Faculty of Applied Science

Elizabeth Croft, Associate Dean, Education & Professional Development

604-822-6614 [elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca)

### **Appendix to the Executive Summary (for internal UBC purposes only)**

Briefly describe the resources that will be required for the program:

#### **Budget and Funding**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020. Tuition is \$27,000 per year for domestic students and \$46,000 per year for international students.

#### **Space Requirements**

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

**Library**

The new courses for this program have been reviewed by the Library. The Urban Systems Pillar courses will not require any additional Library support and the Platform courses requiring new resources will be funded by the APSC Dean's Office. (See Appendix 2, 3 and Appendix 7 Platform Proposal)

## 1. Introduction

This proposal represents one of a suite of new professional programs to be offered at the master's level in the Faculty of Applied Science (APSC). The programs were developed in parallel and will be delivered in parallel. That is, there will be a common start date and timeline for cohorts in all of the programs. A key feature of this suite of programs is that they are structured in two parts, which will be referred to as the "Leadership Platform" and the discipline-specific "Technical Pillar". The Platform is foundational coursework focused on project management, data analysis, and leadership skills. It is a largely common element accessible to the suite of new APSC professional programs. The Pillar is equivalent to a specialization. It contains technical material specific to Urban Systems. Successful completion of the Platform and a Pillar will result in the granting of one degree. Details of the contents of both the Platform and each Pillar are documented in this proposal.

## 2. Program Rationale

### 2.1. Defining the Need for the Program

Over the past year, members of the University's Flexible Learning Initiative and the APSC Dean's office have formed and worked closely with a Program Advisory Committee consisting of faculty from all areas of APSC. The following program proposal is the result of collaborative planning on the part of this group.

### 2.2. Professional Program Mission Statement and Context

*The University of British Columbia, Faculty of Applied Science, wishes to attract students into a **high quality, sector-focused, distinctive and integrated** Applied Science Professional Program that has resources to be delivered sustainably and fiscally meets the University's goals.*

1. **UBC continues to encourage innovative** learning approaches within the fiscal model of cost recovery.
2. **The Flexible Learning Strategy** introduced in 2014 lists the development of new Professional Programs as a priority.

UBC has the opportunity to deliver a distinctive APSC Program in line with the University's Professional Program objectives.

### 2.3. Applied Science Professional Program Approach

#### 2.3.1. Guiding Principles of the Program Advisory Committee

1. There is ongoing meaningful engagement with stakeholders in market research, development, delivery and career opportunities.

2. Our target market is candidates who might consider either an M.B.A. or M.Eng. Management, but would prefer to develop both sector-relevant technical skills and management and leadership skills – our program will be distinctive in the market.
3. We will take advantage of a standardization of core courses to improve quality of offering while reducing costs and complexity.
4. The program will be positioned as a premium alternative to a conventional professional master's program by offering distinctive, high quality, cross-disciplinary technical and non-technical skills to the experienced professional who wants to become a Sector Specialist.
5. Pillars are developed around areas of unique research and teaching strength in APSC, where multiple program "Faculty Champions" are identified, that have strong relevance to our professional community and societal benefit, have strong learner demand, and have strong industry demand for people trained in this sector.
6. Graduate courses offered in the Urban Systems Pillar will be open to all APSC graduate students with the appropriate prerequisites, and similarly to students in other graduate programs, space permitting. This will allow Applied Science to revitalize our graduate program offerings around areas of research and teaching strength, build strong interdisciplinary sector training capacity, and improve our connections to our professional community.

### **2.3.2. Extensive Market Research was used to develop the Value Propositions**

In order to establish the viability of offering new programs, the following activities were undertaken to validate the structure and proposed Pillars. Market research information is provided in Appendix 6. The objectives and curriculum were developed in conjunction with meaningful stakeholder consultation in 4 phases.

1. Market research and concept development conducted through:
  - a. Multiple meetings of the Inter-Disciplinary Working Committee of Applied Science that included the following core members:
    - i. Elizabeth Croft (Associate Dean)
    - ii. James Olson (Associate Dean)
    - iii. Hugh Brock (Vice Provost)
    - iv. Reza Vaziri (Head of Civil Engineering)
    - v. Peter Englezos (Head of Chemical & Biological Engineering)
    - vi. Sathish Gopalakrishnan (Professor in Electrical Engineering)
    - vii. Scott Dunbar (Head of Mining)
    - viii. Walter Merida (Director of Clean Energy Research Centre)
    - ix. Jon Mikkelson (Director of Naval Architecture & Marine Engineering)
    - x. Panos Nasiopoulos (Director of ICICS)
  - b. Survey of current M.Eng. students and alumni (Appendix 6)
  - c. Survey of APSC employers (via Co-op Database) (Appendix 6)

- d. Desktop research of comparable programs in Canada and the United States
2. Validation by external sector expert
  - John Steil (Stantec)
3. Refinement through sector focus groups
  - Urban Systems
  - Validation: June 27, 2014
    - John Steil (Stantec)
  - Focus Group: September 11, 2014
    - David Bennett (Fortis)
    - Brian Crowe (City of Vancouver)
    - Doug Smith (City of Vancouver)
    - John Steil (Stantec)
    - Jack Lee (Opus Dayton Knight)
4. Presentation and discussion with the Department of Civil Engineering Industry Advisory Board
  - The Civil Industry Advisory Board (approximately 12 senior industry leaders) expressed strong support for the proposed program on the basis that the combination of engineering, planning, and management was substantially distinct from existing Masters programs, and they emphasized that they believed both the proposed program and the traditional Masters programs (focused on technical expertise) were both needed.

### **2.3.3. Market Insights**

Consistently repeated messages, related to the potential student market and the relevance of the particular focus areas, were heard through all market research activities outlined above.

For example:

1. Experienced engineers in their chosen careers require sector-relevant, cross-disciplinary technical skills.
2. Engineers require project management, communication and business skills to be effective leaders.
3. Few, if any, schools in Canada and the United States offer this combination of skills in a technical master's program.
4. There is a demonstrated need for a program. (Figure 1)

5. Students are willing to apply to graduate-level programs that are relevant to the stakeholders in their chosen sector. (Figure 2)

Figure 1 Estimated Market Size (number of students per year – Engineering)

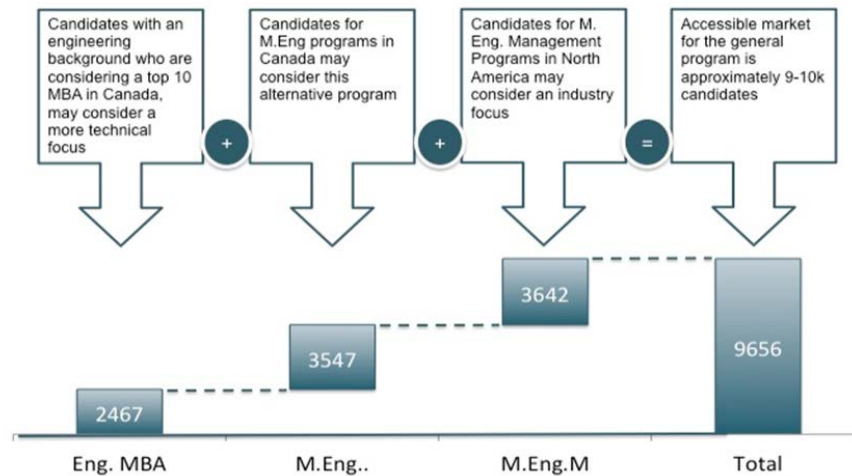
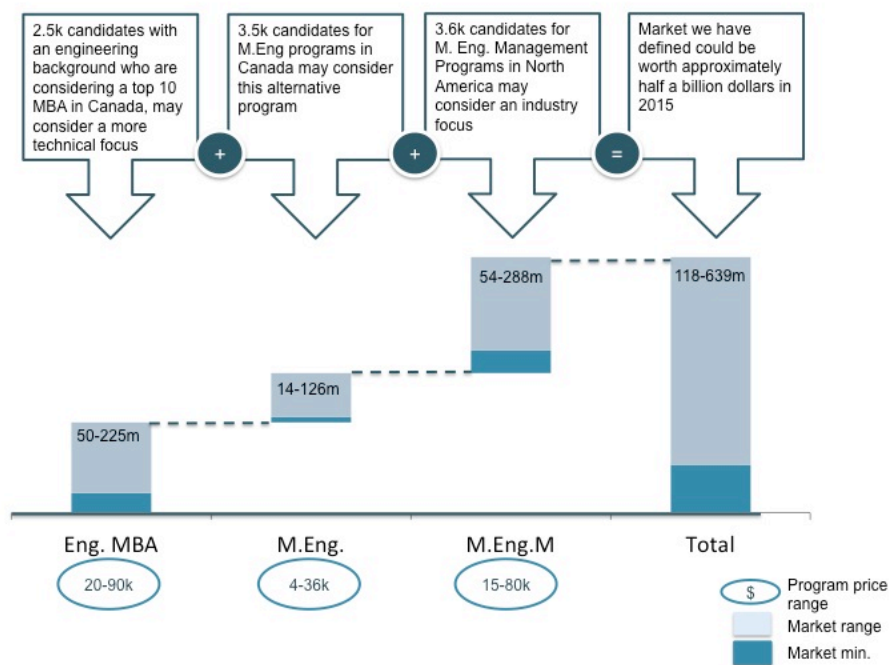


Figure 2 Estimated Market Size (\$ per year - Engineering)





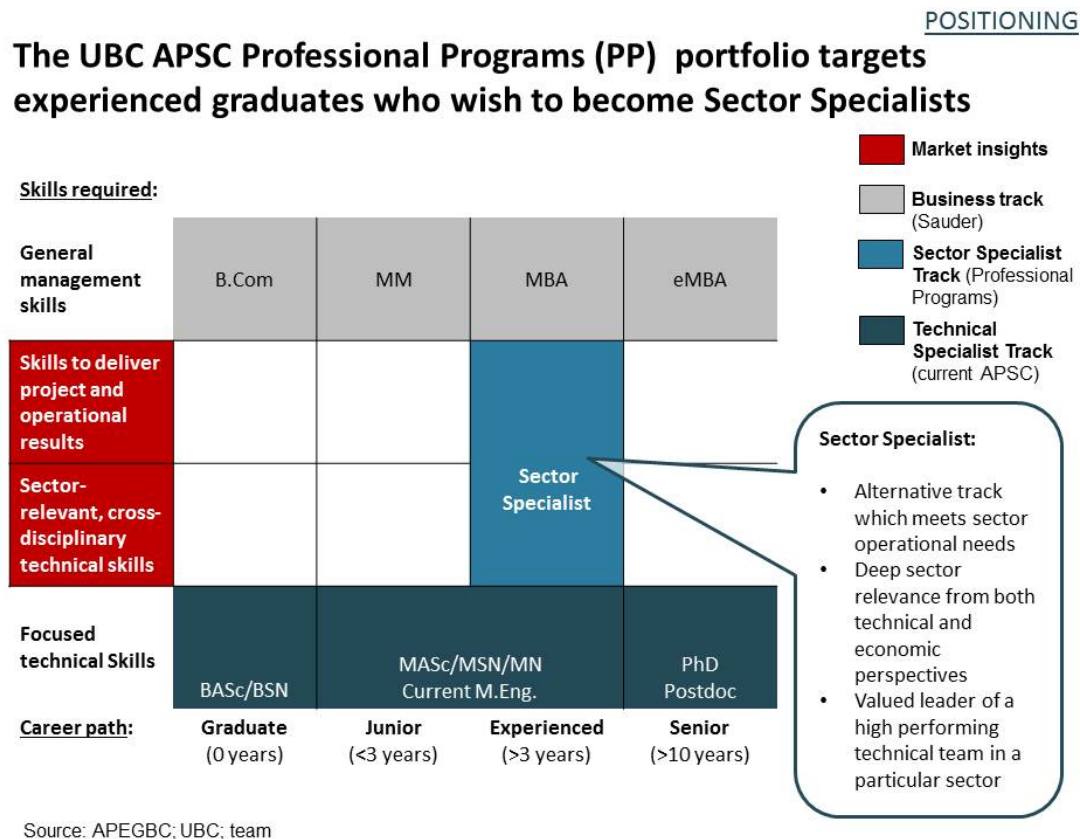
## **2.4. Program Overview**

### **2.4.1. Mission**

The program strives to provide students with a comprehensive and innovative education that will enable them to advance their career in a path that is different from the traditional APSC course-based master's or the Master of Business Administration (M.B.A.). The program is structured to provide a combination of advanced technical skills, integrated with professional skills, which will enable graduates to practice these skills and advance their career trajectory in their chosen industries.

Urban systems provide essential services to cities and regions -- services such as energy, water, sanitation, transportation, telecommunications, and aspects of healthcare delivery. Employers in this sector include municipalities and other levels of government, utility companies, and transportation providers, as well as the consulting engineering firms that these organizations engage for their technical expertise. The sector requires professionals who are versed in both engineering and other technical disciplines (urban planning, architecture) and who have the managerial competence required to work effectively in multidisciplinary teams. These professionals must understand the breadth and complexity of urban systems problems and innovative solutions, from the societal context and role of urban planning to engineering design and implementation, in order to address the complex challenges of providing infrastructure services that are not only adequate, safe, affordable, and reliable, but also environmentally sustainable, adaptable over long time horizons, and resilient to disasters and other pressures.

Figure 3 Placement of New Program Sector Specialist with Existing Programs



#### 2.4.2. Objectives of the Proposed Program

The intent is to produce engineering Program Managers who possess sufficient technical understanding to direct detailed engineering analyses. Some large corporations and government activities within the field find themselves deploying skilled business personnel to lead engineering teams. Often this results in a 'communications gap' between managers and technical staff thus impairing team effectiveness. The M.E.L. in Urban Systems program will create Program Managers who are peers to their engineering team members, but whereas those team members may bring specialist skills in an engineering discipline, the graduate of this program will have specialist skills in program management. The program will:

1. Provide students with a comprehensive and integrated understanding of the broad range of professional roles and technologies involved in supporting urban infrastructure systems, introducing students to disciplines outside of their undergraduate education. A typical example of this is to introduce the principles of urban planning to students with engineering backgrounds.
2. Focus on engineering management and leadership to equip students that have technical training with the professional skills required to take on the central role in developing and overseeing urban infrastructure systems.
3. Develop deep technical expertise in selected areas, such as transportation or power systems.

4. Foster high-level critical thinking and practical, professional skills to enable students to move into positions of leadership within municipal governments and other organizations that support urban systems.
5. Equip tomorrow's professionals with the critical thinking and practical skills necessary to make important contributions to their chosen sector and to make Canada a leader in the global market.
6. Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's companies to benefit from the minds of UBC's top graduate-level students.
7. Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with sector professionals in the Vancouver region.
8. Emerge as the leading institution for the continuing education of current leaders in the urban systems sector and for the training of tomorrow's leaders.
9. Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.
10. Continue to develop a high profile faculty with international expertise in the theory and practice of urban systems.

### 2.4.3 Program Learning Outcomes

In the M.E.L. in Urban Systems program, students will gain knowledge, skills, and capabilities to:

- Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability)
- Use data appropriately for technical and business decision-making
- Understand the critical components of how business works
- Understand the impact of cross-cutting themes in industry
- Identify major ways in which urban systems provision and performance affect society, including linkages to environment, health, quality of life, and economy
- Describe how urban planning (e.g., land-use planning) and urban systems are related
- Illustrate the implications of systems thinking, sustainability and resiliency considerations, and risk issues to design and operation of infrastructure.
- Model and analyze large scale infrastructure projects from multiple perspectives to support strategic-level decision-making.
- Apply principles of engineering economics to the modeling, valuation, and analysis of infrastructure projects.
- Summarize major asset management practices that are important to different types of engineering works. Identify and classify asset management practices within a variety of organizations.
- Describe innovative approaches to the provision of urban infrastructure services and how they address challenges of sustainability and resilience

## 2.5. Contribution to UBC Mandate and Strategic Plan

UBC is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning. In *Place and Promise: The UBC Plan*, our vision statement is: "As one of the world's leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world."

The program will act as one route to the fulfillment of this promise. With the involvement of faculty from all areas in APSC and the Faculty of Commerce and Business Administration; the development of new laboratory facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored research topics, and co-op job placements, the program will offer an exceptional learning environment for students and for faculty undertaking research. In addition, the program will attract students from around the world to study in Vancouver's diverse environment and graduate students who will, in turn, be in demand across the globe.

When we speak of globalization today, it is a synthesis of exploration, learning, and the global exchange of resources and knowledge—not unlike the university itself. Accordingly, the program addresses many of the goals outlined in *The UBC Plan*:

### 2.5.1. Student Learning

- The University provides the opportunity for transformative student learning through outstanding teaching and research, enriched educational experiences, and rewarding campus life.

The program will offer a comprehensive curriculum that draws upon the combined expertise of faculty in all areas of APSC, the Faculty of Commerce and Business Administration, and of sector professionals. The program will synthesize theory and practice through a challenging project-based learning experience that will equip students with the skills and experience needed to excel in the world's most important and fast-growing industries. The number and variety of courses available to students will be purposely limited, as will student enrolment, to ensure a robust and streamlined learning experience that is centered on the program objectives. As well, strong stakeholder support and existing relationships between UBC APSC and local companies promises students both a rich educational experience and employment opportunities after graduation.

### 2.5.2. Innovation Excellence

- The University creates and advances knowledge and understanding, and improves the quality of life through the discovery, dissemination, and application of research

within and across disciplines.

As a leading research and educational facility, UBC is expected to be a world leader as we invest time and resources to create, sustain and grow for the future. The M.E.L. in Urban Systems will expand UBC's current scholarship and position the University to become *the* Canadian leader in the urban systems field. Furthermore, in conjunction with other UBC initiatives (e.g., Campus as a Living Lab, the Centre for Interactive Research on Sustainability (CIRS) building, the campus sustainability office, and numerous research partnerships with municipal and regional infrastructure providers), the new program will help position UBC as a world leader in integrated research, teaching, and outreach on sustainable and resilient future cities.

### **2.5.3. Community Engagement**

- The University serves and engages society to enhance economic, social, and cultural well-being.

Engaging with local governments, utility companies, transportation providers, consulting companies, and other organizations with regard to the needs of the urban systems sector is one of the key components of the program. With a curriculum grounded in collaborative community projects, a reciprocal and experiential learning environment will be created between students and local stakeholders.

### **2.5.4. International Engagement**

- The University creates rich opportunities for international engagement for students, faculty, staff, and alumni, and collaborates and communicates globally.

The program will graduate students who will be in demand across the globe, from industries that will be based in Canada. It will graduate the trained professionals needed to ensure the self-sufficiency of Canada's sector-specific professionals, and the global influence of Canada itself. Strong industries, backed by highly qualified professionals, are key to securing Canada's global presence – to improving and sustaining Canada's innovation and economy, and strengthening Canada's contribution to the global market. By offering the program, UBC will therefore become an invaluable player in both national and international development.

### **2.5.5. Sustainability**

- The University explores and exemplifies all aspects of economic, environmental, and social sustainability.

The program will play a role with the rest of the UBC community to meet society's needs without compromising those of future generations. Through the platform courses that will have a focus on leadership and sustainability, to the activities and services provided both inside and outside of the classroom, the program is designed to be accountable and transparent in the use of available resources. Through the pillar courses, the M.E.L. in

Urban Systems will train a new generation of professionals in integrated, systems-oriented thinking in the planning, design, and operation of urban infrastructure systems to address the societal need for sustainable and resilient future cities.

## **2.6. Support for New APSC Professional Master's Programs**

The University supports the formation of new professional master's programs having goals in alignment with that of the institution. Support and resources are available in a variety of forms including assistance with market research, budgeting, and curriculum development. We have and continue to take advantage of all assistance in the creation, development, delivery and evaluation of the program. As part of the Flexible Learning Initiative, targeted growth of professional master's programs is one of UBC's four priorities over the next five years. Continued support for the Flexible Learning Initiative has been confirmed by our new UBC President, Dr. Arvind Gupta. The strategic plan for flexible learning campus-wide is articulated in its own web space, which can be found here:

<http://flexible.learning.ubc.ca/what-is-flexible-learning/flexible-learning-goals/>

APSC has identified its professional master's programs as having the potential to benefit greatly from not only revitalization, but also expansion. This initiative has been led by the Dean's office and has received consistent support from the Provost's Office through the Flexible Learning Initiative. An overarching goal of these new programs is to revitalize the APSC graduate program offerings which have not been systematically redeveloped for over 20 years. New Pillar courses will be available to all Ph.D., M.A.Sc. and Professional Master's students providing high quality, sector relevant, technically leading edge education for our graduate students. This objective is in line with the espoused goal of the Faculty of Graduate and Postdoctoral studies to rethink graduate education as a preparation not only for academe but also for service in a wide range of leadership opportunities in society.

### **2.6.1. Opportunity Identification**

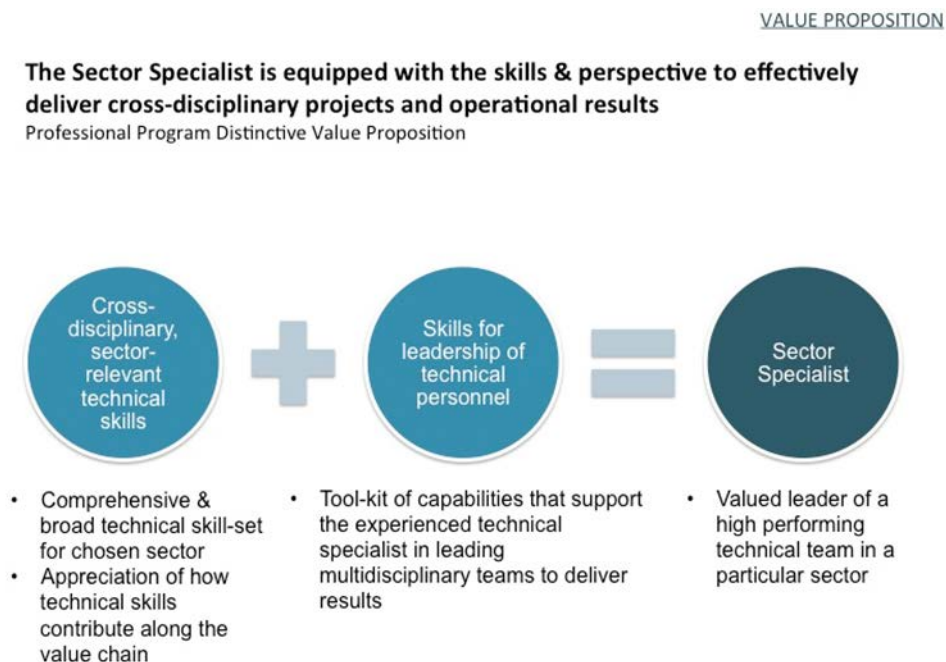
It was felt that an opportunity may exist that had, as yet, not been explored in APSC. Given the unique structure of the Faculty, which is home to not only engineering programs, but also the School of Nursing, the School of Architecture and Landscape Architecture and the School of Community and Regional Planning, it was felt that the potential existed to create a suite of interdisciplinary master's degrees that were aligned with stakeholders in a way that a program housed in a single department or school could not. In order to establish the market for such opportunities, and to establish potential interdisciplinary themes to pursue, the following activities were undertaken:

1. Competitor scans
2. Alumni tracking
3. Ongoing dialogue with stakeholders to identify skills gaps
4. Targeted market research / focus groups
5. Dialogue with faculty to shape opportunities and program champions
6. Initial feasibility assessment
7. Distillation of program concept(s) including clear objectives in launch



## 8. Straw man concept for new professional program, with clear student target

Figure 4 Relationship of Technical and Leadership Skills for a Sector Specialist



### 2.6.2. Program Development

Upon successful conclusion of the opportunity identification phase, program development initiated via the steps outlined below, with this document representing the basis of the material required for step 9. A key element that emerged from the opportunity identification phase was a program structure that featured a largely common Platform, comprising approximately 40% of each program, which would be the foundation for all new professional master's programs in APSC. The remaining 60% of the course content is then comprised of a set of courses drawn from across the Faculty that provide sector-specific technical content. The technical material is referred to as a Pillar. This structure was identified quite early on in the development process and has been referred to internally as a "Platform and Pillar" model from both the curriculum development and delivery perspectives. (Note that for the final Urban Systems program, the final distribution was 30% common platform and 70% sector-specific technical content).

1. Appointment of program Champions
  - Prof. Stephanie Chang, School of Community and Regional Planning
  - Prof. Thomas Froese, Department of Civil Engineering
2. Discussions with advisory committee
3. Refinement of proposition, program design and pricing
4. Definition of operating model / formation of any partnerships
5. Financial modelling
6. Funding application
7. Planning for course (re)design (CTLT)

8. Development of project plan
9. Presentation to Faculty council, Senate, Board, Ministry – and plan refinement as needed
10. Full program design in place
11. Approval from Senate, Board, and Ministry

### **2.6.3. Implementation**

In parallel with the approval process, implementation and launch of the new professional programs will require a significant effort well in advance of the commencement of the programs for the first cohort, which is anticipated for January 2016. Key activities are summarized here:

1. Development of course materials and flexible learning (FL) delivery / co-op modules
2. Development and launch of multi-touch marketing efforts (ideally at least 1 year in advance)
3. Set up in central systems (Enrolment Services, UBC IT)
4. Evaluation of applications (ideally application deadline 7 months in advance) and submission of accepted applications to Department and APSC Dean's Office for approval
5. Program ready to launch with inaugural group of students

### **2.6.4. Program Management**

Due to the intensive nature of the proposed programs and the expected audience, which would be primarily early-career professionals, these programs will require dedicated resources within the Faculty to maintain high-quality, responsive service for administrative details surrounding their delivery (e.g. registration issues, scheduling details, facilitation of workshop activities, co-op placements, coordination of interdisciplinary capstone projects, etc.). Additionally, it is anticipated that there will be support for maintaining continuous program improvement, sufficient marketing efforts, ongoing development of community partners and stakeholder participants, and so on. The budget for these programs includes provisioning for the necessary staff, to be located in the Faculty, to ensure the ongoing support for the activities itemized below, which are regarded as necessary to deliver and maintain a program of the highest caliber:

1. Continuous feedback loop to improve delivery and learning outcomes
2. Refreshment of marketing materials, with relationships / channels fostered ongoing
3. Exploration / implementation of any content repurposing opportunities
4. Tracking of student success rates
5. Financial / operational management
6. Ongoing evolution of program to achieve learning, access, reputational and financial objectives



## 2.7. Relationship to Established Programs

### 2.7.1. The University of British Columbia

Many of the advanced topics that will be covered under the program are already available through programs in the involved departments and schools of APSC at UBC, but the program will synthesize this material and offer a more interdisciplinary approach.

The Master of Engineering Leadership (M.E.L.) program in Urban Systems is unique in British Columbia and distinct from similar programs in Canada and internationally. In the M.E.L. in Urban Systems, engineering and urban planning are integrated, content is relevant to the urban systems industry, and technical skills are developed along with management and leadership skills. The M.E.L. in Urban Systems is not envisioned to be an accredited degree program. These features distinguish the M.E.L. in Urban Systems from UBC's M.Eng. and Master of Community and Regional Planning (M.C.R.P.) programs, which do not feature this integration (the M.C.R.P. program is accredited by professional bodies in planning).

Existing professional programs include:

#### Master of Engineering (M.Eng.)

Faculty of Applied Science, Engineering

The Master of Engineering is a non-thesis, course-based program designed for students who would like to further their education without pursuing research, or individuals who wish to advance their careers with enhanced technical knowledge. It normally takes 12-16 months to complete 30 credits. Students register for the M.Eng. at the Faculty level but generally complete courses within a specific department, and may take a collection of related courses that would be considered a 'specialization', although the degree is somewhat generic in that it is simply granted as a M.Eng. in a specific department in most cases. The admission to the M.Eng. is not cohort-based, and the entry point may be either September or January. If there is a demonstrated demand to continue offering the M.Eng. in addition to the M.E.L. programs, then it is within each individual department's discretion to do so.

#### Master of Community and Regional Planning (M.C.R.P.)

Faculty of Applied Science, School of Community and Regional Planning

Recently approved by the Ministry, the first cohort of this new professional program is planned for September 2015. This program will be accredited by planning accreditation bodies in the U.S. and Canada. It is a two-year, 48- credit program for applicants with a background in planning and community planning or related areas. Proficiency can be demonstrated through work experience and not necessarily through a bachelor's in the discipline.

#### Master of Urban Design (M.U.D.)

Faculty of Applied Science, School of Architecture and Landscape Architecture

This program admitted the first cohort in September 2014 for applicants with a background in architecture, landscape architecture or planning that wish to pursue advanced curriculum that synthesizes urban design theory and practice. It is a 36-credit program that is normally completed in 16 months.

### **2.7.2. Other British Columbian, Canadian, and International Universities**

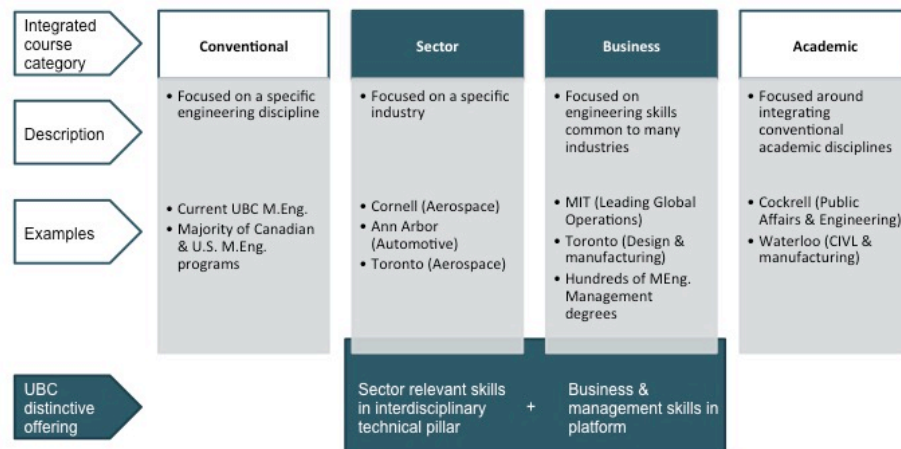
Some programs in Urban Studies exist in B.C., however, none of these are geared toward professionals with technical background and an interest in engineering, planning, and leadership in relation to urban systems. At SFU, the Urban Studies master's program is Arts-based; it has no engineering content and no courses that are planning-focused. Similarly, there is an M.A. in Urban Studies offered at UBC-O that is Arts-based and is a research degree.

A small number of other related programs have also been emerging in other parts of Canada and internationally. In 2013, the University of Toronto (U of T) initiated a 16-month Master of Engineering program in Cities Engineering and Management (MEngCEM), offered by the Civil Engineering department. Like the M.E.L. in Urban Systems, it seeks to provide technical expertise and cross-disciplinary understanding of complex urban issues. The proposed M.E.L. in Urban Systems differs from the U of T program, however, in providing a much stronger interdisciplinary basis (through co-hosting by SCARP and a broader range of electives) and in integrating a substantial Professional Management Platform. In the U of T program, management is covered only through a single elective course.

In the U.S., the New York University (NYU) Polytechnic School of Engineering offers a Master of Science in Urban Systems Engineering and Management. It is primarily an engineering program with minimal planning or management content, and it requires a capstone case study or thesis. The University of Washington's Department of Urban Design and Planning offers a Master of Infrastructure Planning and Management. This is an accredited planning degree with minimal engineering content, and is offered only online. Other universities (e.g., University of Southern California, New Jersey Institute of Technology) offer master's degrees with specialization in infrastructure planning that, similarly, lack the engineering and management content of the M.E.L. in Urban Systems. The Massachusetts Institute of Technology (MIT) offers an interdepartmental Master of Science in Transportation, which requires a thesis and does not have a management emphasis.

In Europe, the IGLUS (Innovative Governance of Large Urban Systems) initiative offers an Executive Master's program that is geared toward high-level managers and features global field cases. Université de Technologie Compiègne offers an Urban Systems Engineering degree that is a 5-year French engineering degree (similar to a master's).

Figure 5 Assessment of Categories of Professional Engineering Master's Programs



Source: US News, Top school websites (MIT, Stanford, Berkeley, CalTech, Carnegie Mellon, Georgia Tech, Urbana-Champaign, Purdue, Ann Arbor, Cockrell, Toronto, Waterloo), team

### 2.7.3. Level of support and recognition from other post-secondary institutions

As a new program, support and recognition from other post-secondary institutions is limited. However, it is anticipated that participation from faculty members outside of UBC delivering content in the program will promote further support from institutions that offer traditional graduate programs in urban system both nationally and internationally. Given UBC's history of expertise in urban systems and the fact that UBC's engineering programs have been ranked second in the nation and among the top 50 worldwide (*Times Higher Education*), it is expected that other post-secondary institutions both in Canada and abroad will recognize and support this program.

### 2.8. Demand for Program

The demand for the suite of APSC professional master's programs comes from multiple sides. British Columbia and Canada need the proposed programs for the success of the provincial and federal Pillar industries to stay competitive with international markets. Given UBC's location, the research of current faculty, and the recent achievements of UBC undergraduate students in the Pillar areas, it is appropriate that UBC be the institution to implement graduate-level programs that are lacking in Canada and are now more important than ever. External marketing research (see section 2.3.2 above), including consultation with urban systems sector representatives from local governments, utilities, and consulting engineering firms, indicated that there is strong demand for the unique training that would be offered by the M.E.L. in Urban Systems. The complexity of urban systems span the gamut of spatial, geographical, functional, infrastructural, cultural, business and social dimensions; solutions to key urban challenges must, therefore, be solved by professionals who are versed in both the engineering and other technical disciplines (urban planning,

architecture) as well as having the managerial competence required to work within teams.

### **2.8.1. Enrolment Predictions and Capacity**

Significant demand is anticipated for the new programs. The desirability of an educational experience that can lead to rapid career progress upon graduation is reflected in the interest we have seen in existing professional master's programs. In the market research for Urban Systems, for example, sector representatives observed that professionals typically take about 15 years on the job to develop the integrated, systems-oriented perspectives that the M.E.L. in Urban Systems will foster; hence, a graduate of the program could look forward to accelerated progress in his or her career in the sector.

To maintain a vibrant learning environment and admit the best and brightest applicants, however, the cohort size will be purposely limited. The minimum initial cohort is anticipated to be 20 students increasing to 41 by 2020.

### **2.8.2. Tuition Rationale**

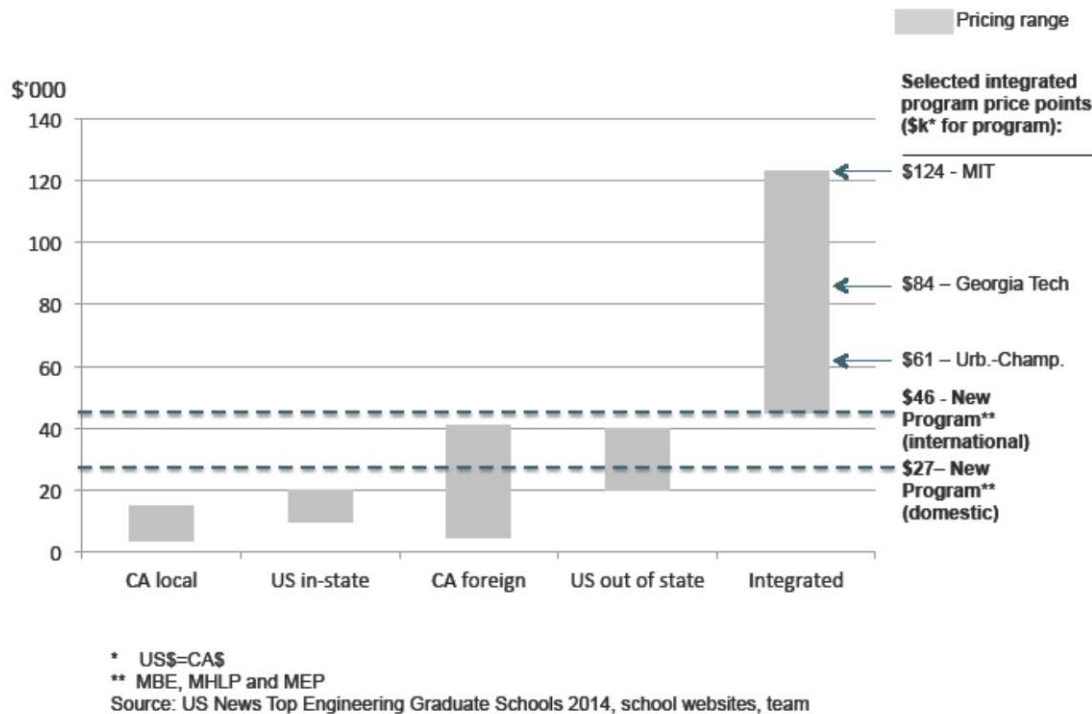
The program falls under the APSC "Guidelines for Professional Programs" (August 31, 2012) which stipulates that new professional programs in the Faculty, as of January 2009, must generate revenue to cover a range of expenses including equipment, facilities and salaries of faculty and staff involved in course delivery and administration. The primary source of revenue for these programs is through the tuition flow-back from the University to the Faculty and unit delivering the program.

The starting tuition level requested for the program is \$27,000 CAD for the one-year program for Canadian citizens and Permanent Residents and \$46,000 CAD for the one-year program for international students requiring a Study Permit. Tuition is paid in three equal installments per year, normally in January, May and September. The student is required to pay a minimum of three installments of tuition in order to graduate, but if the program is extended by permission of the program Director, the student pays tuition installments until the program requirements are met. For domestic students, the continuing fee and the extension fee are set by the University. No part-time studies are allowed. Currently, tuition increases by 2% each year.

We are confident that the program can attract students to pay the proposed tuition for the following reasons:

1. Vancouver is an acknowledged centre for the Urban Systems Pillar area
2. A one-year program fits into the lifestyle framework for most of our potential students
3. The program will draw from an international pool of students
4. The tuition has been researched to be positioned in the lower cost bracket compared to programs at institutions such as MIT and Georgia Tech

Figure 6 Comparison of Tuition within Canada and the United States



### 2.8.3. Scholarships

We are concerned about getting the right students for the program and recognize that the tuition assessment may be prohibitive for some outstanding applicants. As a consequence, we intend to go to stakeholders in each sector seeking named scholarships. We have set aside 7.5 percent of the tuition revenue for financial need.

### 2.8.4. Potential Sectors of Employment for Graduates

Graduates of the program will have developed those skills and practices that stakeholders value most highly in experienced APSC professionals. They will be creative and visionary to see the potential to use the knowledge and training from the program effectively in their employment choices. Government and the private sector are hungry for experts to develop new processes and systems to explore and implement positive changes in their chosen area. Graduates can expect to find careers locally, nationally, and internationally.

### 2.8.5. Opportunities for Further Study

The professional master's degree at UBC is generally not recommended for students who wish to continue on to a Ph.D., and the proposed program will conform to this. As such, it is anticipated that most or all of the graduating students will go on to or return to work in their chosen sector. It is possible, however, that a small number of students will continue to Ph.D.-level study at UBC or elsewhere.

### 3. Program Description and Specifications

#### 3.1. Admission Requirements

Applicants must hold an undergraduate credential in Civil Engineering, Urban Planning or related discipline, 3 years of relevant experience (such as employment related to urban systems) and competence in quantitative methods. Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the M.E.L. in Urban Systems are:

- TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 81
- PTE (Pearson Test of English - Academic): minimum overall score of 59
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 60

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website. The graduate program office in an area of specialization is responsible for collection and assessment of application documents.

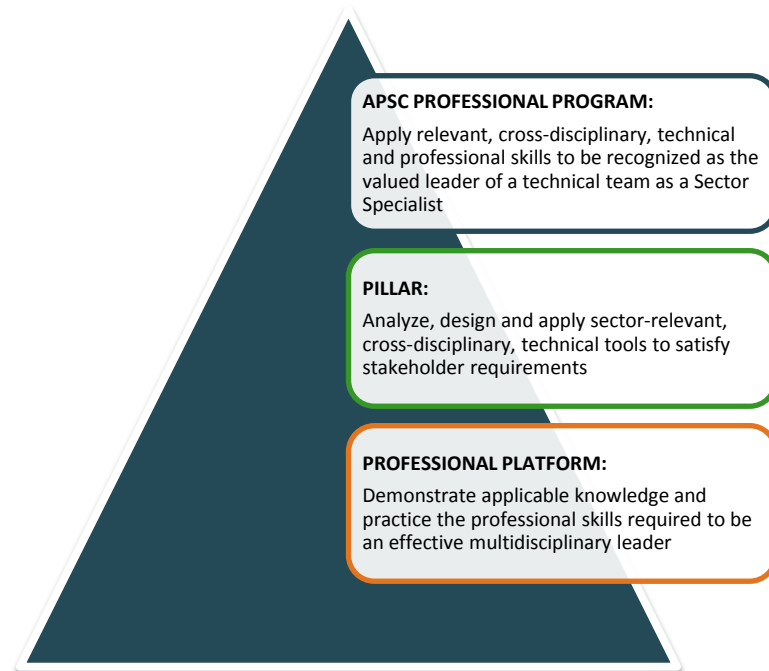
### **3.2. Program and Pillar Requirements**

The program requires a minimum of 30 credits of coursework. The distribution will be 9 credits dedicated to the platform and 21 credits dedicated to the Pillar. Both the Platform and the Pillar have prescribed core courses. In general, where a program has a provision for elective choices, master's programs in the Faculty will allow a maximum of 6 credits of 300- or 400-level undergraduate coursework and 6 credits of 500-level directed studies. The program includes 6 credits of constrained electives that will be drawn from courses in School of Community and Regional Planning (SCARP), the Department of Civil Engineering (CIVL), and other relevant programs. The permissible electives will be submitted to the host units' (SCARP and CIVL) curriculum committees and will be listed on the program web site. Example electives are listed in Section 3.4 (Overview of Pillar), below. The program will be delivered as an intensive one-year program. It is anticipated that this will be favorable to post-professional students already in the workplace.

The program courses will involve a combination of classroom learning and integrated hands-on training. The APSC Professional Management Platform comprises 9 credits, or 30%, of the program, and provides the professional skills required for an experienced graduate to be an effective technical manager. Advanced technical courses in the Urban Systems Pillar comprise 21 credits, or 70%, of the program. The students will move through the program as a cohort, to build a community of learners, to challenge assumptions and to support each other's achievement of the program goals. We will adopt a 'hybrid' – flexible delivery model. The learning experiences will include face to face and online learning elements and scheduling will be refined with input from sector experts and the target population of students.

There are seven proposed Pillars leading to the degree of Master of Engineering Leadership at the UBC Vancouver campus (see Appendix 5 for prospective program curriculum). The Master of Health Leadership and Policy in Seniors Care at the UBC will also utilize this Platform. These programs are distinct and each will be reviewed separately, but as all APSC Professional Programs are conceptualized as sharing a common goal of graduating students with enhanced disciplinary knowledge and business skills, the proposed array of programs is listed in Appendix 5 for information only.

Figure 7 Learning Objectives Relevant to the Three Levels of the Program



### 3.3. Platform Structure utilized by the Urban Systems Program

#### 3.3.1. Leadership & Sustainability (4.5 credits total)

APPP 501 (1.5) Project Management and Leadership

APPP 502 (1.5) Sustainability and Leadership

APPP 503 (1.5) Organizational Leadership

#### *Learning Outcomes*

1. Lead multi-disciplinary teams to effectively deliver sustainable projects
2. Articulate ideas, progress and outcomes through oral and written communications
3. Plan & deliver multidisciplinary projects
4. Identify and apply sustainability concepts to influence the triple bottom-line
5. Apply leadership principles to organizational and social change

#### *Content*

1. Project management
2. Organizational behaviour and structure
3. Sustainability, ethics and policy
4. Personal and professional leadership effectiveness & communications
5. Application of concepts to trans-disciplinary challenges in organizational and social change
6. Fully integrated into technical streams through sector-relevant projects



### **3.3.2. Business Foundations (3 credits)**

#### **APPP 504 (3) Business Acumen for Technical Leaders**

##### *Learning Outcomes*

1. Gain broad knowledge of the structure and mechanics of business.
2. How to use data for decision-making
3. Articulate ideas, progress and outcomes through oral and written communication
4. Practical level of understanding in specific aspects of managerial accounting, strategy and performance, market evaluation, operations management, negotiations and contract management and business-case building and valuation

##### *Content*

1. Managerial accounting
2. Strategy and performance
3. Market evaluation
4. Operations management
5. Negotiations and contract management
6. Business-case building and evaluation
7. Communication skills

### **3.3.3. Faculty of Commerce and Business Administration Electives (Select 1.5 credits total)**

##### *Learning Outcomes*

1. Gain exposure to non-technical issues and skills that impacts business and management

##### *Content (examples of Faculty of Commerce and Business Administration electives, credit values range from 0.7-1.5)*

1. BAEN 542 (0.8) Prototyping
2. BAEN 543 (0.7) Disruption
3. BAEN 544 (0.8) Pitching Your Idea
4. BAEN 545 (0.7) Qualitative Models
5. BAEN 546 (0.8) Social Entrepreneurship
6. BAEN 547 (0.7) Innovation and Sustainability
7. BAFI 540 (0.8) Finance
8. BAMA 540 (0.8) Marketing Fundamentals
9. BAMA 541 (0.8) Product Service Management
10. BASC 540 (0.7) Operations Fundamentals
11. BAEN 550 (1.5) Fundamentals in Entrepreneurship
12. BAPA 501 (1.5) Government and Business
13. BAPA 510 (1.5) Public Policy and the Environment
14. BASD 501 (1.5) Corporate Social Responsibility
15. BASD 505 (1.5) Environmental Economics, Management, and Technology
16. BASM 501 (1.5) Business Strategy
17. BAHHR 505 (1.5) Leadership
18. BAHHR 507 (1.5) Two-Party Negotiations

### 3.3.4. Professional Development

Provide support to candidates who wish to broaden their knowledge

1. Communication Assessment & Support
2. Integrated Sector-specific Experience (Graduate Co-operative Education Program)
3. Employer or Mandatory Sector-specific Project
4. e@UBC Lean Launchpad
5. MITACS Step Business Skills
6. APSC Toastmasters
7. Continuing Studies (PM)
8. APSC Professional Development Workshops
9. English Language Proficiency & Support
10. Data Visualization (VIVA)
11. International Student Support
12. Professional Development Employment Centre (PDEC)

Figure 8 Summary of PDEC Resources



### 3.4 Overview of Pillar for M.E.L. in Urban Systems

#### Value Chain



The Urban Systems Pillar provides an integrated perspective on the infrastructure systems that provide essential services to cities and regions – services such as energy, water, sanitation, transportation, telecommunications and aspects of healthcare delivery. It provides students with an understanding of the breadth and complexity of urban systems problems and innovative solutions, from the societal context and role of urban planning to engineering design and implementation. Within Urban Systems, students will focus on a particular focus area such as Infrastructure Management.

The Urban Systems Pillar consists of a fairly compact set of core courses (URSY 510, URST 520, and URSY 530) and additional courses that are specific to focus areas within the Pillar. Only the Infrastructure Management focus area has been specified in this proposal; its additional courses consist of URSY 540 and URSY 550. Additional focus areas (e.g., transportation) are expected to be proposed in the future.

### ***Learning Outcomes***

1. Identify major ways in which urban systems provision and performance affect society, including linkages to environment, health, quality of life, and economy
2. Describe how urban planning (e.g., land-use planning) and urban systems are related
3. Illustrate the implications of systems thinking, sustainability and resiliency considerations, and risk issues to design and operation of infrastructure.
4. Model and analyze large scale infrastructure projects from multiple perspectives to support strategic-level decision-making.
5. Apply principles of engineering economics to the modeling, valuation, and analysis of infrastructure projects.
6. Summarize major asset management practices that are important to different types of engineering works. Identify and classify asset management practices within a variety of organizations.
7. Describe innovative approaches to the provision of urban infrastructure services and how they address challenges of sustainability and resilience

	<b>Credits</b>
<b>Winter Session – Term 2 (January – April)</b>	
URSY 510	3
URSY 520	3
URSY 540	3
APPP 501	1.5
APPP 502	1.5
<b>Summer Session – Term 1 (May – June); Term 2 (July – August)</b>	
APSC 412 (co-op placement) or an entrepreneurial experience (12 weeks)	6*
APPP 503	1.5
APPP 504	3
<b>Winter Session – Term 1 (September – December)</b>	

URSY 530	3
URSY 550	3
Electives (Faculty of Commerce and Business Administration)	1.5
Electives constrained	6
<b>TOTAL CREDITS</b>	<b>30*</b>

\*Note: APSC 412 has a credit value of 6. Students choosing this option should note that these credits are non-additive, meaning they are not counted toward the 30 required program credits. The entrepreneurial experience options also do not have credits that count toward the required program credits. The choice of APSC 412 or an entrepreneurial experience will take place over a 12-week period. APPP 503 and APPP 504 will be offered in an intense 4-week version before and after the APSC 412 or entrepreneurial experience. Students will choose their schedule with the approval of the M.E.L. U.R.Y.S. graduate program office

Constrained electives (6).

The program includes 6 credits of constrained electives that will be drawn from courses in School of Community and Regional Planning (SCARP), the Department of Civil Engineering (CIVL), and other relevant programs. The permissible electives will be submitted to the host units' (SCARP and CIVL) curriculum committees and will be listed on the program web site. Examples of potential electives include: CIVL 525 (information systems development), ENGR 505 (social cost benefit analysis for engineering projects), ENGR 536 (sustainable land use and transportation), ENGR 549 (environmental risk analysis), PLAN 548M (strategic planning), PLAN 579 (health and built environment), PLAN 597 (planning for water resources). This selected list is for illustrative purposes only and is not complete.

### Figure 9 Course Credits Distribution

## MASTER OF ENGINEERING LEADERSHIP IN URBAN SYSTEMS

APPP 501 (1.5)	APPP 503 (1.5)	APPP 504 (3)	URSY 540 (3)	URSY 510 (3)	URSY 520 (3)	URSY 530 (3)	URSY 550 (3)	ELECTIVE (3)	ELECTIVE (3)
APPP 502 (1.5)	Sauder Elective (1.5)								
PLATFORM (9 CREDITS)									
Total Credit Load for MEL in IN URBAN SYSTEMS is 30 Credits									

### **3.5. Supervision and Evaluation**

Unlike the graduate-level research programs at UBC, a student in the program will not be assigned a single, dedicated supervisor, but will rather be supervised day-to-day in their work by the Pillar Directors and the APSC Professional Program Office. Coursework is evaluated through mini-projects, exams, homework assignments and in-class quizzes. For Pillars having a capstone project as a core component, supervision and evaluation will be provided by a professor and by sector-specific adjuncts, while a Co-operative Education placement will be supervised mainly by the sponsoring company, and given a final mark by a UBC faculty member involved in the professional program based on the company's report and the student's final report and presentation. Expectations of students will be formalized through individual course syllabi.

### **3.6. Policies on Program Management and Assessment**

The program will be administered under APSC. In delivering this new responsive model program it is essential that the Dean's Office, APSC Professional Program Office and Graduate Program Offices responsible for the Pillars collaborate and co-operate in an intimate fashion. The student should have access to all services and needs from within the same Faculty to ensure timely and comprehensive service of their academic and non-academic activities.

In parallel to internal reviews used to evaluate professional degrees conducted according to the APSC and UBC governance guidelines, the program will be evaluated and developed based on the recommendations of an Advisory Committee. This expert panel of outside professionals and academics will meet once per term. Committee membership will be approved by the Dean of APSC.

## **4. Calendar Statement - Program**

[Removed from this document and attached separately for purposes of Curriculum.]

## **5. Program Resources**

### **5.1. Program Funding and Budget**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020. This enrolment is not expected to have any impact on enrolment in existing related programs (i.e., M.Eng in Civil Engineering and M.C.R.P.).

As this program is unique, and is directed at a sector where there is identified unmet need, impact on enrolment from existing programs or on opportunities for existing students is expected to be small.

## 5.2. Qualified Faculty

Courses will be taught by a combination of faculty from all departments and schools in APSC and also from other faculties at UBC; Visiting Professors, sector-specific adjuncts and guest lecturers will be involved.

## 5.3. Pillar Champions or Directors

Each Pillar has a 'Champion', or in some cases more than one champion, who was instrumental in establishing the value proposition for the Pillar and also in the design of the curriculum. It is expected that these individuals will continue to have an instrumental role in the administration and oversight of the Pillar upon program launch, and may become Program Directors (see 5.5).

## 5.4. Library Resources

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support and the Platform courses requiring new resources will be funded by the APSC Dean's Office (see Appendix 2 & 3 and Appendix 7 Platform Proposal).

## 5.5. Administration

- **Program Directors**

The Directors for each Pillar will be appointed by the Dean of APSC. The Director will lead the implementation of the program and oversee its evolution, growth and position within APSC. As well as assuming teaching and research commitments, the program Director will represent the program on university committees. The Director will also be expected to lead the community outreach component of the program to secure co-op opportunities. The Director will take an active role in developing the necessary community and stakeholder linkages to establish a long-term and wide range of co-op placements. The Director will become the principal point of contact for community and stakeholder partners. The Director will report to the Head of the lead department or school as appointed by the Dean of APSC.

- **Program Manager**

It is expected that the suite of professional programs will be managed on a day-to-day basis by one or more centrally located program managers. This program manager would assist in: student recruitment, student enquiries, website development and maintenance, applications and admissions, timetabling, classroom scheduling, extra-curricular events and workshops, and addressing registration inquiries or issues. Support for admissions and records will also be provided by the APSC Dean's Office.

## 5.6. Space Requirements

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

### 5.7. Consultations with University Units

Consultation requests were sent to the following (see Appendix 4):

1. Faculty of Applied Science, School of Regional & Community Planning (2 responses)
2. Faculty of Forestry
3. Faculty of Land and Food Systems
4. UBC Sustainability Initiative
5. Faculty of Commerce and Business Administration
6. Faculty of Science

### 5.8. Contact Information

**Contact Person:**

University of British Columbia, Faculty of Applied Science, Dean's Office  
Elizabeth Croft, Associate Dean, Education & Professional Development  
[elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca) 604-822-6614

## 6 Appendices Accompanying Pillar Proposals

[Removed for purposes of Curriculum; may be requested.]

**UBC Curriculum Proposal Form****Category: (1)**

<b>Faculty:</b> Faculty of Applied Science (APSC) <b>Schools:</b> <b>Faculty Approval Date:</b> December 5, 2014 <b>Effective Session:</b> 2015 Winter, Term 2 <b>Year:</b> 2015-2016	<b>Date:</b> December 19, 2014 <b>Contact Person(s):</b> Faculty of Applied Science Dean's Office <b>Deborah Feduik</b> (Manager, M.Eng & Graduate Programs) Tel: 604-822-8386 Email: <a href="mailto:gradprog@apsc.ubc.ca">gradprog@apsc.ubc.ca</a> M.Eng
<p><b>Proposed Calendar Entry:</b></p> <p><b>Master of Engineering Leadership in Urban Systems</b></p> <p><b>Program Overview</b></p> <p>The Master of Engineering Leadership (M.E.L.) in Urban Systems is a program within the Faculty of Applied Science.</p> <p>Urban systems provide the technical infrastructure that underpin modern urban society—transportation, water, waste handling, power, data, etc. The M.E.L. in Urban Systems program trains students to fill leadership roles in the planning, design, construction, operation, and overall management of these critical systems.</p> <p><b>Admission Requirements</b></p> <p>Applicants must hold an undergraduate credential in Civil Engineering, Urban Planning or related discipline, 3 years of relevant experience (such as employment related to urban systems) and competence in quantitative methods. Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director.</p> <p>The minimum admission requirement for students with degrees from North American</p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,195,0,0">http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,195,0,0</a></p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new program.</p> <p><b>Rationale:</b></p> <p>The creation of this program has been driven, in part, by strong interest from the external community (whereby British Columbia will see a high level of activity over the next few decades), in part by a desire to collaborate between the Departments and Schools in the Faculty of Applied Science and in part to raise UBC's profile and to attract students (both within Canada and abroad), and to collaborate internationally.</p> <p>The Urban Systems Pillar brings together the strengths of units within Applied Science (primarily the Dept. of Civil Engineering and the School of Community and Regional Planning, but also potentially other units such as Electrical and Computer Engineering and UBC-Okanagan). It draws on the capabilities of these units to provide an innovative new program to meet the demand in the urban systems sector for professionals with not only technical expertise but also leadership skills and an understanding of societal context, urban planning, and innovative approaches.</p>



institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the M.E.L. in Urban Systems are:

- TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 81
- PTE (Pearson Test of English - Academic): minimum overall score of 59
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 60

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other

significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website. The graduate program office in an area of Specialization is responsible for collection and assessment of application documents.

### **Transfer Credit**

1. Graduate students who have earned credits outside their current master's program (e.g., from a different university, in a different UBC master's program, as an undergraduate, or as an unclassified student) may transfer up to 12 credits or up to 40% of the total number of credits needed for completion of their current program (whichever is more), provided that:

- the courses were not used to satisfy the requirements of another credential;
- the courses were not used as a basis for admission to the graduate degree program;
- at least a B standing (UBC 74%) was obtained in courses considered for transfer;
- the courses considered for transfer credit have been taken within five years of commencement of the current degree program.

2. No more than 6 credits of transfer credit may be at the undergraduate level (300-/400-level).

3. The 12-credit (40%) restriction applies to students in UBC-approved Exchange Agreements established by the UBC Go Global Office.

4. Requests for transfer credit must be accompanied by a letter from the home graduate program addressed to the Dean of the Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis.

Courses taken as a UBC Access Studies (or non-degree) student may be approved for transfer toward a graduate program (in accordance with transfer credit regulations specified above) with the permission of the graduate program and the Dean of Applied Science.

### **Program Requirements**

Degree completion requires completion of 30 credits. This includes 21 credits of Pillar courses, including 6 credits of constrained electives, and 9 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master's programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the M.E.L. in Urban Systems graduate program office. Students in the M.E.L. in Urban Systems will choose in their second term between a Co-operative Education Placement (APSC 412; the credits are non-additive in that they are not counted toward the 30 required program credits) or an entrepreneurial experience. A complete list of the courses required for successful completion is available on the M.E.L. in Urban Systems program website <insert link>.

### **Financial Assistance**

Financial assistance based on academic merit

<p>and financial need may be available.</p> <p>Students should consult the M.E.L. in Urban Systems program website for more information.</p> <p><b>Contact Information</b></p> <p>Faculty of Applied Science Dean's Office 5000-2332 Main Mall Vancouver, BC V6T Email: <a href="mailto:gradprog@apsc.ubc.ca">gradprog@apsc.ubc.ca</a> <a href="http://www.apsc.ubc.ca">www.apsc.ubc.ca</a></p>	
<p><b>Proposed Calendar Entry:</b></p> <p><b>URSY – Urban Systems</b></p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code</a></p> <p><b>Present Calendar Entry:</b> n/a</p> <p><b>Type of Action:</b> Create new course code</p> <p><b>Rationale for Proposed Change:</b> This new course code is being created to identify the new courses within the Master of Engineering Leadership (M.E.L.) Pillar in Urban Systems.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>URSY 510 (3) Urban Systems and Society</b></p> <p>Urban systems in society and economy; spatial issues; equity and social justice. Governance, policy, regulation. Globalization and international development; implications for urban systems. Urban and regional economics; infrastructure financing. Urban systems and technology; tradeoffs; socio-economic-technical systems; emerging and green technologies. <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b> This is a core course within the Master of Engineering Leadership (M.E.L.) in Urban Systems program. This course will be taken in the first term of the program. The course is designed to cover a wide range of issues that provide the societal context for the design and</p>

	<p>management of urban systems. This context is foundational for the Urban Systems program, and is not taught in undergraduate technical degree programs (e.g., in engineering bachelor's degrees). While this content does exist in a variety of courses at UBC, the program requires a single course that allows exposure to a variety of related issues that will be addressed in the M.E.L. Urban Systems program.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of URSY 510 in the M.E.L. in Urban Systems Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>URSY 520 (3) Urban Systems Planning</b></p> <p>Planning for engineers. Demand-side planning: population and demand modeling; demand management. Supply-side planning: long term planning, strategic planning. Data, metrics, indicators and assessment.</p> <p><i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b> This is a core course within the Master of Engineering Leadership (M.E.L.) in Urban Systems program. This course will be taken in the first term of the program. This course aims to provide students with an understanding of the fundamentals of urban and regional planning (including scope, tools, and profession) and how they relate to urban systems design and management, with emphasis on planning in the context of Canada and the United States.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of URSY 520 in the M.E.L. in Urban Systems Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before</p>

	delivery.
<p><b>Proposed Calendar Entry:</b></p> <p><b>URSY 530 (3) Urban Systems Engineering</b></p> <p>Technical infrastructure systems that support communities: water; waste and storm water; solid waste; transportation; energy and data. Systems' services and demands; technical alternatives; distribution systems; modeling, design, construction, operations and maintenance issues.</p> <p><i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b> This is a core course within the Master of Engineering Leadership (M.E.L.) in Urban Systems program. This course will be taken in the final term of the program. This course ensures that all students are familiar with the full range of technical infrastructure systems that make up urban environments, and understand the interdependencies involved in their design and management. It will provide a survey of the systems including water distribution, wastewater and stormwater, solid waste, transportation, energy and data.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of URSY 530 in the M.E.L. in Urban Systems Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>URSY 540 (3) Urban Systems Project Delivery and Economics</b></p> <p>Stakeholder practices: stakeholder engagement, public consultation, partnerships, stakeholder management, buy-in. Project delivery: project delivery options, public-private partnerships (P3), integrated project delivery (IPD), partnering. Modeling, analytical methods, and decision support:</p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b> This is a core course within the Master of Engineering Leadership (M.E.L.) in Urban Systems program. This course will be taken in</p>

<p>economic and risk modeling.  <i>This course is not eligible for Credit/D/Fail grading.</i></p> <p><i>Co-requisite: STAT251 or equivalent course in elementary statistics, CIVL403 or equivalent course in Engineering Economics</i></p>	<p>the first term of the program. This course contributes to the infrastructure management focus area and covers advanced economic and risk modeling and detailed understanding of project delivery alternatives.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of URSY 540 in the M.E.L. in Urban Systems Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>URSY 550 (3) Infrastructure Asset Management</b></p> <p>General frameworks for infrastructure management, system-specific asset management (road conditions, pipe inspection), maintenance and renewal. Data, metrics, indicators and assessment: data sources, performance indicators, assessment, assessing condition and sustainability, multi-objective, multi-criteria decision making, performance prediction, lifecycle cost analysis (LCA), sustainability.</p> <p><i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b>  This is a core course within the Master of Engineering Leadership (M.E.L.) in Urban Systems program. This course will be taken in the final term of the program. This course contributes to the infrastructure management focus area and covers the field of asset management for urban systems.</p> <p>This course addresses topics and practices that relate to the operations phase of infrastructure systems, which are a significant component of the professional responsibilities associated with infrastructure, but are rarely addressed in undergraduate engineering programs.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of URSY 550 in the M.E.L. in Urban Systems Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before</p>

	delivery.
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18 March 2015

To: Vancouver Senate

From: Senate Curriculum & Admissions Committees

Re: Master of Health Leadership and Policy in Seniors Care (approval)

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The Senate Curriculum and Admissions Committees have reviewed the material forwarded to them by the Faculty of Applied Science and enclose those proposals they deem ready for approval.

The following is recommended to Senate:

**Motion:** *“That the new Master of Health Leadership and Policy (M.H.L.P.) in Seniors Care program and its associated new courses be approved.”*

Respectfully submitted,

Dr Peter Marshall, Chair, Senate Curriculum Committee  
Dr Robert Sparks, Chair, Senate Admissions Committee



**FACULTY OF APPLIED SCIENCE**

*New program and courses*

Master of Health Leadership and Policy in Seniors Care; NURS 542 (3) Social  
Epidemiology: Special Populations; NURS 576 (3) Topics in Social and Environmental  
Planning to Foster Health of Populations



**a place of mind**  
THE UNIVERSITY OF BRITISH COLUMBIA

**Provost and Vice President Academic**  
Walter C. Koerner Library  
1958 Main Mall  
Vancouver, BC Canada V6T 1Z2

Phone 604 822 4948  
Fax 604 822 3134

**Memo**

**To:** Paul Harrison, Chair, Senate Academic Policy Committee

**From:** David Farrar, Provost and Vice-President Academic

A handwritten signature in black ink, appearing to read 'DAF', followed by a horizontal line.

**Date:** January 15, 2015

**Re:** **Administration of Master of Engineering Leadership Programs**

The Dean of the Faculty of Applied Science has requested that the proposed new graduate professional programs be officially designated as professional programs and that they be administered by the Faculty of Applied Science rather than by the Faculty of Graduate and Postdoctoral Studies.

The proposed programs are:

- Master of Engineering Leadership in Advanced Materials Manufacturing
  - Master of Engineering Leadership in Clean Energy Engineering
  - Master of Engineering Leadership in Dependable Software Systems
  - Master of Engineering Leadership in Green Bio-Products
  - Master of Engineering Leadership in Integrated Water Management
  - Master of Engineering Leadership in Naval Architecture and Marine Engineering
  - Master of Engineering Leadership in Urban Systems
  - Master of Health Leadership in Seniors Care
1. I am satisfied that these programs meet the criteria for designation as professional graduate programs.
  2. For the reasons outlined below, I support these programs being administered by the Faculty of Applied Science
    - a) All criteria laid out "Optional Transfer of Professional Graduate Programs from the Faculty of Graduate and Postdoctoral Studies to the Disciplinary Faculties" document, approved by Senate in January of 2005, have been met.
    - b) The Faculty of Applied Science has been successfully handling the administration of the Master of Engineering programs for nearly a decade. In that time, the Faculty of Applied Science gained considerable experience in effective graduate program administration. There is a healthy and productive relationship between the Faculty of Graduate and Postdoctoral Studies and Applied Science which all expect to continue.
    - c) The Faculty of Applied Science has the resources, including staff and financial resources, to provide the suite of services the Faculty of Graduate and Postdoctoral Studies provides for most graduate programs including financial support for students, student appeals, and matters relating to admissions and compliance with requirements for degree completion.

- d) This does not set a precedent. Decisions about the administration of future new graduate professional programs will be made in accordance with the guidelines approved by Senate in January, 2005.
- e) I have consulted with Vice-Provost and Dean, Graduate and Postdoctoral Studies, Dr. Susan Porter. She agrees to this request because the M.Eng. Programs are already administered by the Faculty of Applied Science, and the Masters of Engineering Leadership are closely related to the M.Eng. programs.

**EXECUTIVE SUMMARY**  
**MASTER OF HEALTH LEADERSHIP AND POLICY IN SENIORS CARE**  
**FACULTY OF APPLIED SCIENCE**  
**UNIVERSITY OF BRITISH COLUMBIA**  
**FEBRUARY 22, 2015**

**Overview**

The University of British Columbia is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. It creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. One such example of innovation was when UBC introduced the first Canadian university degree program in Nursing in 1919 which led APSC to form the the Department of Nursing and Health in 1924. UBC's entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning. The proposed program is inspired by this history of innovation. The unique combination of learning experiences this program offers will provide students with a comprehensive and innovative education that enables them to build on their disciplinary knowledge and skills and past work experiences. The program will expand students' knowledge of conditions that shape the care of Seniors and conditions that influence Seniors' health and wellbeing. Students in this program will interact with students in other graduate programs as they develop their leadership abilities and their understanding of operations.

Consultation with stakeholders has revealed that healthcare professionals require not only substantive knowledge related to the care of Seniors they also require project management, communication and business skills to be effective leaders. Few, if any, schools in Canada and the United States of America currently offer this combination of skills in a technical master's program

The program is designed to fill a significant and widening gap in the Seniors Care workforce in Canada and internationally. By combining knowledge of the Care of Seniors with knowledge and skills to analyze and refine organizational policies, set and evaluate practice standards and manage operations graduates will be well positioned to provide leadership in the design and delivery of care for Seniors in a range of community and institutional contexts and ultimately enhance the wellbeing of Seniors.

**Credential**

The credential awarded will be the Master of Health Leadership and Policy (M.H.L.P.) in Seniors Care (S.C.). The degree will be a master's degree with a balance between advanced health policy theories, interdisciplinary knowledge and real-world applications. The field of study will be advanced health policy technology and techniques for Seniors Care applications.

**Location**

The Vancouver Campus of UBC is the main location for classroom education and administration. Course instruction and assignments will be achieved through collaborations among UBC, provincial and federal agencies and local private sector stakeholders involved in health policy research and development.

**Faculty Offering Program**

The program will be offered formally, administered and delivered by the Faculty of Applied Science, UBC.

**Program Start Date**

The program will be offered in the 2015/2016 academic year, beginning in January 2016.

**Program Completion Time**

Anticipated time for completion of the program is 1 year of full-time academic study, including any work-term placements and non-academic activities.

**Program Outcomes**

The program will position UBC as a leading institution for continuing education training of current leaders in the Seniors Care field and for the training of tomorrow's leaders.

Graduates of the program will:

- Acquire the critical thinking and practical skills necessary to shape policy and positively influence the social organization of care for Seniors in a range of institutional and community settings
- Benefit from exposure to UBC's research and practice innovations in Seniors Care and engagement with stakeholder connections by offering an attractive hands-on education that allows students to obtain valuable work experience; and acquire knowledge and skills that enable them to participate in developing system level solutions.
- Benefit from a learning environment that fosters interdisciplinary engagement to analyse and propose sustainable solutions to address system level issues in the design and delivery of Seniors Care.
- Have knowledge and skills needed to address the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with Seniors Care practice settings in the Vancouver region.
- Be highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.

**Attributes of Graduates**

Graduates of the M.H.L.P in S.C. program will be able to:

- Understand the socio-political context of Seniors Care.
- Critically analyze trends related to the social epidemiology of aging.
- Critically analyze and propose policies to enhance Seniors Care.
- Develop care strategies.

- Enact Philosophies of care.
- Anticipate and analyze the interface between aging and health.
- Incorporate principles of environmental gerontology.
- Employ conceptual and analytical tools.
- Perform relevant Quality Assurance research and analyze and comply with policy and international best practices.
- Lead organizational operations and maintain quality.
- Manage operations of a Seniors' facility, appraise and correct quality, set and achieve aspirational goals.
- Explicate organizational models of practice that foster ethical, equitable and socially sustainable policies and practices in Seniors Care.
- Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability).
- Use data appropriately for technical and business decision-making.
- Understand the critical components of how business works.

### **Contribution to UBC's Mandate and Strategic Plan**

In *Place and Promise: The UBC Plan*, our vision statement is: "As one of the world's leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world." The program will act as one route to the fulfillment of this promise. With the involvement of faculty from the School of Nursing in the delivery of the Seniors Care pillar who will work in partnership with faculty from Engineering and other Schools in Applied Science and faculty in the Faculty of Commerce and Business Administration to deliver platform courses; the development of new facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored project topics, and fieldwork placements in Seniors Care settings, the program will offer an exceptional learning environment for students and faculty. In addition, the program will attract students from around the world to learn about both public and private models for the delivery of Seniors Care and innovative approaches to providing Seniors Care in a socio-culturally diverse community. Graduates of the program will be in demand.

### **Delivery Methods**

The Faculty of Applied Science (APSC) has taken the lead in developing a conceptual framework for new Professional Programs comprising a common "Platform" that provides the professional skills required for an experienced graduate to be an effective professional leader, with "Pillars" of specialization courses in particular sectors relevant to APSC's educational mission and professional communities (the term Platform refers to foundation coursework focused on project management, data analysis, and leadership skills, while the term Pillar is equivalent to specialization). The School of Nursing has been working to develop a program for inclusion in this suite of offerings. The program will be delivered as an intensive one-year program. It is anticipated that this program will be favourable to post-

professional students already in the workplace. The Platform will be delivered by faculty from APSC and the Faculty of Commerce and Business Administration.

The Pillar courses will be delivered by faculty from the School of Nursing. The M.H.L.P. in S.C. program requires a minimum of 30 credits of coursework. The distribution will be 9 credits dedicated to the Platform to provide the professional skills required for an experienced graduate to be an effective manager in Seniors Care practice contexts and 21 credits dedicated to the Pillar. These courses have a substantive focus on the care of Seniors. Both the Pillar and Platform have prescribed core courses with the latter allowing students to select 1.5 credits from a list of courses in the Faculty of Commerce and Business. The students will move through the program as a cohort, to build a community of learners, to challenge assumptions and to support each other's achievement of the program goals. A 'hybrid' – flexible delivery model will be adopted. The learning experiences will include face to face and online learning elements and scheduling will be refined with input from sector experts and the target population of students. We anticipate that there will be intensive sessions in Summer Session; weekly classes in particular terms and, in addition to fieldwork experiences, there will be a co-op or practicum option available. In keeping with the University's vision for the professional degree programs, in the longer term it is possible that some of the courses may be offered as 'continuing education courses' (i.e., considering aging when working with special populations; supporting seniors and families through decision making processes).

### **Linking Learning Outcomes and Curriculum Design, Optional Work-terms**

The number and variety of courses available to students is purposely limited to ensure a robust and streamlined learning experience that is centered on the program learning outcomes. Each of these outcomes corresponds to at least one of the core courses and summarizes the goal of that course. Work experience is an essential admission requirement to ensure students will be able to capitalize upon the learning experiences and design innovative culminating projects. There is a current and growing need for expertise in this field of practice for services and leadership in both the public and private sectors. The market niche this programme is designed to fill extends beyond a particular site of Seniors Care and is conceptualized to consider the continuum of care for seniors who reflect the diverse social, geographic and demographic profile of BC's citizens. We anticipate graduates will be prepared to shape the vision for Seniors Care policy and develop plans for enacting the vision in different practice contexts.

### **Program Strengths**

The program offers a comprehensive curriculum that is grounded in collaborative community projects embedded in the Platform coursework, and that draws upon the combined expertise of faculty in the participating units. Moreover, the School of Nursing and its faculty have established robust working relationships with other academic units and enact their teaching and conduct their research in interdisciplinary and inter-sector partnerships. The School has strong support from their practice partners for the program concept and these partners (from both public and private sectors and a range of health and other disciplines) have offered to support students' learning.



According to the Organization for Economic Co-operation and Development (OECD) statistics, the number of senior citizens will grow to over 20% of the population in most industrialized nations of Europe and North America by 2040. In Canada alone, it is estimated that seniors will account for 25% of the population by 2036. In British Columbia, nearly 15% of the population 85 and older reside in a care facility, either public or private. Seniors also utilize the health care system more often than other segments of the population. Though they represent 14% of the population, they utilize 45% of all public-sector health spending, account for 40% of acute hospital stays and 82% of home care. Some of the challenges that decision makers will need to focus on include (a) improve integration of care and services to seniors across the health care continuum; (b) increase focus on prevention; (c) treat social supports as an integral aspect of care; (d) adopt an efficient use of technology; and (e) collect, manage, and report accurate information for policy-making.

### **Related Programs at UBC or other BC Post-secondary Institutions**

A selection of courses offered through existing graduate programs will be used for the new program as well as the creation of new courses. There are currently no existing programs at UBC or within British Columbia that offer this program's combination of technical skills (care of Seniors) and advanced leadership training.

- *Graduate Education in Nursing:* In BC, graduate programs in nursing are similar to UBC's M.S.N. degree which emphasizes theory and research as they are applied in different contexts (education, clinical practice). The M.S.N. degree is a prerequisite to Ph.D. education in nursing. Similarly, the UBC School of Nursing, like many of its counterparts in Canada and the United States of America, offers the M.N. – Nurse Practitioner degree. The M.N. program is designed to provide the educational requirements requisite to the Nurse Practitioner credential. Nurse Practitioner programs are offered at three universities in BC including UBC. There is limited overlap between the required courses for the M.S.N. and M.N.-N.P. degrees and the proposed M.H.L.P. in Seniors Care.
- *Graduate Education in Business and Health:* On the 'business side' the Faculty of Commerce and Business Administration offers the E.M.B.A. Health and has partnered with the School of Population and Public Health to offer the Master of Health Administration degree. These degrees focus principally on the business of health administration. They do not have a substantive focus on care of a particular population such as the content in the M.H.L.P. in S.C. Pillar. In conceptualizing the M.H.L.P. program we have sought to ensure that students will acquire knowledge related to Seniors and conditions that influence aging, in order to ensure they are well equipped to consider the care needs of the population as they make 'business' decisions related to how staff or other resources may be allocated, budgets managed or policies articulated. Consultations with UBC's M.H.A. Program Director indicate they support our proposed programme as important and distinct from their degree.
- *Other Graduate Programs:* Simon Fraser University (SFU) offers a degree in gerontology. This is inherently a research degree and does not focus on illness, aging and service delivery, nor does it include 'business' content we have included in the Platform. Similarly, the Master of Arts in Leadership offered by Royal Roads University does not include what we generally refer to as the 'technical (Pillar) content' related to care of the aging population. UBC's Master of Occupational Therapy (M.O.T.) graduate program is the only BC program that provides the education leading to the O.T. credential. While this

program includes content related to the aging population, it does not include the 'Platform' content. Consultation with the M.O.T. program indicates they support the program as distinct from their own.

**Institutional Contact**

University of British Columbia

Faculty of Applied Science

Elizabeth Croft, Associate Dean, Education and Professional Development

604-822-6614 [elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca)

**Appendix to the Executive Summary (for internal UBC purposes only)****Budget and Funding**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020. Tuition is \$27,000 per year for domestic students and \$46,000 per year for international students. The enrolment will not impact existing program such as the MSN that has different admission requirements.

**Space Requirements**

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

**Library**

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support, and the Platform courses requiring new resources will be funded by the APSC Dean's Office. (See Appendix 2 and 3 and Appendix 7 Platform Proposal)

## 1. Introduction

This proposal represents one of a suite of new professional programs to be offered at the master's level in the Faculty of Applied Science (APSC). The programs were developed in parallel and will be delivered in parallel. That is, there will be a common start date and timeline for cohorts in all of the programs. A key feature of this suite of programs is that they are structured in two parts, which will be referred to as the "Platform", and the discipline-specific "Pillar", equivalent to a specialization. The Platform is foundational coursework focused on project management, data analysis, and leadership skills. It is a largely common element accessible to the suite of new APSC professional programs. The Pillar contains technical material specific to the care of Seniors in a range of community and institutional contexts. Students will acquire knowledge of evidence related to best practices in the provision of Seniors Care; understand the social and environmental conditions that mitigate or exacerbate the impact of aging on Seniors health and wellbeing; acquire knowledge of the social organization of services for Seniors; develop skills in critically analyzing and proposing policies that influence access to Seniors Care; and learn how to set and monitor standards for the provision of Seniors Care. Successful completion of the Platform and a Pillar will result in the granting of one degree. Details of the contents of both the Platform and the Master of Health Leadership and Policy in Seniors Care Pillar are documented in this proposal.

## 2. Program Rationale

### 2.1 Defining the Need for the Program

Over the past year, members of the University's Flexible Learning Initiative and the APSC Dean's office have formed and worked closely with a Program Advisory Committee consisting of faculty from all areas of APSC. The conceptualization of this particular Platform and Pillar structure was identified as relevant across a number of areas of specialization within Applied Science. The following program proposal is the result of collaborative planning on the part of this committee and faculty experts in the School of Nursing.

### 2.2. Mission Statement

*The University of British Columbia, Faculty of Applied Science, wishes to attract students into a **high quality, sector-focused, distinctive and integrated** Applied Science Professional Program that has resources to be delivered sustainably, and fiscally meets the University's goals.*

1. UBC continues to encourage innovative learning approaches within the fiscal model of cost recovery.
2. The Flexible Learning Strategy introduced in 2014 lists the development of new Professional Programs as a priority.

*The School of Nursing's Mission is to provide leadership and innovation in integrated nursing education, research, knowledge exchange and practice to advance individual, family, community, and population health.*

UBC has the opportunity to deliver a distinctive School of Nursing and APSC Program in line with the University's Professional Program objectives.

## **2.3. Applied Science Professional Program Approach**

### **2.3.1. Guiding Principles of the Program**

1. There is meaningful engagement with stakeholders in market research, development, delivery and career opportunities.
2. Our target market is candidates who might consider either an M.B.A. or graduate program in Management, but would prefer to develop both sector-relevant technical skills and management and leadership skills – our program will be distinctive in the market.
3. We take advantage of a standardization of core courses to improve quality of offering while reducing costs and complexity.
4. The program is positioned as a premium alternative to a conventional master's program by offering distinctive, high quality, cross-disciplinary technical and non-technical skills to the experienced professional who wants to become a Sector Specialist.
5. Pillars are developed around areas of unique research and teaching strength in APSC, where multiple program "Faculty Champions" are identified, that have strong relevance to our professional community and societal benefit, have strong learner demand, and have strong industry demand for people trained in this sector.
6. Graduate courses offered in the Seniors Care Pillar will be open to all Nursing graduate students with the appropriate prerequisites, and similarly to students in other graduate programs, space permitting. This will allow Nursing to revitalize our graduate program offerings around areas of research and teaching strength, build strong interdisciplinary sector training capacity, and improve our connections to our professional community.

### **2.3.2. Extensive Market Research was used to develop the Value Propositions**

In order to establish the viability of offering new programs, the following activities were undertaken to validate the structure and proposed Pillars. Market research information is provided in Appendix 6.

The objectives and curriculum were developed in conjunction with meaningful stakeholder consultation in 3 phases:

1. Market research and concept development conducted through
  - a. Multiple meetings of the Inter-Disciplinary Working Committee of Applied Science that included the following core members:

- i. Elizabeth Croft (Associate Dean)
    - ii. James Olson (Associate Dean)
    - iii. Hugh Brock (Vice Provost)
    - iv. Reza Vaziri (Head of Civil Engineering)
    - v. Peter Englezos (Head of Chemical and Biological Engineering)
    - vi. Sathish Gopalakrishnan (Professor in Electrical Engineering)
    - vii. Scott Dunbar (Head of Mining)
    - viii. Walter Merida (Director of Clean Energy Research Centre)
    - ix. Jon Mikkelson (Director of Naval Architecture and Marine Engineering)
    - x. Panos Nasiopoulos (Director of ICICS)
  - b. Survey of current MEng students and alumni (see Appendix 6)
  - c. Survey of APSC employers (via Co-op Database) (see Appendix 6)
  - d. Desktop research of comparable programs in Canada and the United States of America
2. Validation by external sector experts (details below).
  3. The conceptualization of the platform-pillar concept was identified as relevant across disciplines within the Faculty. In the case of the M.H.L.P. degree, the conceptualization of the program was refined through in-depth dialogue with School of Nursing faculty, community and research partners, and through consultation with representatives of their graduate students. The conceptualization of the program was then refined following formal focus groups with stakeholders in both the public and private sector as outlined below.

### **Health Leadership and Policy: Seniors Care**

Validation: September 16 2014

- Heather Mak (Providence)

Focus Group: September 17 2014

- Janet Bergen (Lakeview)
- Joanne Dykeman (Revera)
- Tracy Sacre' (Proof of Care)

The overview of the core courses and the Platform was very well received and the participants indicated that they would have taken the program if it had been available when they were in their early career search for post-graduate education. In the recruitment process, the program is encouraged to look for students in traditional and non-traditional fields – find the people who are interacting with, and responsible for, Seniors Care across the continuum. The range of concepts in the curriculum will meet the needs of healthcare professionals leading and managing high performance teams.

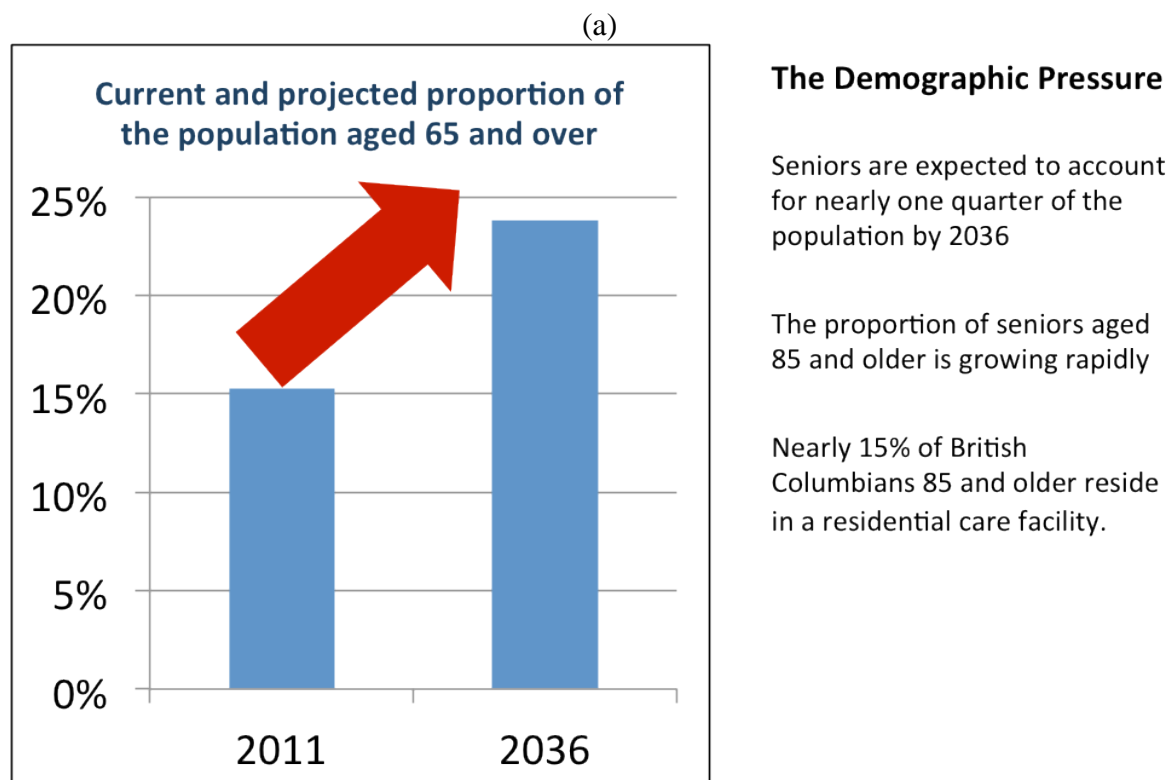
### 2.3.3. Market Insights

Consistently repeated messages, related to the potential student market and the relevance of the particular focus areas, were heard through all market research activities outlined above.

For example such messages included:

1. Experienced healthcare professionals in their chosen careers require sector-relevant, cross-disciplinary technical skills.
2. Healthcare professionals require project management, communication and business skills to be effective leaders.
3. No schools in Canada and the United States of America offer this combination of skills in a technical master's program.
4. The Seniors Care Pillar was identified as highly relevant to stakeholders in the public and private sectors of healthcare delivery. Demographic projections suggest an increased proportion of seniors in the population and an associated increased need for professionals to provide and manage Seniors Care. (Figures 1 a and 1 b)
5. Nursing has a strong presence (as leaders, care providers and researchers) in this sector of practice.
6. A number of employers indicated they would recommend this credential to their staff.

Figure 1(a) and (b) Illustration of Sector Relevance of Seniors Care to British Columbia and Canada



(b)

Seniors represent 14% of population, yet utilize:

**45%** of all public-sector health spending;

**40%** of acute hospital stays;

**85%** of hospital-based continuing care;

**82%** of home care; and

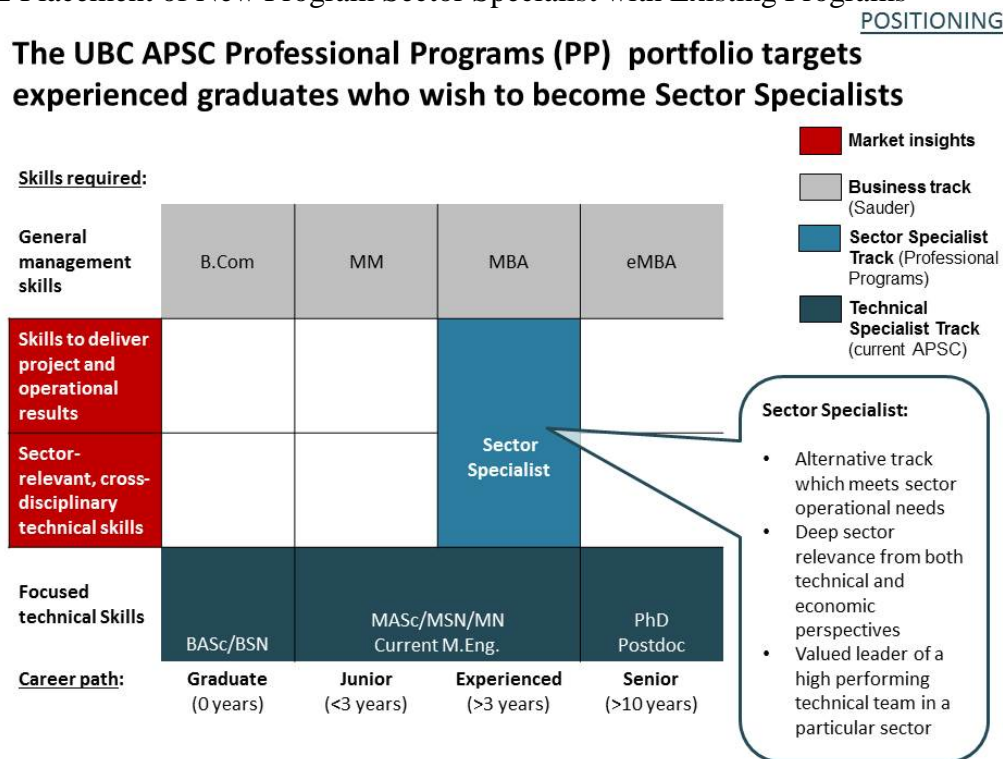
**95%** of residential care.

## 2.4. Program Overview

### 2.4.1. Context

The program strives to provide students with a comprehensive and innovative education that will enable them to advance their career in a path that is different from the traditional APSC course-based master's (M.S.N. or M.N.) or the Master of Business Administration (M.B.A.). The program is structured to provide a combination of advanced technical skills, integrated with professional skills, which will enable graduates to practice these skills and advance their career trajectory in their chosen sector.

Figure 2 Placement of New Program Sector Specialist with Existing Programs



## 2.4.2. Objectives of the Proposed Program

The M.H.L.P in S.C. program will:

1. Equip tomorrow's professionals with the critical thinking and practical skills necessary to make important contributions to their chosen sector and to make Canada a leader in the global market.
2. Capitalize on Vancouver's industrially diverse environment and UBC's current stakeholder connections by offering an attractive hands-on education that allows students to get valuable work experience; and allows BC's healthcare sector to benefit from the minds of UBC's top graduate-level students.
3. Link the concerns of extra-university partners by offering students a project-based curriculum that explores cutting edge concepts in collaboration with healthcare sector professionals in the Vancouver region.
4. Emerge as the leading institution for the continuing education of current leaders in the Seniors Care Pillar sector and for the training of tomorrow's leaders.
5. Graduate highly skilled professionals who can fill the jobs gap currently existing and expected to increase in Canada in the foreseeable future.
6. Continue to develop a high profile faculty with international expertise in the theory and practice of Seniors Care.

## 2.4.3. Program Learning Outcomes

Graduates of the M.H.L.P. in S.C. program will:



1. Understand the socio-political context of Seniors Care
2. Critically analyze trends related to the social epidemiology of aging
3. Critically analyze and propose policies to enhance Seniors Care
4. Develop care strategies
5. Enact Philosophies of Care
6. Anticipate and analyze the interface between aging and health
7. Incorporate principles of environmental gerontology
8. Employ conceptual and analytical tools.
9. Perform relevant Quality Assurance research and analyze and comply with policy and international best practices.
10. Lead Organizational operations and maintain quality.
11. Manage operations of a seniors' facility, appraise and correct quality, set and achieve aspirational goals.
12. Explicate organizational models of practice that foster ethical, equitable and socially sustainable policies and practices in Seniors Care.
13. Deliver multidisciplinary projects effectively (project management, leadership and team building, effective communications, sustainability)
14. Use data appropriately for technical and business decision-making
15. Understand the critical components of how business works
16. Appreciate the impact of cross-cutting themes in industry

## 2.5. UBC Mandate and Strategic Plan

The University of British Columbia is a comprehensive research-intensive university, consistently ranked among the 40 best universities in the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning.

In *Place and Promise: The UBC Plan*, our vision statement is: "As one of the world's leading universities, The University of British Columbia creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world."

The program will act as one route to the fulfillment of this promise. With the involvement of faculty from the School of Nursing in the delivery of the Seniors Care pillar who will work in partnership with faculty from Engineering and other Schools in Applied Science and faculty in the Faculty of Commerce and Business Administration to deliver platform courses; the development of new laboratory facilities and the improvement of existing study spaces; and collaboration with local stakeholders in the areas of student mentorship, sponsored research topics, and internship job placements, the program will offer an exceptional learning environment for students and for faculty undertaking research. In

addition, the program will attract students from around the world to study in Vancouver's diverse environment and graduate students who will, in turn, be in demand across the globe. When we speak of globalization today, it is a synthesis of exploration, learning, and the global exchange of resources and knowledge – not unlike the university itself. Accordingly, the program addresses many of the goals outlined in *The UBC Plan*.

### **2.5.1. Student Learning**

- The University provides the opportunity for transformative student learning through outstanding teaching and research, enriched educational experiences, and rewarding campus life.

The program will offer a comprehensive curriculum that draws upon the combined expertise of faculty in the School of Nursing who will work in partnership with faculty from Engineering and other Schools in Applied Science, the Faculty of Commerce and Business Administration and with sector professionals. The program will synthesize theory and practice through a challenging project-based learning experience that will equip students with the skills and experience needed to excel in the world's most important and fast-growing sector. The number and variety of courses available to students will be purposely limited, as will student enrolment, to ensure a robust and streamlined learning experience that is centered on the program objectives. As well, strong stakeholder support and existing relationships between UBC APSC in general and the School of Nursing in particular and research and practice partners in the private, public and non-profit sectors promises students both a rich educational experience and employment opportunities after graduation.

### **2.5.2. Innovation Excellence**

- The University creates and advances knowledge and understanding, and improves the quality of life through the discovery, dissemination, and application of research within and across disciplines.

As a leading research and educational facility, UBC is expected to be a world leader, and *the* Canadian leader in the areas of the M.H.L.P. in S.C. program, as we invest time and resources to create, sustain and grow for the future. By expanding UBC's current scholarship in the areas of this program, UBC will not only be a leader in the exchange of knowledge in these areas; it will also, by contributing to the involved sectors, be a central part of the means by which people and knowledge are mobilized. The care of seniors is an applied area of practice that draws upon knowledge generated a variety of disciplinary perspectives. UBC leads in the development of such foundational knowledge. This program will provide an avenue for the uptake of such knowledge.

### **2.5.3. Community Engagement**

- The University serves and engages society to enhance economic, social, and cultural well-being.

Engaging with public and private sector practice sites with regard to the needs of their sector is one of the key components of the program. With a curriculum grounded in collaborative community projects, a reciprocal and experiential learning environment will be created between students and local stakeholders. There is significant interest in identifying ways to effectively respond to the emerging demographic trends without compromising quality. The community is an essential partner in this undertaking.

#### **2.5.4. International Engagement**

- The University creates rich opportunities for international engagement for students, faculty, staff, and alumni, and collaborates and communicates globally.

The program will graduate students who will be in demand across the globe, from sectors that will be based in Canada. It will graduate the trained professionals needed to ensure the self-sufficiency of Canada's sector-specific professionals, and the global influence of Canada itself. Seniors Care is provided in both public and private sectors and by non-profit societies. Knowledge of regulatory policies and practice standards in the public sphere and the marketplace is essential to ensuring an effective system of services for seniors and to ensuring increasingly scarce health care resources are effectively deployed. Highly qualified professionals are key to securing Canada's global presence in Seniors Care – to improving and sustaining Canada's innovation and economy, and strengthening Canada's unique contribution to the global market. By offering the program, UBC will therefore become an invaluable player in both national and international development.

#### **2.5.5. Sustainability**

- The University explores and exemplifies all aspects of economic, environmental, and social sustainability.

The program will play a role with the rest of the UBC community to meet society's needs without compromising those of future generations. Through the platform courses that will have a focus on leadership and sustainability, to the activities and services provided both inside and outside of the classroom, the program is designed to be accountable and transparent in the use of available resources. Social sustainability, ethics and policy are core concepts explored in programs of scholarship in Nursing. Nursing faculty are members of the APSC sustainability working group. Nursing's contributions to this interdisciplinary dialogue has enhanced awareness of the social impacts, both positive and negative, of technical innovations (i.e. industry, mining, etc.) on individuals and communities' health while also introducing ways social initiatives may mitigate negative impacts.

### **2.6. Support for the New APSC Professional Master's Program**

The University supports the formation of new professional master's programs having goals in alignment with that of the institution. Support and resources are available in a variety of forms including assistance with market research, budgeting, and curriculum development. We have and continue to take advantage of all assistance in the creation, development, delivery and evaluation of the program. As part of the Flexible Learning Initiative, targeted

growth of professional master's programs is one of UBC's four priorities over the next five years. Continued support for the Flexible Learning Initiative has been confirmed by our new UBC President, Dr. Arvind Gupta. The strategic plan for flexible learning campus-wide is articulated in its own web space, which can be found here:

<http://flexible.learning.ubc.ca/what-is-flexible-learning/flexible-learning-goals/>

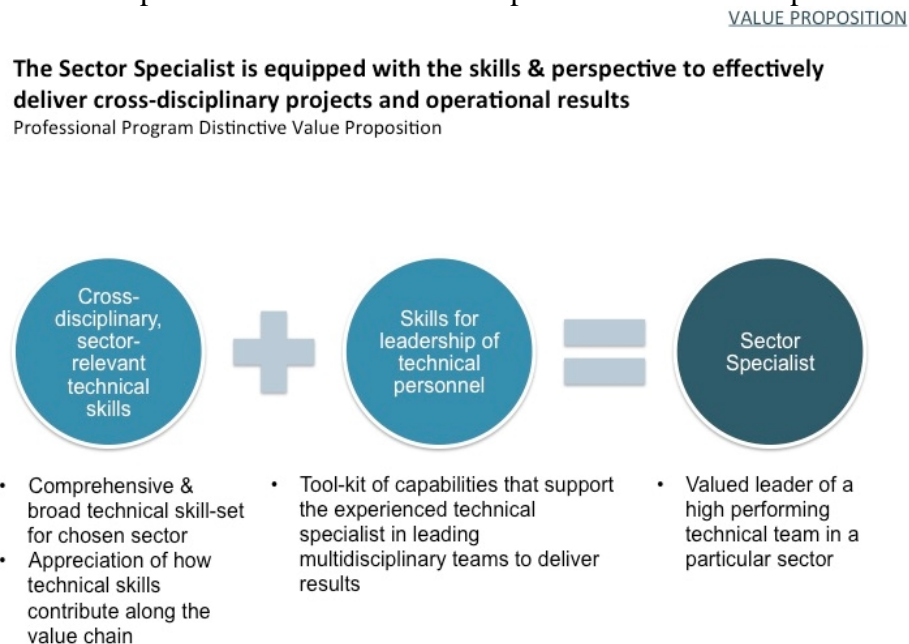
APSC has identified its professional master's programs as having the potential to benefit greatly from not only revitalization, but also expansion. This initiative has been led by the Dean's office and has received consistent support from the Provost's Office through the Flexible Learning Initiative. This objective is in line with the espoused goal of the Faculty of Graduate and Postdoctoral studies to rethink graduate education as a preparation not only for academe but also for service in a wide range of leadership opportunities in society.

### **2.6.1. Opportunity Identification**

It was felt that an opportunity may exist that had, as yet, not been explored in APSC. Given the unique structure of the Faculty, which is home to not only engineering programs, but also the School of Nursing, the School of Architecture and Landscape Architecture and the School of Community and Regional Planning, it was felt that the potential existed to create a suite of interdisciplinary master's degrees that were aligned with stakeholders in a way that a program housed in a single department or school could not. In order to establish the market for such opportunities, and to establish potential interdisciplinary themes to pursue, the following activities were undertaken:

1. Competitor scans
2. Alumni tracking
3. Ongoing dialogue with stakeholders to identify skills gaps
4. Targeted market research / focus groups
5. Dialogue with faculty to shape opportunities and program champions
6. Initial feasibility assessment
7. Distillation of program concept(s) including clear objectives in launch
8. Straw man concept for new professional program, with clear student target

Figure 3 Relationship of Technical and Leadership Skills for a Sector Specialist



## 2.6.2. Program Development

Upon successful conclusion of the opportunity identification phase, program development initiated via the steps outlined below, with this document representing the basis of the material required for step 9. A key element that emerged from the opportunity identification phase was a program structure that featured a largely common Platform, comprising approximately 40% of each program, which would be the foundation for all new professional master's programs in APSC. The remaining 60% of the course content is then comprised of a set of courses drawn from across the Faculty that provide sector-specific technical content. The technical material is referred to as a Pillar. This structure was identified quite early on in the development process and has been referred to internally as a "Platform and Pillar" model from both the curriculum development and delivery perspectives. (Note that for the final M.H.L.P. in Seniors Care program, the final distribution is 30% common platform and 70% sector-specific technical content.)

1. Appointment of program Champion (Judith Lynam)
2. Discussions with advisory committee
3. Refinement of proposition, program design and pricing
4. Definition of operating model / formation of any partnerships
5. Financial modelling
6. Funding application
7. Planning for course (re)design (CTLT)
8. Development of project plan
9. Presentation to Faculty council, Senate, Board, Ministry – and plan refinement as needed
10. Full program design in place

11. Approval from the Senate, the Board of Governors, and the Ministry of Advanced Education

### **2.6.3. Implementation**

In parallel with the approval process, implementation and launch of the new professional programs will require a significant effort well in advance of the commencement of the programs for the first cohort, which is anticipated for January 2016. Key activities are summarized here:

1. Development of course materials and flexible learning (FL) delivery / internship modules
2. Development and launch of multi-touch marketing efforts (ideally at least 1 year in advance)
3. Set up in central systems (Enrolment Services, UBC IT)
4. Evaluation of applications (ideally application deadline 7 months in advance) and submission of accepted applications to Department and APSC Dean's Office for approval
5. Program ready to launch with inaugural group of students

### **2.6.4. Program Management**

Due to the intensive nature of the proposed programs and the expected audience, which would be primarily mid-career professionals, these programs will require dedicated resources within the Faculty to maintain high-quality, responsive service for administrative details surrounding their delivery (e.g. registration issues, scheduling details, facilitation of workshop activities, field placements, coordination of interdisciplinary capstone projects, etc.). Additionally, it is anticipated that there will be support for maintaining continuous program improvement, sufficient marketing efforts, ongoing development of community partners and stakeholder participants, and so on. The budget for these programs includes provisioning for the necessary staff, to be located in the Faculty, to ensure the ongoing support for the activities itemized below, which are regarded as necessary to deliver and maintain a program of the highest caliber:

1. Continuous feedback loop to improve delivery and learning outcomes
2. Refreshment of marketing materials, with relationships / channels fostered ongoing
3. Exploration / implementation of any content repurposing opportunities
4. Tracking of student success rates
5. Financial / operational management
6. Ongoing evolution of program to achieve learning, access, reputational and financial objectives

## **2.7. Relationship to Established Programs**

### **2.7.1. The University of British Columbia**

This program includes new (Pillar) courses specifically developed to provide students with knowledge related to care of the focus population (Seniors). In addition, existing courses currently available to graduate students in Nursing will provide additional required content (i.e. research, equity, ethics and policy). The existing courses will incorporate case examples related to Seniors Care. Some of the proposed Platform courses are new, while others are available through programs in the involved departments and schools of APSC and the Faculty of Commerce and Business Administration at UBC. The Platform courses will employ an interdisciplinary approach through the use of case studies relevant to the Seniors Care Pillar.

Existing professional programs include:

**Master of Science in Nursing (M.S.N.)**

**Faculty of Applied Science, School of Nursing**

This 33 credit program can be completed with a thesis or a project and used as a preparation for doctoral studies. The M.S.N. program is designed to prepare graduates to function as leaders in a range of roles such as education, advanced practice, policy implementation, health care management, and nursing knowledge development. While the M.S.N. program includes content related to theory development and policy analysis it differs from the proposed M.H.L.P. program in a number of aspects. There is a limited overlap in the required courses for the two programs. And, the new program is designed for an interdisciplinary cohort who we envision will enact a variety of leadership roles in a range of settings. The new program emphasizes the application of knowledge specific to Seniors Care, engagement with the development and analysis of policies related to Seniors Care, and most importantly incorporates leadership and technical business skills essential to explicating and enacting high standards of care in a range of settings.

**Master of Nursing: Nurse Practitioner (M.N.-N.P.)**

**Faculty of Applied Science, School of Nursing**

The M.N. degree is designed to prepare graduates in a specialized area of nursing practice within the context of a professional graduate education. The M.N. Nurse Practitioner (M.N.-N.P.) program prepares Nurse Practitioners who will work in primary care settings. Graduates are prepared to assess, diagnose, and treat common and predictable conditions across the lifespan, and are eligible to apply for registration as Nurse Practitioner (Family) in British Columbia. This two-year course-based master's program accepts baccalaureate-prepared Registered Nurse applicants with a number of years of relevant practice experience.

**2.7.2. Other British Columbia and Canadian universities**

There are currently no universities in British Columbia or in Canada that offer accredited *graduate* programs with the proposed Platform and Pillar structure.

***Graduate Education in Nursing:*** In Canada, as in most contexts in the US, graduate programs in Nursing are similar to our own M.S.N. degree which emphasizes theory and research as they are applied in different contexts (education, clinical practice). The M.S.N.



degree is prerequisite to the Ph.D.; or an M.N. – Nurse Practitioner degree, that focuses on the educational requirements to be credentialed as a Nurse Practitioner.

***Graduate Education in Business and Health:*** On the ‘business side,’ the Faculty of Commerce and Business Administration offers the E.M.B.A. Health and School of Population and Public Health offers the Master of Health Administration degree in conjunction with the Faculty of Commerce and Business Administration. These degrees focus principally on the business of health administration. They do not have a substantive focus on care of a particular population. Moreover, consultations with the M.H.A. program director indicate they support our proposed programme as important and distinct from their degree.

***Other Graduate Programs:*** Simon Fraser University (SFU) offers a degree in gerontology, but this is inherently a research degree and does not focus on illness, aging and service delivery nor does it focus on the social organization of care for the aging population. Similarly, the Master of Arts in Leadership offered by Royal Roads University does not include what we generally refer to as the ‘technical content’ related to care of the aging population.

### **2.7.3. Level of support and recognition from other post-secondary institutions**

As a new program, support and recognition from other post-secondary institutions is limited. However, it is anticipated that participation from faculty members outside of UBC delivering content in the program will promote further support from institutions that offer traditional graduate programs in Seniors Care both nationally and internationally. Given The School of Nursing’s long history in educating Nursing leaders and recognized expertise in research, policy and Seniors Care, it is expected that other post-secondary institutions both in Canada and abroad will recognize and support this program.

### **2.8. Demand for Program**

The need for professionals with technical and integrated professional skills is growing rapidly, and Canada currently has neither the trained personnel required to meet the needs, nor the means of training them. There are currently *no* other Canadian institutions that offer sector-focused (rather than research-oriented) training at the graduate level with the proposed Platform and Pillar structure.

The demand for the suite of APSC professional master’s programs comes from multiple sides. British Columbia and Canada need the proposed programs for the success of the provincial and federal Pillar Sectors to stay competitive with international markets. Given UBC’s location, the research of current faculty, and the recent achievements of UBC undergraduate students in the Pillar area, it is appropriate that UBC be the institution to implement a graduate-level programs that are lacking in Canada and are now more important than ever. According to the Organization for Economic Co-operation and Development (OECD) statistics, the number of senior citizens will grow to over 20% of the population in most industrialized nations of Europe and North America by 2040. In Canada alone, it is estimated that seniors will account for 25% of the population by 2036. In British



Columbia, nearly 15% of the population 85 and older reside in a care facility, either public or private. Seniors also utilize the health care system more often than other segments of the population. Though they represent 14% of the population, they utilize 45% of all public-sector health spending, account for 40% of acute hospital stays and 82% of home care. Some of the challenges that decision makers will need to focus on include (a) improve integration of care and services to seniors across the health care continuum; (b) increase focus on prevention; (c) treat social supports as an integral aspect of care; (d) adopt an efficient use of technology; and (e) collect, manage, and report accurate information for policy-making.

This program is designed to prepare professionals to lead, design and deliver comprehensive care and services for seniors in a range of community and institutional settings in both the public and private sectors. The goal of the programme is to provide learning experiences that enable graduates to complement their knowledge of the health of seniors with substantive knowledge related to Seniors Care and with knowledge of business operations.

In particular, students will acquire knowledge of the social and organizational conditions, including policies and practices, that foster optimum functioning among seniors and develop proficiency in the use of business models (tools) and approaches that enable them to lead and oversee service provision. The program focuses on seniors who are healthy and those who are coping with health conditions. The program builds upon a number of assumptions that include:

- The UBC School of Nursing is well positioned to develop and offer this program and lead initiatives in Seniors Care because of the knowledge and expertise that is foundational to nursing programmes (i.e. health promotion, primary health care, provision acute and specialized care in a range of community to institutional contexts; processes of service delivery and communication etc.) and the roles played by nurses in the design and delivery of care for seniors.
- The proposed program builds upon research strengths within the Faculty (i.e. existing programs of research in care of seniors; faculty and adjunct faculty with considerable expertise in care of seniors) and builds synergies that align with UBC priorities (i.e. excellence in socially relevant research and practice).
- Our consultations with sector experts in both the public and private sectors of health services delivery for seniors have shown strong support for the proposed program and indicate that graduates will bring important and needed knowledge and skills to their chosen careers.
- The program fills a gap in practice and will produce graduates who are able to fill a significant identified need for improving patient outcomes and for fostering the wellbeing of seniors in community and institutional contexts. The focus of the Seniors Care content will ensure that graduates are well positioned to design and deliver care to enhance patient outcomes and address conditions of the social and physical environment that mitigate and/or exacerbate the impact of aging on health.

- The knowledge and skills to be acquired through this program will build needed capacity among a range of professionals. The consultations undertaken to date indicate that the credential will be highly valued in both public and private sector practice environments by a range of individuals with professional degrees (i.e. OT/PT, dieticians, MDs, SW).

## **2.9 Enrolment, Tuition, Scholarships, Post-graduation Opportunities**

### **2.9.1. Enrolment Predictions and Capacity**

To maintain a vibrant learning environment and admit the best and brightest applicants, however, the cohort size will be purposely limited. The anticipated minimum initial cohort will be 20 students increasing to 41 by 2020. The enrolment will not impact existing programs such as the MN-NP or MSN as they each have different admission requirements.

### **2.9.2. Tuition Rationale**

The program falls under the APSC “Guidelines for Professional Programs” (August 31, 2012) which stipulates that new professional programs in the Faculty, as of January 2009, must generate revenue to cover a range of expenses including equipment, facilities and salaries of faculty and staff involved in course delivery and administration. The primary source of revenue for these programs is through the tuition flow-back from the University to the Faculty and unit delivering the program.

The starting tuition level requested for the program is \$27,000 CAD for the one-year program for Canadian citizens and Permanent Residents and \$46,000 CAD for the one-year program for international students requiring a Study Permit. Tuition is paid in three equal installments per year, normally in January, May and September. The student is required to pay a minimum of three installments of tuition in order to graduate, but if the program is extended by permission of the program Director, the student pays tuition installments until the program requirements are met. For domestic students, the continuing fee and the extension fee are set by the University. No part-time studies are allowed. Currently, tuition increases by 2% each year.

We are confident that the program can attract students to pay the proposed tuition for the following reasons:

1. UBC is a leading centre for nursing education in Canada and this program will provide requisite knowledge and skills to access leadership roles in Seniors Care.
2. A one-year program fits into the lifestyle framework for most of our potential students.
3. The program will draw from an international pool of students.
4. The proposed tuition is comparable to the MHA tuition currently charged at UBC.
5. US out of state tuition for a Nurse Practitioner averages \$31,500 US (2012 data). Persons completing this degree could lead programs employing Nurse Practitioners.
6. We have strong expressions of interest from organizations internationally and from other jurisdictions in BC and Canada who want their staff to complete this program.

### 2.9.3. Scholarships

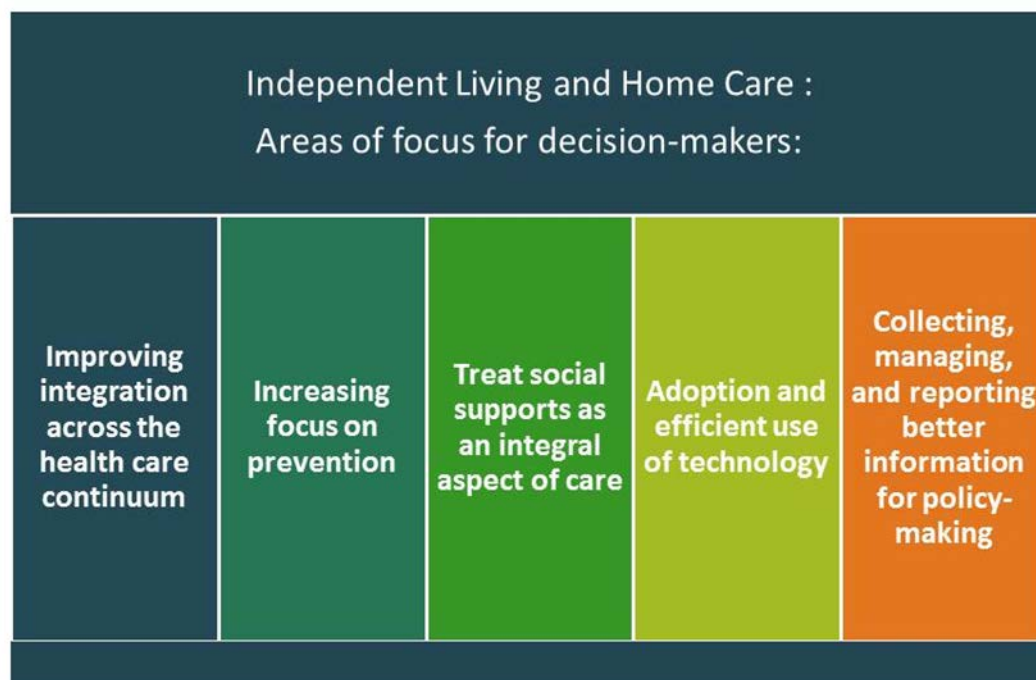
We are concerned about getting the right students for the program and recognize that the tuition assessment may be prohibitive for some outstanding applicants. As a consequence, we intend to go to stakeholders in each sector seeking named scholarships. We have set aside 7.5 percent of the tuition revenue for financial need.

### 2.9.4. Potential Sectors of Employment Post-graduation

Graduates of the program will have developed those skills and practices that stakeholders value most highly in experienced APSC professionals including nursing. They will be creative and visionary to see the potential to use the knowledge and training from the program effectively in their employment choices. Government and private sector industry are hungry for experts to develop new processes and systems to explore and implement positive changes in Seniors Care. Graduates can expect to find careers locally, nationally, and internationally.

The market niche this program is designed to fill extends beyond particular sites of Seniors Care. We anticipate graduates will be prepared to shape the vision for Seniors Care policy and develop plans for enacting the vision in different practice contexts. The domains of practice that are relevant to Seniors Care are illustrated in the following diagram.

Figure 4 Example Areas of Focus for Decision-Makers in Seniors Care

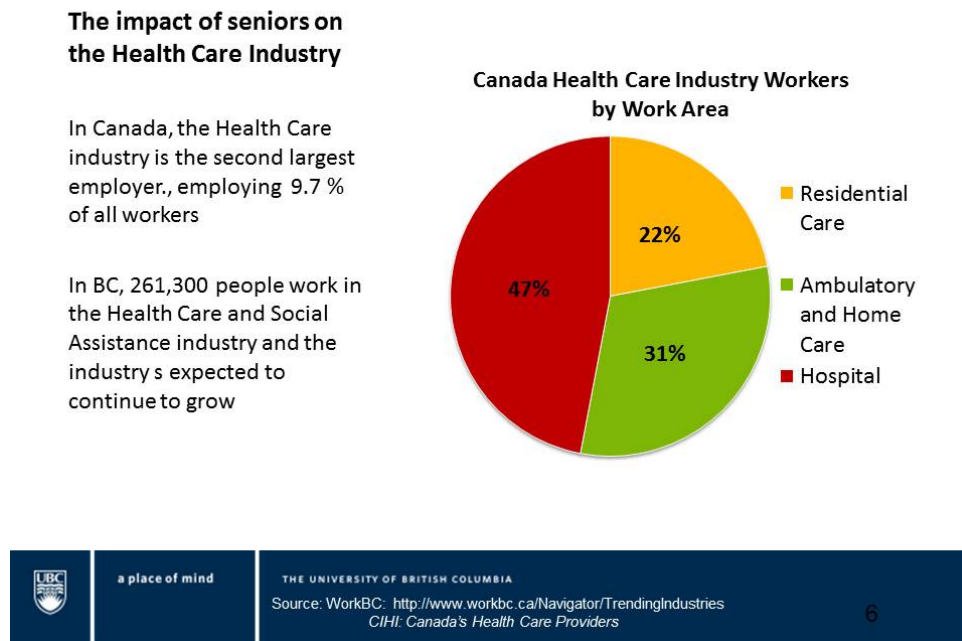


There is a current and growing need for expertise in this field of practice for services and leadership in both the public and private sectors. Research in health services delivery that is particularly of interest to Seniors Care is that services are often offered in ‘silos’ which can interfere with the effective use of resources and/or compromise health outcomes. In Seniors Care, this process is made more complex because of the intersectoral engagement in service provision. Through the course and field work experiences provided in this program, students will gain knowledge of the social organization of service delivery for seniors (policies, funding arrangements and options in public, private and non-profit sectors) and insight into ways in which resources and expertise of different sectors may be most effectively deployed to enhance health outcomes of seniors.

Figure 5 Healthcare and the BC Jobs Plan



Figure 6 Canadian Healthcare Workers by Area



### 2.9.5. Opportunities for Further Study

The professional master's degree at UBC is generally not recommended for students who wish to continue on to a Ph.D., and the proposed program will conform to this. As such, it is anticipated that most or all of the graduating students will go on to, or return to, work in Seniors Care. It is possible, however, that a small number of students will continue to Ph.D.-level study at UBC or elsewhere.

## 3. Program Description and Specifications

### 3.1. Admission Requirements

Applicants must hold an undergraduate credential in healthcare or related field (Nursing, Social Work, Occupational or Physical Therapy, Dietetics) and 3 years of relevant experience with at least 1 year in Seniors Care. Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the M.H.L.P. in S.C. are:

- TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 81
- PTE (Pearson Test of English - Academic): minimum overall score of 59
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 60

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website. The Applied Science graduate program office is responsible for collection and assessment of application documents.

### **3.2. Program and Pillar Requirements**

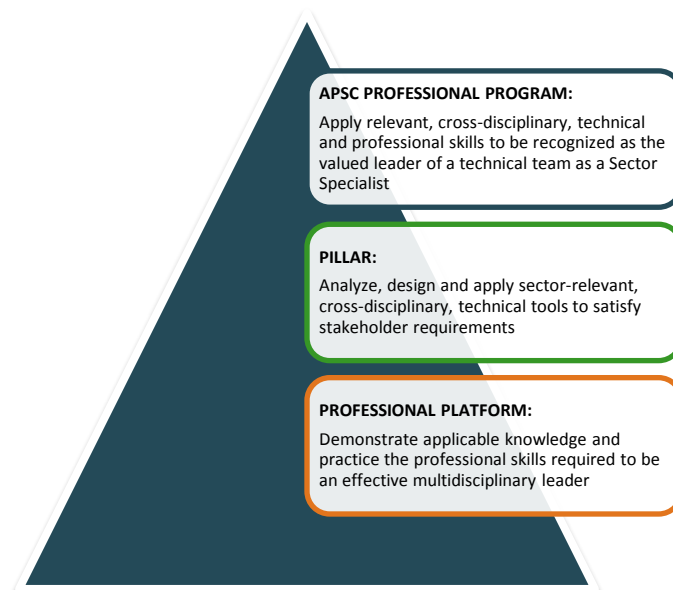
The program requires a minimum of 30 credits of coursework. The distribution will be 9 credits dedicated to the Platform to provide the professional skills required for an experienced graduate to be an effective technical manager and 21 credits dedicated to the Pillar in advanced (technical) courses related to Seniors Care. The program will be delivered as an intensive one-year program with no free electives. It is anticipated that this will be favourable to post-professional students already in the workplace.

The students will move through the program as a cohort, to build a community of learners, to challenge assumptions and to support each other's achievement of the program goals. We will adopt a 'hybrid' – flexible delivery model. The learning experiences will include face-to-face and online learning elements and scheduling will be refined with input from sector experts and the target population of students. We anticipate that there will be intensive sessions in the Summer Session; weekly classes in particular terms and, in

addition to fieldwork experiences, there will be a co-op or practicum option available. In keeping with the University's vision for the professional degree programs, in the longer term it is possible that some of the courses, or course components, may be offered as 'continuing education courses' (i.e., considering aging when working with special populations; supporting seniors and families through decision making processes, design considerations for populations with dementia).

Structurally, the M.H.L.P. in Seniors Care is one of a number of new professional programs being proposed by Applied Science. As articulated earlier in this proposal, this program includes a shared a Platform of courses that we anticipate will also be taken by other Pillars leading to separate degrees including the Master of Engineering Leadership at the UBC Vancouver Campus (see Appendix 5 for a prospective curriculum). These programs are distinct. Each program will be reviewed separately and can, if necessary, be delivered independently of one another. But, as all APSC professional programs are conceptualized as sharing a common goal of graduating students with enhanced disciplinary knowledge (Pillar) and business skills (Platform), the proposed array of programs is listed in Appendix 5 for information only.

Figure 7 Learning Objectives Relevant to the Three Components of the Program



### 3.3. Platform Structure for the M.H.L.P. in Seniors Care

#### 3.3.1. Leadership and Sustainability (4.5 credits total)

APPP 501 (1.5) Project Management and Leadership  
APPP 502 (1.5) Sustainability and Leadership  
APPP 503 (1.5) Organizational Leadership

#### *Learning Outcomes*

1. Lead multi-disciplinary teams to effectively deliver sustainable projects
2. Articulate ideas, progress and outcomes through oral and written communications
3. Plan and deliver multidisciplinary projects
4. Identify and apply sustainability concepts to influence the triple bottom-line
5. Apply leadership principles to organizational and social change

*Content*

1. Project management
2. Organizational behaviour and structure
3. Sustainability, ethics and policy
4. Personal and professional leadership effectiveness and communications
5. Application of concepts to trans-disciplinary challenges in organizational and social change
6. Fully integrated into technical streams through sector-relevant projects

### **3.3.2. Business Foundations (3 credits)**

APPP 504 (3) Business Acumen for Technical Leaders

*Learning Outcomes*

1. Gain broad knowledge of the structure and mechanics of business.
2. How to use data for decision-making
3. Articulate ideas, progress and outcomes through oral and written communication
4. Practical level of understanding in specific aspects of managerial accounting, strategy and performance, market evaluation, operations management, negotiations and contract management and business-case building and valuation

*Content*

1. Managerial accounting
2. Strategy and performance
3. Market evaluation
4. Operations management
5. Negotiations and contract management
6. Business-case building and evaluation
7. Communication skills

### **3.3.3. Faculty of Commerce and Business Administration Electives (Select 1.5 credits total)**

*Learning Outcomes*

1. Gain exposure to non-technical issues and skills that impacts business and management

*Content (examples of Faculty of Commerce and Business Administration electives, credit values range from 0.7-1.5)*

1. BAEN 542 (0.8) Prototyping
2. BAEN 543 (0.7) Disruption
3. BAEN 544 (0.8) Pitching Your Idea
4. BAEN 545 (0.7) Qualitative Models
5. BAEN 546 (0.8) Social Entrepreneurship



6. BAEN 547 (0.7) Innovation and Sustainability
7. BAFI 540 (0.8) Finance
8. BAMA 540 (0.8) Marketing Fundamentals
9. BAMA 541 (0.8) Product Service Management
10. BASC 540 (0.7) Operations Fundamentals
11. BAEN 550 (1.5) Fundamentals in Entrepreneurship
12. BAPA 501 (1.5) Government and Business
13. BAPA 510 (1.5) Public Policy and the Environment
14. BASD 501 (1.5) Corporate Social Responsibility
15. BASD 505 (1.5) Environmental Economics, Management, and Technology
16. BASM 501 (1.5) Business Strategy
17. BAHHR 505 (1.5) Leadership
18. BAHHR 507 (1.5) Two-Party Negotiations

### **3.3.4. Professional Development**

Provide support to candidates who wish to broaden their knowledge

1. Communication Assessment and Support
2. Integrated Sector-specific Experience (Graduate Cooperative Education Program)
3. Employer or Mandatory Sector-specific Project
4. e@UBC Lean Launchpad
5. MITACS Step Business Skills
6. APSC Toastmasters
7. Continuing Studies (PM)
8. APSC Professional Development Workshops
9. English Language Proficiency and Support
10. Data Visualization (VIVA)
11. International Student Support
12. Professional Development Employment Centre (PDEC)

Figure 8 Summary of PDEC (Professional Program Development Employment Centre) Resources

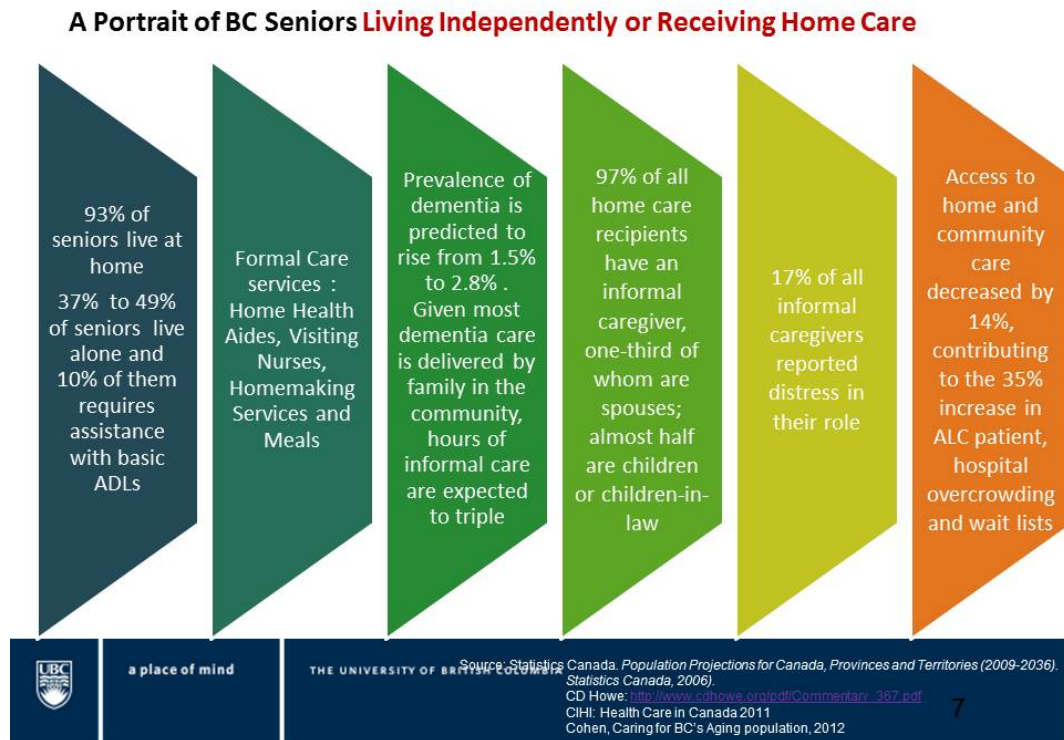
PROFESSIONAL PLATFORM

**The APSC Professional Program Professional Platform also offers students optional opportunities to expand their skills through the Professional Development Employment Centre**

Communication Assessment & Support	Integrated Sector Experience (Graduate Co-op)	Employer or Mandatory Project	e@UBC Lean Launchpad
MITACS Step Business Skills	APSC Toastmasters	Continuing Studies (e.g. PM)	APSC Professional Development Workshops*
English Language Proficiency & Support	Data Visualization (VIVA)	International student support	Career support

### 3.4. Overview of Pillar for M.H.L.P. in Seniors Care

Figure 9 Portrait of British Columbia Seniors Care



***Value Chain – Program developed to educate healthcare professionals working with all areas of Seniors Care in the public and private sector***



### Program Learning Outcomes

Graduates of the M.H.L.P in S.C. program will:

1. Understand the socio-political context of Seniors Care
2. Critically analyze trends related to the social epidemiology of aging
3. Critically analyze and propose policies to enhance Seniors Care
4. Develop care strategies
5. Enact Philosophies of Care
6. Anticipate and analyze the interface between aging and health
7. incorporate principles of environmental gerontology
8. Employ conceptual and analytical tools.

9. Perform relevant Quality Assurance research and analyze and comply with policy and international best practices.
10. Lead Organizational operations and maintain quality.
11. Manage operations of a seniors' facility, appraise and correct quality, set and achieve aspirational goals.
12. Explicate organizational models of practice that foster ethical, equitable and socially sustainable policies and practices in Seniors Care.

#### Example of a Typical Program Schedule

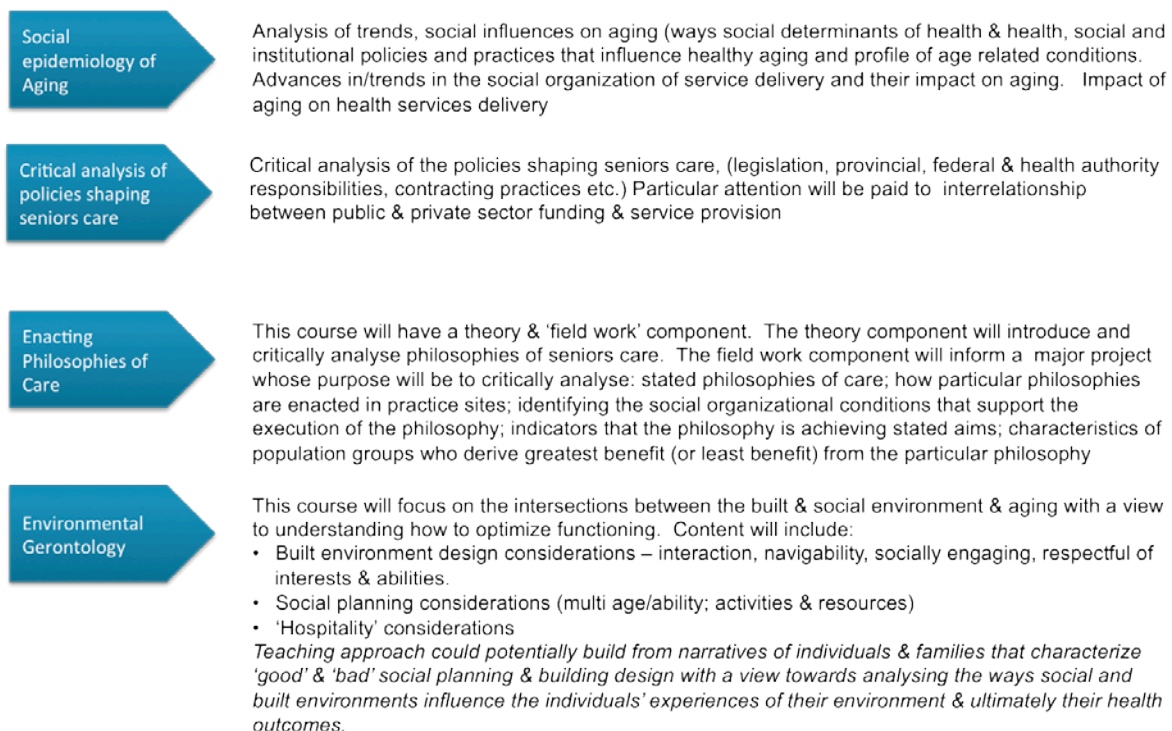
	Credits
<b>Winter Session – Term 2 (January – April)</b>	
NURS 542 Social Epidemiology: Special Populations	3
NURS 585 Special Topics in Nursing	6
APPP 501	1.5
APPP 502	1.5
<b>Summer Session – Term 1 (May – June); Term 2 (July – August)</b>	
NURS 586 Specialized Domains of Nursing Practice:	3
NURS 504 Research and Evidence-Based Practice	3
APPP 503	1.5
APPP 504	3
<b>Winter Session – Term 1 (September – December)</b>	
NURS 576 Topics in Social and Environmental Planning to Foster Health of Populations	3
NURS 560 The Politics of Health Policy:	3
Electives (Faculty of Commerce and Business Administration)	1.5
<b>TOTAL CREDITS</b>	<b>30</b>

There are no free electives.

Figure 10 Course Credit Distributions

MASTER OF HEALTH LEADERSHIP AND POLICY IN SENIORS CARE								
APPP 501 (1.5)	APPP 503 (1.5)	APPP 504 (3)	NURS 542 (3)	NURS 585 (6)	NURS 586 (3)	NURS 504 (3)	NURS 576 (3)	NURS 560 (3)
APPP 502 (1.5)	Sauder Elective (1.5)		PILLAR SPECIFIC ANALYSIS COURSE					
PLATFORM (9 CREDITS)			PILLAR COURSES (21 CREDITS)					
Total Credit Load for MHLP in Seniors Care is 30 Credits								

Figure 11 Concept Map for Proposed Curriculum



**Research literacy**

This course is designed to build upon foundational knowledge related to research and to introduce key premises of QA-QI approaches within practice settings. Students will learn to critically analyse research, synthesize evidence, and learn how such insights are applied to Seniors' Care. The course will also examine issues related to the ethical conduct of research and the design of QI-QA initiatives with Seniors and staff in institutional settings. The role of organizational leaders in facilitating research & QI-QA initiatives at their sites will be examined.

**Organizational Leadership: Optimal Case Management**

This course examines the organizational practices that enhance the quality of 'case management' to achieve excellent patient outcomes. In addition to explicating best practices in service provision, the course builds upon business competencies introduced in platform courses, to focus on organizational-level leadership specific to the provision of excellent care. Content considers: analysing workflow and staff skill mix, organizational communication practices & infrastructure; managing staff from multiple bargaining units and employers; fiscal responsibility within the mandate of the organization; implementing and evaluating strategic planning; preparing for accreditation; and aligning with priorities of funders (e.g. Health Authority, Ministry of Health, or other Corporate entity). Specific cases will be introduced to enable students to develop the ability to manage employees from multiple bargaining units, manage a budget allocation & plan & justify resource allocation decisions. *(May include a co-op or practicum placement and result in a capstone project).*

**Managing Illnesses & disabilities associated with aging populations**

Understanding the 'geriatric giants' is essential for any leader in Seniors' Care as is an understanding of common assessment tools and care options. In this course, students will learn about the 3 D's: dementia, delirium and depression; potential negative consequences for Seniors who enter the healthcare system (e.g. iatrogenesis, loss of function, falls) & polypharmacy. The content will include a focus on the roles of interdisciplinary team members and examine evidence related to organizational practices and clinical approaches (e.g. policies, communication, staff development) that have been shown to be most effective in ensuring the provision of appropriate & optimal care to Seniors. Assessment tools & resources – determining baseline, setting & communicating 'action plans', Approaches to slowing neurodevelopmental decline & optimizing memory

### 3.5. Supervision and Evaluation

Unlike the graduate-level research programs at UBC, a student in the program will not be assigned a single, dedicated supervisor, but will rather be supervised day-to-day in their work by the Pillar Directors and the APSC Professional Program Office. Coursework is evaluated through mini-projects, exams, homework assignments and in-class quizzes. For Pillars having a capstone project as a core component, supervision and evaluation will be provided by a professor and by sector-specific adjuncts, while a Cooperative Education placement will be supervised mainly by the sponsoring company, and given a final mark by a UBC faculty member involved in the professional program based on the company's report and the student's final report and presentation. Expectations of students will be formalized through individual course syllabi.

### 3.6. Policies on Program Management and Assessment

The program will be administered under APSC. In delivering this new responsive model program, it is essential that the Dean's Office, APSC Professional Program Office and The School of Nursing Student Support Office, collaborate and cooperate in an intimate fashion. The student should have access to all services and needs from within the same Faculty to ensure timely and comprehensive service of their academic and non-academic activities.

In parallel to internal reviews used to evaluate professional degrees conducted according to the APSC and UBC governance guidelines, the program will be evaluated and developed based on the recommendations of an Advisory Committee. This expert panel of outside professionals and academics will meet once per term. Committee membership will be approved by the Dean of APSC. The members of the Advisory Committee will include

leaders and stakeholders from practice settings and from disciplines whose research and practice intersects with the provision of Seniors Care. (i.e., leaders in health authorities; executive directors of Seniors Care facilities or programs; clinicians and/or scientists working with seniors; policy leaders within government and/or health professions).

#### **4. Calendar Statement – Program**

[Removed from this document and attached separately for purposes of Curriculum.]

### **5. Program Resources**

#### **5.1. Program Funding and Budget**

The program will be delivered as fiscally sustainable. The budget is sensitive to enrolment numbers and has been calculated for an initial enrolment of 20, expected to increase to an enrolment of 41 by 2020.

As this program is unique, and is directed at a sector where there is identified unmet need, impact on enrolment from existing programs or on opportunities for existing students is expected to be small.

#### **5.2. Qualified Faculty**

Courses will be taught by a combination of faculty from a number of departments and schools in APSC and also from other faculties at UBC; visiting Professors, sector-specific adjuncts and guest lecturers will be involved.

##### *5.2.1. Pillar Champions or Directors*

Each Pillar has a ‘Champion’, or in some cases more than one champion, who was instrumental in establishing the value proposition for the Pillar and also in the design of the curriculum. It is expected that these individuals will continue to have an instrumental role in the administration and oversight of the Pillar upon program launch, and may become Program Directors (see Section 5.4). The current Champion for this Pillar is Dr. Judith Lynam.

#### **5.3. Library Resources**

The new courses for this program have been reviewed by the Library. The Pillar courses will not require any additional Library support and the Platform courses requiring new resources will be funded by the APSC Dean’s Office. (See Appendix 2 and 3 and Appendix 7 Platform Proposal)

#### **5.4. Administration**

- **Program Directors**



The Directors for each Pillar will be appointed by the Dean of APSC. The Director will lead the implementation of the program and oversee its evolution, growth and position within APSC. As well as assuming teaching and research commitments, the program Director will represent the program on university committees. The program Director will also be expected to lead the community outreach component of the program to secure internship opportunities. The Director will take an active role in developing the necessary community and stakeholder linkages to establish a long-term and wide range of internship placements. The Program Director will become the principal point of contact for community and stakeholder partners. The Director will report to the Director of the School of Nursing as appointed by the Dean of APSC.

- **Program Manager**

It is expected that the suite of professional programs will be managed on a day-to-day basis by one or more centrally located program managers. This program manager would assist in: student recruitment, student enquiries, website development and maintenance, applications and admissions, timetabling, classroom scheduling, extra-curricular events and workshops, and addressing registration inquiries or issues. Support for admissions and records will also be provided by the APSC Dean's Office.

## 5.5. Space Requirements

Dedicated space for APSC Professional Programs is being developed within a new building to be completed in 2016. UBC has swing space available which will be used as interim accommodation until new facilities are ready.

## 5.6. Consultations with University Units

Consultation requests were sent to the following (see Appendix 4):

1. Faculty of Applied Science, School of Nursing
2. Faculty of Applied Science, School of Regional and Community Planning
3. Faculty of Arts, School of Social Work
4. Faculty of Forestry
5. Faculty of Land and Food Systems
6. Faculty of Medicine, Department of Occupational Science and Occupational Therapy
7. Faculty of Medicine, School of Population and Public Health
8. UBC Sustainability Initiative
9. Faculty of Commerce and Business Administration
10. Faculty of Science

## 5.7. Contact Information

### Contact Person(s):

University of British Columbia, Faculty of Applied Science, Dean's Office  
Elizabeth Croft, Associate Dean, Education and Professional Development



[elizabeth.croft@ubc.ca](mailto:elizabeth.croft@ubc.ca) 604-822-6614

## **6 Appendices Accompanying Pillar Proposals**

[Removed for purposes of Curriculum; may be requested.]

## UBC Curriculum Proposal Form

### Category: (1)

<p><b>Faculty:</b> Faculty of Applied Science (APSC)  <b>Schools:</b> Nursing  <b>Faculty Approval Date (SoN):</b> November 3, 2014  <b>Effective Session:</b> Winter, Term 2  <b>Year:</b> 2015-2016</p>	<p><b>Date:</b> December 19, 2014  <b>Contact Person(s):</b>  Faculty of Applied Science Dean's Office  <b>Deborah Feduik</b> (Manager, MEng and Graduate Programs)  Tel: 604-822-8386  Email: <a href="mailto:gradprog@apsc.ubc.ca">gradprog@apsc.ubc.ca</a></p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>Master of Health Leadership and Policy in Seniors Care</b></p> <p><b>Program Overview</b></p> <p>The Master of Health Leadership and Policy in Seniors Care (M.H.L.P. in S.C.) is a program within the Faculty of Applied Science.</p> <p>This program is designed to prepare professionals to lead, design, and deliver comprehensive care and services for seniors in a range of community and institutional settings in both the public and private sectors. The goal of the program is to provide learning experiences that enable graduates to complement their knowledge of the health of seniors with both substantive knowledge related to Seniors Care and knowledge of business operations.</p> <p><b>Admission Requirements</b></p> <p>Applicants must hold an undergraduate credential in healthcare or related field (Nursing, Social Work, Occupational or Physical Therapy, Dietetics) and 3 years of relevant experience with at least 1 year in Seniors Care. Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director.</p> <p>The minimum admission requirement for students with degrees from recognized</p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,211,0,0">http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,211,0,0</a></p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new master's program.</p> <p><b>Rationale:</b></p> <p>The creation of this program has been driven, in part, by strong interest from the external community (whereby British Columbia will see a high level of activity over the next few decades), in part by a desire to collaborate between the Departments and Schools in the Faculty of Applied Science and in part to raise UBC's profile and to attract students (both within Canada and abroad), and to collaborate internationally.</p> <p>This program is designed to prepare professionals to lead, design and deliver comprehensive care and services for Seniors in a range of community and institutional settings in both the public and private sectors. The goal of the programme is to provide learning experiences that enable graduates to complement their knowledge of the health of Seniors with substantive knowledge related to Seniors Care and with knowledge of business operations.</p> <p>Students will acquire knowledge of the social and organizational conditions, including policies and practices, that foster optimum functioning among Seniors and develop</p>

<p>institutions within Canada or the United States of America is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.</p> <p>The minimum admission requirement for applicants with degrees from outside Canada and the United States of America is an overall degree average of 76% (UBC-equivalency).</p> <p>Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Acceptable English language proficiency tests for the M.H.L.P. in S.C. are:</p> <ul style="list-style-type: none"> <li>• TOEFL (Test of English as a Foreign Language): minimum score of 550 (paper version); 213 (computer version); 80 (Internet version, effective September 2005)</li> <li>• IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0</li> <li>• MELAB (Michigan English Language Assessment Battery): minimum overall score of 81</li> <li>• PTE (Pearson Test of English - Academic): minimum overall score of 59</li> <li>• CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L</li> <li>• CAEL (Canadian Academic English Language Assessment): minimum overall score of 60</li> </ul> <p>Applicants who do not meet both the academic and English language proficiency requirements</p>	<p>proficiency in the use of business models (tools) and approaches that enable them to lead and oversee service provision. This graduate program focuses on Seniors who are healthy and those who are coping with health conditions.</p>
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stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website<insert link>. The Applied Science graduate program office is responsible for collection and assessment of application documents.

### **Transfer Credit**

1. Graduate students who have earned credits outside their current master's program (e.g., from a different university, in a different UBC master's program, as an undergraduate, or as an unclassified student) may transfer up to 12 credits or up to 40% of the total number of credits needed for completion of their current program (whichever is more), provided that:

- the courses were not used to satisfy the requirements of another credential;
- the courses were not used as a basis for admission to the graduate degree program;
- at least a B standing (UBC 74%) was obtained in courses considered for transfer;
- the courses considered for transfer credit have been taken within five years of commencement of the current degree program.

2. No more than 6 credits of transfer credit may be at the undergraduate level (300-/400-level).

3. The 12-credit (40%) restriction applies to students in UBC-approved Exchange Agreements established by the UBC Go Global Office.

4. Requests for transfer credit must be accompanied by a letter from the home graduate program addressed to the Dean of the Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis.

Courses taken as a UBC Access Studies (or non-degree) student may be approved for transfer toward a graduate program (in accordance with transfer credit regulations specified above) with the permission of the graduate program and the Dean of Applied Science.

### **Program Requirements**

Degree completion requires completion of 30 credits. This includes 21 credits of Pillar courses and 9 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master's programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the M.H.L.P. in S.C. graduate program office. A complete list of the courses required for successful completion are available on the program website <insert link>

### **Financial Assistance**

Financial assistance based on academic merit and financial need may be available.

Students should consult the program website for more information.

### **Contact Information**

<p>Faculty of Applied Science School of Nursing T201-2211 Wesbrook Mall Vancouver, BC V6T 2B5 Email: <a href="http://www.nursing.ubc.ca/">http://www.nursing.ubc.ca/</a></p>	
<p><b>Proposed Calendar Entry:</b></p> <p><b>NURS 542 (3) Social Epidemiology: Special Populations</b></p> <p>Trends and social and institutional policies and practices that influence the health and illness profiles of particular population groups; trends in the social organization of service delivery for their impact on health. <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b> This is a core course within the new Applied Science Professional Master's Program Master of Health Leadership and Policy (M.H.L.P.). As outlined in the appended syllabus, the special population will focus upon Seniors Care. We envision there may in future be other populations of focus, hence the request for designation as a versionable course.</p> <p>The goal of the course is to introduce students to trends (e.g. demographic, cultural, social, health) and social, institutional and health policies and practices that influence the health and illness of seniors.</p> <p>Students will analyze trends and social and institutional policies and practices that influence the health and illness profiles of seniors. Students will examine trends in the social organization of service delivery for their impact on the health of seniors. As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of NURS 542 in the M.H.L.P. Program. We will take into account the recommendations by the committee for this course proposal as the course materials are developed and finalized before delivery.</p>
<p><b>Proposed Calendar Entry:</b></p>	<p><b>URL:</b> N/A</p>

<p><b>NURS 576 (3) Topics in Social and Environmental Planning to Foster Health of Populations</b></p> <p>Characteristics of social and built environments for their impact on the health of populations. <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale for Proposed Change:</b> This is conceptualized as content that is core to the new Applied Science Professional Master's Program Master of Health Leadership and Policy (M.H.L.P.). As outlined in the appended syllabus, the topics will relate to the substantive focus of the program which is Seniors Care.</p> <p>We envision there may in future be other populations of focus, hence the request for designation as a versionable course.</p> <p>The goal of the course is to challenge students to think critically about the ways policies shape the social organization of the environment and to consider how social and built environments influence aging and the experiences of seniors. Each module will include a three hour lecture or field activity that examines evidence related to the ways social and built environments influence healthy aging and the aging experience.</p> <p>Modules will also include examination of cases that illustrate the ways in which research insights have been incorporated into particular social or built environments and will trace their impact on the functioning of seniors living with prevalent age related challenges. Cases will incorporate narratives and perspectives of a number of different sectors engaged with Seniors Care including: Seniors, clinicians, people providing community or institutional services.</p> <p>As recommended by the GNPCC, the Faculty of Applied Science accepts the delegated responsibility for further review of NURS 576 in the M.H.L.P. Program. We will take into account the recommendations by the committee</p>
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	for this course proposal as the course materials are developed and finalized before delivery.
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18 March 2015

To: Vancouver Senate

From: Senate Curriculum Committee

Re: March Curriculum Proposals (approval)

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The Senate Curriculum Committee has reviewed the material forwarded to it by the faculties and encloses those proposals it deems as ready for approval.

The following is recommended to Senate:

**Motion:** *“That the new courses and new course code brought forward by the faculties of Graduate and Postdoctoral Studies (Arts), Land and Food Systems, and Medicine be approved.”*

Respectfully submitted,

Dr Peter Marshall, Chair, Senate Curriculum Committee

**FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES***New courses and new course code***Arts**

LAIS (Library, Archival and Information Studies) Course Code; LAIS 605 (3) Seminar in Advanced Research Methods; LAIS 607 (3) Doctoral Proseminar; LAIS 608 (3) Academic and Research Practices in Library, Archival and Information Studies; LAIS 609 (3-6) d Advanced Seminar in Library, Archival and Information Studies Topics; LIBR 506 (3) Human-Information Interaction; LIBR 507 (3) Methods of Research and Evaluation in Information Organizations; LIBR 508 (3) Information Practices in Contemporary Society; LIBR 541 (3) New Media for Children and Young Adults

**FACULTY OF LAND AND FOOD SYSTEMS***New course*

LFS 340 (3) First Nations Health and the Traditional Role of Plants

**FACULTY OF MEDICINE***New courses*

SPPH 200 (3) Understanding the Sociocultural Determinants of the Health of Populations; SPPH 300 (3) Working in International Health; SPPH 302 (3) Topics in Health Informatics for Health/Life Sciences Students; SPPH 404 (3) First Nations Health: Historical and Contemporary Issues; SPPH 406 (3) Aging from an Interdisciplinary Perspective; SPPH 408 (6) Topics in Aboriginal Health: Community-based Learning Experience; SPPH 409 (3) International Indigenous Experiences of Colonization; SPPH 410 (3) Improving Public Health: An Interprofessional Approach to Designing and Implementing Effective Interventions; SPPH 411 (3) Violence Across the Lifespan



## UBC Curriculum Proposal Form Change to Course or Program

### Category: (1)

<b>Faculty:</b> Arts <b>Department:</b> School of Library, Archival and Information Studies <b>Faculty Approval Date:</b> January 7, 2015 <b>Effective Session</b> <u>W</u> <b>Term</b> <u>1</u> <b>Year</b> <u>2015</u> <b>for Change</b>	<b>Date:</b> November 18, 2014 <b>Contact Person:</b> Mary Sue Stephenson <b>Phone:</b> 604-294-3124 <b>Email:</b> susie.slais@ubc.ca
<b>Proposed Calendar Entry:</b>  LAIS – Library, Archival and Information Studies	<b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code</a> )  <b>Present Calendar Entry:</b> N/A  <b>Type of Action:</b> Create new course code: LAIS  <b>Rationale for Proposed Change:</b> The School of Library, Archival and Information Studies has course codes assigned to graduate courses associated with the Master of Library and Information Studies (LIBR) and the Master of Archival Studies (ARST) degrees. These codes are currently also used to designate courses in the school's PhD program, which is a single academic degree and is not a direct continuation of the Master's level professional degrees.  As part of a redesign of the structure of the PhD curriculum, which emphasizes that it is a single program rather than two streams continuing from the Master's level degrees, the new LAIS course code will be used to identify the doctoral courses in the School.  The LAIS designation appropriately reflects the whole of the school (Library, Archival and Information Studies), which is the designation of the PhD degree. It will serve to reduce confusion and more clearly represent the nature of the program.
<b>Proposed Calendar Entry:</b>	<b>URL:</b> N/A



LAIS 605 (3) Seminar in Advanced Research Methods

*This course is not eligible for Credit/D/Fail grading.*

**Present Calendar Entry:**

N/A

**Type of Action:**

Create new course

**Rationale:**

Two general changes are being proposed to the SLAIS doctoral program. The first is that the two six credit courses required in the first year of the program are being replaced with several 3 credit courses to allow for greater flexibility for students to customize their studies to their areas of interest, for example, through taking courses outside the department. Given the small size of the program, this flexibility is important from both student and administrative perspectives. The second change is the introduction of a new course code (LAIS) to be used for doctoral courses, to clearly distinguish them from the professional master's program courses in the school that use the codes: LIBR and ARST and to unify and streamline the PhD program.

This course is a required research methods course for doctoral students.

The goal of this course is to enable students to design good research based on a thorough understanding of the research process, and of the methods frequently used in social sciences and humanities research. As such, the course focuses on the comparative advantages and disadvantages of qualitative, quantitative, and mixed methods research designs, and of knowing how differences in the worldview underlying these approaches contribute to the choices we make when designing our research.

It is general in scope to meet the needs of all students to strengthen research and academic communication skills, increase their knowledge of diverse research perspectives, and ensure they have a solid grounding in research ethics.



	<p>This course is essential in this program because many students enter the PhD from professional, course-based master's programs without having acquired advanced research skills. .</p>
<p><b>Proposed Calendar Entry:</b></p> <p>LAIS 607 (3) Doctoral Proseminar  <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale:</b>  Two general changes are being proposed to the SLAIS doctoral program. The first is that the two six credit courses required in the first year of the program are being replaced with several 3 credit courses to allow for greater flexibility for students to customize their studies to their areas of interest, for example, through taking courses outside the department. Given the small size of the program, this flexibility is important from both student and administrative perspectives. The second change is the introduction of a new course code (LAIS) to be used for doctoral courses, to clearly distinguish them from the professional master's program courses in the school that use the codes: LIBR and ARST and to unify and streamline the PhD program.</p> <p>This seminar course aims to provide doctoral and advanced master's students with an orientation to current research and the academic disciplines in library, archival and information studies (LAIS). It familiarizes students with key schools of thought in the field, provides background on reference disciplines, examines significant research streams, and helps students begin developing their own areas of interest. The course is designed around three broad areas of focus within iSchools: people, information and technology and emphasizes the multidisciplinary nature of LAIS. The use of</p>



	<p>the term “iSchool” refers to the membership of the School of Library, Archival and Information Studies in the iSchools organization (<a href="http://ischools.org/">http://ischools.org/</a>), a collection of Information Schools dedicated to advancing the information field. It signals the cross-institutional focus of the information studies field, and a teaching and research focus on the relationships between information, people, and technology.</p> <p>This seminar course aims to provide doctoral and advanced master’s students with an orientation to current research and the academic disciplines in library, archival and information studies (LAIS). It familiarizes students with key schools of thought in the field, provides background on reference disciplines, examines significant research streams, and helps students begin developing their own areas of interest. The course is designed around three broad areas of focus within iSchools: people, information and technology and emphasizes the multidisciplinary nature of LAIS.</p> <p>This course will be required for all doctoral students in the program and open also to advanced master’s students in the MLIS or MAS programs who are seeking a more research oriented course with a highly interactive seminar format. The course is needed to help incoming students build a common understanding of the LAIS fields, to develop awareness of and critical perspectives on the major themes, schools of thought and theoretical foundations within these fields, and to develop the communication and collaboration skills necessary to multidisciplinary work. This course is a modified and combined version of the first half of the required 6 credit course LIBR/ARST 610, which is being discontinued.</p>
<p><b>Proposed Calendar Entry:</b></p>	<p><b>URL:</b> N/A</p>



LAIS 608 (3) Academic and Research  
Practices in Library, Archival and Information  
Studies  
*This course is not eligible for Credit/D/Fail  
grading.*

**Present Calendar Entry:**

N/A

**Type of Action:**

Create new course

**Rationale:**

Two general changes are being proposed to the  
SLAIS doctoral program.

The first is that the two six credit courses  
required in the first year of the program are  
being replaced with several 3 credit courses to  
allow for greater flexibility for students to  
customize their studies to their areas of interest,  
for example, through taking courses outside the  
department. Given the small size of the  
program, this flexibility is important from both  
student and administrative perspectives.

The second change is the introduction of a new  
course code (LAIS) to be used for doctoral  
courses, to clearly distinguish them from the  
professional master's program courses in the  
school that use the codes: LIBR and ARST and  
to unify and streamline the PhD program.

This course will give students the opportunity  
to prepare for future careers by applying their  
advanced subject knowledge in library, archival  
and information studies (LAIS) to real tasks in  
diverse work contexts, including academic,  
community-based and organizational. Students  
will gain a broader understanding of how  
research communities function and how  
academics contribute to society and the  
professional world, while also gaining skills  
that will enable them to make their own  
contributions.

**Proposed Calendar Entry:**

LAIS 609 (3-6) d Advanced Seminar in  
Library, Archival and Information Studies  
Topics  
*This course is not eligible for Credit/D/Fail*

**URL:**

N/A

**Present Calendar Entry:**

N/A

**Type of Action:**



grading.

## Create new course

### **Rationale:**

Two general changes are being proposed to the SLAIS doctoral program. The first is that the two six credit courses required in the first year of the program are being replaced with several 3 credit courses to allow for greater flexibility for students to customize their studies to their areas of interest, for example, through taking courses outside the department. Given the small size of the program, this flexibility is important from both student and administrative perspectives. The second change is the introduction of a new course code (LAIS) to be used for doctoral courses, to clearly distinguish them from the professional master's program courses in the school that use the codes: LIBR and ARST and to unify and streamline the PhD program.

This is a variable credit, doctoral level seminar course that will be used by full time and visiting faculty to offer courses in their areas of expertise. In the existing program, there is no way to offer such courses at the doctoral level, which limits the scope of the program. We expect that this course will be used on a semi-regular basis to offer an advanced seminar on archival theory, which is one of the areas of specialization among students in our program. When offered, students will have the option to choose between LAIS 608 and LAIS 609.

The goal of this course is to provide an opportunity for doctoral students to undertake focused study of a particular area within the broad field of Library, Archival and Information Studies, based on the expertise of a particular faculty member.

The seminar detailed in this proposal is focused on interactive information retrieval (IR), an area of study at the nexus of system-centred IR, information seeking research, and human computer interaction. Interactive IR studies





human information seekers and their interactions with information retrieval systems with the twin goals of better understanding system users (human affect, behavior and cognition) and of designing more effective and user-centred retrieval systems. Online search systems are near ubiquitous in contemporary society; this course will enable students to make sense of this phenomenon and contribution to this research field.

The learning outcomes of this course are an understanding of the central concepts, areas of debate, and the structure of the literature in this particular field, to strengthen analytical and writing skills, and to build understanding of the broader research context for students' dissertation research.

# **UBC Curriculum Proposal Form** **Change to Course or Program**

## **Category: (1)**

<b>Faculty:</b> Arts <b>Department:</b> School of Library, Archival and Information Studies <b>Faculty Approval Date:</b> January 7, 2015 <b>Effective Session</b> <u>W</u> <b>Term</b> <u>1</u> <b>Year</b> <u>2015</u> <b>for Change</b>	<b>Date:</b> November 18, 2014 <b>Contact Person:</b> Mary Sue Stephenson <b>Phone:</b> 604-294-3124 <b>Email:</b> susie.slais@ubc.ca
<b>Proposed Calendar Entry:</b>  LIBR 506 (3) Human-Information Interaction <i>This course is not eligible for Credit/D/Fail grading.</i>	<b>URL:</b> N/A  <b>Present Calendar Entry:</b> N/A  <b>Type of Action:</b> Create new course  <b>Rationale:</b> This course is one of four required Core courses in the M.L.I.S. program. Only one of the existing Core courses [LIBR 502 is being renamed and renumbered as LIBR 509 on a separate proposal] is being retained in the new design. LIBR 506 is one of the three new courses.  The goal of this course is to ground students in the area of human information interaction. This foundations course is essential for understanding information users and communities, and will be utilized by students during their program of study and into their professional lives to develop, evaluate, and improve upon information systems, organizations, and services.  This course will educate students in the theory and practice of user information needs, use, and behaviour. M.L.I.S. students need to understand how those seeking and using information define their information needs, and how the user will interact with and use this information so that the best possible match can be made between the user and the most relevant

	<p>information available. Students will also need knowledge of techniques for determining what users' informational needs are, and what tasks the information will help accomplish, for purposes of planning and developing new information systems and information tools.</p>
<p><b>Proposed Calendar Entry:</b></p> <p>LIBR 507 (3) Methods of Research and Evaluation in Information Organizations</p> <p><i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale:</b> This course is one of four required Core courses in the M.L.I.S. program. Only one of the existing Core courses [LIBR 502 is being renamed and renumbered as LIBR 509 on a separate proposal] is being retained in the new design. LIBR 507 is one of the three new courses.</p> <p>Research is a core component of the information professions, and essential to good information practice. Information professionals not only aid others in carrying out research, but also rely on the research literature to improve their own evidence-based practice, and knowledgeably employ research methods in assessing and evaluating programs and services.</p> <p>This course will educate students in the theory and practice of research and evaluation. Evidence-based practice is a hallmark of good professional practice, and MLIS students need to learn how to use existing research literature in the assessment of existing programs and services, and in the planning and implementation of new ones. To critically appraise this literature, students also need to know how to identify appropriate</p>

	methods of data collection given a specific research problem, and how to design and carry out an effective program of research when research-based findings are not available for the purpose at hand
<p><b>Proposed Calendar Entry:</b></p> <p>LIBR 508 (3) Information Practices in Contemporary Society  <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b> N/A</p> <p><b>Present Calendar Entry:</b> N/A</p> <p><b>Type of Action:</b> Create new course</p> <p><b>Rationale:</b>  This course is one of four required Core courses in the M.L.I.S. program. Only one of the existing Core courses [LIBR 502 is being renamed and renumbered as LIBR 509 on a separate proposal] is being retained in the new design. LIBR 508 is one of the three new courses.</p> <p>This course prepares students from diverse scholarly and professional backgrounds to investigate, analyze and critique the social, political and cultural tensions surrounding contemporary information practices. Students will critically engage with the theoretical approaches, ethical groundings, methodological frameworks and technical skills utilized by information professionals.</p> <p>The course will educate students on the various roles of information professionals in a modern information-based society. Students come into the MLIS Program with diverse educational backgrounds and experience, and require a framework along which they can orient themselves to the particular requirements and culture of professional information practice. Further, MLIS students need to develop and apply skill in critical analysis of information use in a variety of circumstances and settings, and to know how to plan, analyze, advocate</p>

	for, and implement programs and practices that meet user requirements that are technologically and economically feasible, while reflecting high ethical standards that balance the requirements of accessibility, privacy, and freedom of information.
<p><b>Proposed Calendar Entry:</b></p> <p>LIBR 541 (3) New Media for Children and Young Adults  <i>This course is not eligible for Credit/D/Fail grading.</i></p>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=LIBR">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=LIBR</a></p> <p><b>Present Calendar Entry:</b>  N/A</p> <p><b>Type of Action:</b>  Create new course</p> <p><b>Rationale:</b>  This course is changing from an individual topic within a variable credit course [LIBR 559B] to a free-standing Calendar course.</p> <p>Among the numerous materials courses, necessary for developing selection and mediation competence in future information professionals, New Media for Children and Young Adults is the only course that deals extensively in contemporary digital media and cyberculture. An understanding of digital youth and media is essential for those specializing in youth services, in public, academic, school and special libraries. Furthermore, the course provides an important introduction to children's media and culture for students in the Master of Library and Information Studies (M.L.I.S.) program.</p> <p>The course is closely connected to developing students' research capacity (MLIS graduate competency 4.1 and 4.2: <a href="http://slais.ubc.ca/programs/about-department/graduate-competencies/">http://slais.ubc.ca/programs/about-department/graduate-competencies/</a>). Student projects from LIBR 559B have comprised the majority of posters in the iSchool's annual Research Day, and a student project from this course has won "Best Poster" the last two years (2013,</p>

	2014). Several projects from the course have been presented at scholarly international conferences and workshops. Thus, course outcomes are tied closely to our school's measures of student learning, providing important graduate competency indicators.
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**UBC Curriculum Proposal Form  
Change to Course or Program**

**Category: (1)**

<p><b>Faculty:</b> LFS  <b>Department:</b> N/A  <b>Faculty Approval Date:</b> January 29, 2015  <b>Effective Session (W or S):</b> W  <b>Effective Academic Year:</b> 2015</p>	<p><b>Date:</b> January 22, 2015  <b>Contact Person:</b> Gwen Chapman  <b>Phone:</b> Phone 604 822 6874   Fax 604 822 5143  <b>Email:</b> <a href="mailto:gwen.chapman@ubc.ca">gwen.chapman@ubc.ca</a></p>
<p><b>Proposed Calendar Entry:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=name&amp;institution=11&amp;code=LFS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=name&amp;institution=11&amp;code=LFS</a></p> <p>LFS: Land &amp; Food Systems</p> <p><b>As of July 1, 2015, the IHHS courses have been distributed among the following units: School of Social Work, School of Population Health, and Faculty of Land and Food Systems.</b></p> <p><b>LFS 340</b> (3) First Nations Health and the Traditional Role of Plants  <b>This Interprofessional Health and Human Service (IHHS) course covers the</b>          First Nations medical systems and medicinal plants. Bridging the traditional with modern sciences.</p>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?code=IHHS</a></p> <p><b>Present Calendar Entry:</b>  <del>IHHS 301</del> (3) First Nations Health and the Traditional Role of Plants          First Nations medical systems and medicinal plants. Bridging the traditional with modern sciences.  <del>Prerequisite: Enrolment in a health and human service program.</del></p> <p><b>Type of Action:</b>          Move the above listed IHHS courses to LFS; include an IHHS identifier within the course description; and include a subject area note on the LFS course description page within the UBC calendar. Delete prerequisite</p> <p><b>Rationale for Proposed Change:</b>          Please refer to the cover memo [attached]          As a result of the disestablishment of the CHD, these courses have been transferred to the Faculty of Land and Food Systems. The titles, credit values, and course content remain the same. IHHS 301 course was taught by LFS faculty and the content of the courses closely aligns with the mandate of LFS; it is a natural fit to situate this course within the Faculty of Land and Food Systems. With the transfer of the course to LFS, the desire is to open enrolment to a wide variety of students, not just those enrolled in health and human service programs, thus the restrictive prerequisite is being removed.</p>



### UBC Curriculum Proposal Form Change to Course or Program

**Category: (1)**

<b>Faculty:</b> Medicine <b>Department:</b> School of Population and Public Health <b>Faculty Approval Date:</b> December 12, 2014 <b>Effective Session (W or S):</b> W2015 <b>Effective Academic Year:</b> 2015/2016	<b>Date:</b> January 29, 2015 <b>Contact Person:</b> Carrie Hunter <b>Phone:</b> 604-827-2709 <b>Email:</b> carrie.hunter@ubc.ca
<b>Proposed Calendar Entry:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=SPPH">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=SPPH</a>  SPPH: School of Population & Public Health  <b>As of July 1, 2015, the IHHS courses have been distributed among the following units: School of Social Work, School of Population Health, and Faculty of Land and Food Systems.</b>  <b>SPPH</b> 200 (3) Understanding the Sociocultural Determinants of the Health of Populations <b>This Interprofessional Health and Human Service (IHHS) course covers the</b> idea of "population health," and the implementation and evaluation of programs or policies to improve health. Open to all students. [3-0-0]	<b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a>  <b>Present Calendar Entry:</b> <del>IHHS</del> 200 (3) Understanding the Sociocultural Determinants of the Health of Populations <del>The</del> idea of "population health," and the implementation and evaluation of programs or policies to improve health. Open to all students. [3-0-0]  <b>Type of Action:</b> Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the SPPH course description page within the UBC calendar.  <b>Rationale for Proposed Change:</b> Please see cover memo [attached] As a result of the disestablishment of the CHD, these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.
<b>Proposed Calendar Entry:</b>  <b>SPPH</b> 300 (3) Working in International Health <b>This is a</b> tutored, web based <b>Interprofessional Health and Human Service (IHHS)</b> course on planning/preparing for work in a developing country. Causes of ill health amongst populations living in poverty; analysis of available solutions. Health Science background not essential.	<b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a>  <b>Present Calendar Entry:</b> <del>IHHS</del> 300 (3) Working in International Health <del>T</del> utored, web based course on planning/preparing for work in a developing country. Causes of ill health amongst populations living in poverty; analysis of available solutions. Health Science background not essential.  <b>Type of Action:</b> Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the SPPH course description page within the UBC calendar.





	<p><b>Rationale for Proposed Change:</b> Please see cover memo [attached] As a result of the disestablishment of the CHD, these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>SPPH</b> 302 (3) Topics in Health Informatics for Health/Life Sciences Students <b>Interprofessional Health and Human Service (IHHS) course.</b></p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a></p> <p><b>Present Calendar Entry:</b></p> <p><del>IHHS</del> 302 (3) Topics in Health Informatics for Health/Life Sciences Students</p> <p><b>Type of Action:</b> Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the SPPH course description page within the UBC calendar.</p> <p><b>Rationale for Proposed Change:</b> Please see cover memo [attached] As a result of the disestablishment of the CHD, these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>SPPH</b> 404 (3) First Nations Health: Historical and Contemporary Issues <b>This Interprofessional Health and Human Service (IHHS) course covers an</b> epistemological approach that considers the determinants of health and spiritual-environmental-cultural perspectives. [3-0-0]</p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a></p> <p><b>Present Calendar Entry:</b></p> <p><del>IHHS</del> 404 (3) First Nations Health: Historical and Contemporary Issues <del>An</del> epistemological approach that considers the determinants of health and spiritual-environmental-cultural perspectives. [3-0-0]</p> <p><b>Type of Action:</b> Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the SPPH course description page within the UBC calendar.</p> <p><b>Rationale for Proposed Change:</b> Please see cover memo [attached] As a result of the disestablishment of the CHD,</p>



	<p>these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>SPPH</b> 406 (3) Aging from an Interdisciplinary Perspective</p> <p><b>This Interprofessional Health and Human Service (IHHS) course covers issues</b> associated with aging in our society. For students registered in health and human services programs only.</p>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a></p> <p><b>Present Calendar Entry:</b></p> <p><del>IHHS</del> 406 (3) Aging from an Interdisciplinary Perspective</p> <p><del>Issues</del> associated with aging in our society. For students registered in health and human services programs only.</p> <p><b>Type of Action:</b>  Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the SPPH course description page within the UBC calendar.</p> <p><b>Rationale for Proposed Change:</b>  Please see cover memo [attached]  As a result of the disestablishment of the CHD, these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>SPPH</b> 408 (6) Topics in Aboriginal Health: Community-based Learning Experience</p> <p><b>In-depth cultural and interprofessional learning experience that enables students to live and study in BC First Nations communities while learning about health, wellness, and community strengths from a local perspective. Interprofessional Health and Human Service (IHHS) course.</b></p>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a></p> <p><b>Present Calendar Entry:</b></p> <p><del>IHHS</del> 408 (6) Topics in Aboriginal Health: Community-based Learning Experience</p> <p><b>Type of Action:</b>  Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the SPPH course description page within the UBC calendar.</p> <p><b>Rationale for Proposed Change:</b>  Please see cover memo [attached]  As a result of the disestablishment of the CHD, these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the</p>



	<p>same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>SPPH</b> 409 (3) International Indigenous Experiences of Colonization</p> <p><b>This Interprofessional Health and Human Service (IHHS) course is an</b> online, interprofessional, comparative inquiry of indigenous experiences of global colonization and the manifestations of that experience in the contemporary socio-cultural environment. Informed and guided by indigenous knowledge and drawing upon a range of disciplines such as public health, history, sociology and public policy.</p>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a></p> <p><b>Present Calendar Entry:</b></p> <p><b>IHHS</b> 409 (3) International Indigenous Experiences of Colonization</p> <p><del>An</del> online, interprofessional, comparative inquiry of indigenous experiences of global colonization and the manifestations of that experience in the contemporary socio-cultural environment. Informed and guided by indigenous knowledge and drawing upon a range of disciplines such as public health, history, sociology and public policy.</p> <p><b>Type of Action:</b>  Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the SPPH course description page within the UBC calendar.</p> <p><b>Rationale for Proposed Change:</b>  Please see cover memo [attached]  As a result of the disestablishment of the CHD, these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>SPPH</b> 410 (3) Improving Public Health: <del>An</del> Interprofessional Approach to Designing and Implementing Effective Interventions</p> <p><b>This Interprofessional Health and Human Service (IHHS) course promotes collaborating interprofessionally. Each</b> student team will identify and research a critical public health issue, and develop a detailed practical and effective intervention. Intended for students in health and human service programs.</p>	<p><b>URL:</b>  <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a></p> <p><b>Present Calendar Entry:</b></p> <p><del>IHHS</del> 410 (3) Improving Public Health: <del>an</del> Interprofessional Approach to Designing and Implementing Effective Interventions</p> <p><del>By collaborating interprofessionally, each</del> student team will identify and research a critical public health issue, and develop a detailed practical and effective intervention. Intended for students in health and human service programs.</p> <p><b>Type of Action:</b>  Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the</p>



	<p>SPPH course description page within the UBC calendar.</p> <p><b>Rationale for Proposed Change:</b> Please see cover memo [attached] As a result of the disestablishment of the CHD, these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.</p>
<p><b>Proposed Calendar Entry:</b></p> <p><b>SPPH</b> 411 (3) Violence Across the Lifespan <b>This Interprofessional Health and Human Service (IHHS) course covers</b> violence in families across the lifespan. Particular emphasis on intersections of race, class, and gender; the long-term impact of childhood exposure to violence; and prevention-focused initiatives.</p>	<p><b>URL:</b> <a href="http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS">http://www.calendar.ubc.ca/vancouver/courses.cfm?page=code&amp;code=IHHS</a></p> <p><b>Present Calendar Entry:</b></p> <p><del>IHHS</del> 411 (3) Violence Across the Lifespan <del>Interprofessional learning about</del> violence in families across the lifespan. Particular emphasis on intersections of race, class, and gender; the long-term impact of childhood exposure to violence; and prevention-focused initiatives.</p> <p><b>Type of Action:</b> Move the above listed IHHS courses to SPPH; include an IHHS identifier within the course description; and include a subject area note on the SPPH course description page within the UBC calendar.</p> <p><b>Rationale for Proposed Change:</b> Please see cover memo [attached] As a result of the disestablishment of the CHD, these courses have been transferred to the School of School of Population and Public Health. The titles, credit values, and course content remain the same. As some of the courses are currently taught by SPPH faculty and the content of the courses closely aligns with the mandate of SPPH, it is a natural fit to situate these courses within the School of Population and Public Health.</p>



6 March 2015

From: Senate Student Awards Committee

To: Senate

**Re: New Awards and Changes to Existing Awards (February 2015)**

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The Student Awards Committee recommends:

*“That Senate accept the awards as listed and forward them to the Board of Governors for approval; and that letters of thanks be sent to the donors.”*

**Bachelor of International Economics (BIE) International Student Merit Scholarship** – Scholarships valued up to \$15,000 each are offered to continuing international students in the Bachelor of International Economics (BIE) program at the Vancouver School of Economics. Students selected for these scholarships must have completed at least 27 credits towards their BIE degree. Students must demonstrate strong academic achievement, engagement in the program, and the potential to make a scholarly contribution within the BIE program. The scholarships are made on the recommendation of the Vancouver School of Economics. (First Award Available in the 2015/2016 Winter Session)

**Bachelor of International Economics (BIE) International Student Major Entrance Scholarship** – Scholarships valued up to \$15,000 each are available to outstanding international students entering the Bachelor of International Economics (BIE) program at the Vancouver School of Economics. The awards are based primarily on the students' scholarly achievement, with preference given to students who demonstrate strong leadership abilities and community involvement. Subject to continued scholarship standing, the scholarships will be renewed for a further three years of study or until the BIE degree is obtained (whichever is the shorter period). Awards are made on the recommendation of the Vancouver School of Economics. (First Award Available in the 2015/2016 Winter Session)

**Joan Joyce CARTER Memorial Scholarship** – Scholarships totalling \$4,800 have been made available through an endowment established by the Estate of Joan Joyce Carter. Ms. Carter passed away in 2013. The scholarships are offered to deserving students in the



Peter A. Allard School of Law. The awards are made on the recommendation of the Peter A. Allard School of Law, and in the case of graduate students, in consultation with the Faculty of Graduate and Postdoctoral Studies. (First Award Available in the 2015/2016 Winter Session)

**Jack T. EDWARDS Memorial Award in Law** – A \$1,000 award has been made available through an endowment established by the Edwards Family in memory of Jack T. Edwards for a student in the JD program who has demonstrated dedication to a clinical legal program at UBC Law. After serving as a fighter pilot in the RCAF reserve, Jack Edwards went on to a successful career as a lawyer in Vancouver before being appointed a Justice of the Supreme Court of British Columbia. Jack was dedicated to serving clients, as well as his profession, with integrity. The award is made on the recommendation of the Peter A. Allard School of Law. (First Award Available in the 2015/2016 Winter Session)

**Hamish KIMMINS Scholarship in Forest Ecosystem Studies** – Scholarships totalling \$1,500 have been made available through an endowment established by friends and colleagues of Dr. Hamish Kimmins in recognition of his dedication and commitment to forestry education and research. In keeping with his area of expertise and his commitment to graduate student mentorship, this scholarship is given to students in the Faculty of Forestry focusing their studies at the ecosystem level, with preference given to students engaged in ecosystem-level modeling. The awards are made on the recommendation of the Faculty of Forestry in consultation with the Faculty of Graduate and Postdoctoral Studies. (First Award Available in the 2015/2016 Winter Session)

**Lawrence LEWIN Bursary in Law** – A \$1,000 bursary is offered annually to a UBC Peter A. Allard School of Law student entering the first year of either the JD program or a graduate degree program. Preference will be given to students from the East, West or Central Kootenay regions of BC. Mr. Lawrence J. Lewin is a UBC Faculty of Law graduate who resides in Creston (LLB 1959). The award is adjudicated by Enrolment Services. (First Award Available in the 2015/2016 Winter Session)

**Alan STEEVES Memorial Award in Mechanical Engineering** – A \$1,200 award has been made available through an endowment established by friends, colleagues and family to honour the memory of Alan Steeves, who was first a student, and subsequently a long-serving and highly respected IT staff member in the Department of Mechanical



Engineering. Alan was a First Nations artist and a conservationist whose impact was felt beyond UBC. The award will be given to an undergraduate student in Mechanical Engineering who exhibits creativity and is involved in student teams. Preference will be given to students who self-identify as Aboriginal. The award is made on the recommendation of the Department of Mechanical Engineering. (First Award Available in the 2015/2016 Winter Session)

**Gitanjali STEVENS Prize in International Relations** – A \$1,000 prize is offered annually by the Goel Family Charitable Foundation to an undergraduate student studying International Relations with a focus on India. The award is made on the recommendation of the Chair of the International Relations program. (First Award Available in the 2014/2015 Winter Session)

**Previously Approved Awards with Changes in Terms or Funding Source:**

**#451 Universal Buddhist Temple Scholarship** – A \$1,500 scholarship is offered annually by the Universal Buddhist Temple to outstanding graduate students in Buddhist studies. No recipient shall receive this scholarship for more than two years. The award is made on the recommendation of the Department of Asian Studies in consultation with the Faculty of Graduate and Postdoctoral Studies.

**Why and how amended:** As requested by the donor through the Annual Student Award Confirmation Form, the number of scholarships available has been reduced.

**#1190 Italian Government Book Prize** – A book prize is offered annually by the Consulate General of Italy in Vancouver to an undergraduate student in Italian of a level above beginners (200 or higher), on the recommendation of the Head of the Department of French, Hispanic & Italian studies.

**Why and how amended:** As requested by the donor through the Annual Student Award Confirmation Form, the name of the organization that is offering the award has been edited.

**#1286 Normand M. Bouchard Memorial Bursary** – Bursaries totalling \$4,000 have been made available through an endowment established by Mr. William and Mrs. Miyo Thornton-Trump in memory of their son, Norman Bouchard (1969-1995). Norman





Bouchard was a long-time UBC Film Society Executive who graduated from UBC in 1995. The theatre at the UBC Student Union Building is named after Norman Bouchard. The bursaries are for students in any year or faculty. The adjudication is made by Enrolment Services.

**Why and how amended:** As per the donor's request, the award has changed from annually funded to endowed, and the number of bursaries available has increased.

**#1436 Crowe MacKay LLP Scholarship in Accounting** - Two \$3,500 scholarships are offered annually by Crowe MacKay LLP, and the Chartered Accountants Education Foundation, to an undergraduate student enrolled in the Accounting option of the Bachelor of Commerce program at the Sauder School of Business. This award was established to mark the 40th anniversary of Crowe MacKay LLP (formerly MacKay LLP) and honour the legacy created by the founding partner, Iain MacKay and the other leading partners of Crowe MacKay LLP. This award is made on the recommendation of the Sauder School of Business to a student in good academic standing who has expressed an intention to enter the Chartered Professional Accountant program immediately following graduation.

**Why and how amended:** As requested by the donor through the Annual Student Award Confirmation Form, the award description has been modified to include the updated name of the professional program.

**#2005 Jean Barman Prize in Aboriginal Education** - Prizes totalling \$1,000 are offered annually to students of Aboriginal ancestry pursuing graduate or teacher education degrees based on a project related to Aboriginal people. The award is named in honour of Dr. Jean Barman, an outstanding professor who taught and works in this area. The award is made on the recommendation of the Faculty of Education in consultation with the Associate Dean of Indigenous Education and the Faculty of Graduate and Postdoctoral Studies.

**Why and how amended:** As requested by the Faculty, the line regarding the recommendation process has been edited.

**#2009 Lotus Light Charity Society Mu-Shu Lee Memorial Award in Education** – Two awards of \$500 each are offered annually by the Family of Mu-Shu Lee to





outstanding undergraduate or graduate students in Special Education in the Faculty of Education who demonstrate strong academic achievement and involvement in the community. Candidates must be a Canadian citizen, a landed immigrant (permanent resident) or have protected person status. Recommendations are made by the Faculty of Education and, in the case of graduate students, in consultation with the Faculty of Graduate and Postdoctoral Studies.

**Why and how amended:** As requested by the donor, the number of awards available has increased, the award eligibility has changed to include undergraduate students, and the award criteria have broadened with the “involvement in the community” component.

**#2933 Ronald Jobe Children's Literature Scholarship** - Scholarships totalling \$2,200, with no one student receiving more than \$1,000, have been made available through an endowment established in honour of Dr. Ronald Jobe, a Professor in the Department of Language and Literacy Education since 1978. He has created a stimulating atmosphere for scholarship in children's literature at the university through his dynamic teaching style and involved supervision of graduate theses, as well as his advocacy for the subject both nationally and internationally. The award is made to students in the Master of Arts Program in Children's Literature on the recommendation of the School of Library, Archival and Information Studies, in consultation with the Faculty of Graduate and Postdoctoral Studies.

**Why and how amended:** As requested by the donor, the line that clarifies that no one student shall receive more than \$1,000 has been added.

**#3734 Pharmasave Drugs (Pacific) Ltd Scholarship in Pharmacy** – A \$1,000 scholarship, gift of Pharmasave Drugs Pacific Ltd., is offered annually to a student proceeding to the fourth year in the Faculty who has obtained the highest standing in the required Therapeutics courses of the second and third year.

**Why and how amended:** As requested by the donor through the Annual Student Award Confirmation Form, the required courses considered for the evaluation of the students' academic standing have changed.

**#3761 Pharmasave Drugs (Pacific) Ltd Leadership Award** – A \$1,500 award is offered annually by Pharmasave Drugs Pacific Ltd. for a student in the third or fourth



year of a Bachelor of Pharmaceutical Sciences program who demonstrates leadership skills and has an interest in community practice. The award is made on the recommendation of the Faculty of Pharmaceutical Sciences.

**Why and how amended:** As requested by the donor through the Annual Student Award Confirmation Form, the word “Leadership” has been added to the award title.

**#4529 Lotus Light Charity Society Mu-Shu Lee Memorial Award in Social Work –**

Two awards of \$500 each are offered annually by the Family of Mu-Shu Lee to undergraduate or graduate students in social work who demonstrate strong academic achievement and involvement in the community. Preference is given to students with Aboriginal heritage who are Canadian citizens or permanent residents or have protected person status. Recommendation is made by the School of Social Work and, in the case of graduate students, in consultation with the Faculty of Graduate and Postdoctoral Studies.

**Why and how amended:** As requested by the donor, the number of awards available has increased and the award criteria have broadened with the “involvement in the community” component.

**#4663 Aboriginal Transfer Scholarship –** Entrance scholarships valued at \$2,500 each are available to eligible Canadian Aboriginal students transferring from Langara College into the Bachelor of Arts, Bachelor of Science or Bachelor of Commerce programs at UBC. This scholarship supports Aboriginal students who meet the University's admission requirements under the UBC-Langara Aboriginal Transfer Program. Eligible students must have attained an average at the point of admission to UBC of B+ or higher (3.33 or greater on the Langara grade scale) and register in a minimum of 24 credits during the upcoming Winter Session at UBC.

**Why and how amended:** As requested by Enrolment Services, the award title was revised to better distinguish this award from #4664 (for continuing students); the list of eligible programs has been updated to include new programs; some text has been edited to improve clarity of description.

**#4664 Aboriginal Transfer Award -** Awards ranging in value from \$1,500 to \$2,500 are available to continuing eligible Canadian Aboriginal students who were admitted to the Bachelor of Arts, Bachelor of Science, or Bachelor of Commerce programs at UBC under



the UBC-Langara Aboriginal Transfer Program and who have demonstrated academic achievement and community engagement. The award is adjudicated by Enrolment Services in consultation with the Faculties and the First Nations House of Learning.

**Why and how amended:** As requested by Enrolment Services, the list of eligible programs has been updated to include new programs; some text has been edited to improve clarity of description; the adjudicating body has been changed to include Enrolment Services.

**#4678 Bachelor of International Economics (BIE) International Entrance Scholarship** – Scholarships valued up to \$15,000 each are available to outstanding International students entering the Bachelor of International Economics (BIE) program at the Vancouver School of Economics. The awards are based primarily on the students' scholarly achievement, with preference given to students who demonstrate strong leadership abilities and community involvement. Awards are made on the recommendation of the Vancouver School of Economics.

**Why and how amended:** As requested by the International Student Initiative, the award value has changed and the student eligibility has broadened.

**#5368 MineSight Award in Mining Engineering** - Awards totalling \$5,000 are offered by MineSight to undergraduate students enrolled in Mining Engineering. Preference will be given to students who have expressed interest in computer technology related to the mining industry. To be considered, candidates must show high academic achievement. The award is made on the recommendation of the Norman B. Keevil Institute of Mining Engineering.

**Why and how amended:** As requested by the donor, the donor's corporate name has been updated in both the award title and calendar description.

**#5900 Dale Robert Pedersen Prize in Criminal Law** - A \$1,000 prize is offered by Dale R. Pedersen (LLB '94) to a first year Law student who achieves the highest standing in Criminal Law. The award is made on the recommendation of the Peter A. Allard School of Law.



**Why and how amended:** Following the Faculty's note that Criminal Law is actually a first year course, award eligibility has changed to first year Law student.

**#6472 Lawrence R. Munroe Scholarship in Community & Regional Planning** – A \$3,150 scholarship has been made available through an endowment established by Diana L. Belhouse (BA 1947, LLB 1973), to honour the memory of her husband, Lawrence R. Munroe, P.Eng. (BASc, Civil Engineering 1946). The award is available to outstanding students in the School of Community and Regional Planning who are Canadian citizens and who majored in or received an undergraduate degree in geography or civil engineering from the University of British Columbia or the University of Victoria. Lawrence began his successful career in 1946 with the Vancouver Town Planning Commission until the creation of City of Vancouver Planning Department where he held the position of Associate Director of Planning, until his passing at 47 years of age in 1970. In honour of Lawrence's influence on the beautification of the City of Vancouver and lifetime work, preference will be given to students who have demonstrated an interest in urban design which focuses on the creation and retention of green space and enhances the beauty of cities or urban areas. The award is made on the recommendation of the School of Community and Regional Planning, in consultation with the Faculty of Graduate and Postdoctoral Studies.

**Why and how amended:** As per the donor's request, the number of awards available has changed, SFU has been removed from the eligible undergraduate degree institutions, and financial need consideration has also been removed.

**#8197 Fine Arts Dental Laboratories Ltd and Leixir Lab Group Bursary** – Two bursaries in the amount of \$1,500 each are offered by Fine Arts Dental Laboratories and Leixir Lab Group to two students in any of the first three years of Dentistry who require financial assistance to pursue their studies.

**Why and how amended:** As requested by the donor through the Annual Student Award Confirmation Form, and as a result of the recent acquisition of the Fine Arts Dental Laboratories Ltd by the Leixir Lab Group of Canada, the name of the latter company has been added to the title of the award and in the award description.

**#8342 Gurminder Singh Tatra Bursary** – A \$1,000 bursary is offered annually by Dr. Gurminder S. Tatra to an undergraduate student in the first year of the D.M.D. program.



Dr. Tatra was a Dental Officer in the Canadian Forces who completed his dental school education at UBC under the “Dental Officer Training Program”. The bursary was created to help support dental students who are in financial need. The adjudication is made by Enrolment Services.

**Why and how amended:** As requested by the donor through the Annual Student Award Confirmation Form, the number of bursaries available has reduced from four to one and the eligibility has been limited to students in the first year of the D.M.D. program.

**#8539 UBC Law Student Emergency Award** - The UBC Law Student Emergency Award has been established to assist law students in any year of study who are faced with an unexpected financial challenge of a serious nature which impacts their well-being and/or their ability to continue in the program. The student must demonstrate that all other possible sources of support have been explored before an application is considered. All requests are determined on a case-by-case basis. Awards are adjudicated by Enrolment Services.

**Why and how amended:** As requested by the Faculty, student eligibility has been broadened to allow graduate students to be considered for the emergency funding as well.

#### **Previously-Approved Awards with Changes in Method of Payment:**

**Why and how amended:** Effective for the 2015 Summer Session, the method of administering payment for the following graduate awards will change from Payroll to the SISC. The award terms and funding source are unchanged. Large awards (>\$15,000 per year) used to be administered through Payroll because the SISC was not capable of direct deposit to the recipient's bank account. Effective January 2015, SISC became capable of direct deposit. Changing the method of administering payment will better align with how other funding administered by G+PS is distributed.

#### **Alzheimer Society of Canada Graduate Award**

The Alzheimer Society of Canada offers funding to support graduate students undertaking research in the area of Alzheimer's disease and other dementias. Recipients are selected by the funding agency.

#### **Child and Family Research Institute Graduate Award**



The Child and Family Research Institute offers funding to support graduate students undertaking research into children's and women's health concerns. Recipients are selected by the funding agency.

**Canadian Cystic Fibrosis Foundation Graduate Award**

The Canadian Cystic Fibrosis Foundation offers funding to support graduate students undertaking research into cystic fibrosis. Recipients are selected by the funding agency.

**Canadian Diabetes Association Graduate Award**

The Canadian Diabetes Association offers funding to support graduate students undertaking research into diabetes. Recipients are selected by the funding agency.

**Canadian Institutes of Health Research (CIHR) Canada Graduate Scholarship Master's Award**

The Canadian Institutes of Health Research (CIHR) offers funding to support Master's students undertaking health research. The awards are made on the recommendation of the Faculty of Graduate and Postdoctoral Studies.

**Canadian Institutes of Health Research (CIHR) Doctoral Award**

The Canadian Institutes of Health Research (CIHR) offers funding to support doctoral students undertaking health research. Recipients are selected by the funding agency.

**Canadian Institutes of Health Research (CIHR) Vanier Scholarship**

The Canadian Institutes of Health Research (CIHR) offers funding to support doctoral students undertaking research into health research. Recipients are selected by the funding agency.

**Canadian Institutes of Health Research (CIHR) Strategic Training Program Award**

Various Canadian Institutes of Health Research (CIHR)-funded Strategic Training Programs offer funding to support graduate students undertaking health research. Recipients are selected by the individual training programs.

**Heart and Stroke Foundation of Canada Graduate Award**

The Heart and Stroke Foundation of Canada offers funding to support graduate students undertaking heart and stroke research. Recipients are selected by the funding agency.

**Kidney Foundation of Canada Graduate Award**

The Kidney Foundation of Canada offers funding to support graduate students undertaking research into kidney disease. Recipients are selected by the funding agency.

**Multiple Sclerosis Society of Canada Graduate Award**



The Multiple Sclerosis Society of Canada offers funding to support graduate students undertaking research into multiple sclerosis. Recipients are selected by the funding agency.

**NSERC Canada Graduate Scholarship Master's Award**

The Natural Sciences and Engineering Research Council (NSERC) offers funding to support Master's students undertaking research in natural sciences and engineering. The awards are made on the recommendation of the Faculty of Graduate and Postdoctoral Studies.

**NSERC Doctoral Award**

The Natural Sciences and Engineering Research Council (NSERC) offers funding to support doctoral students undertaking research in natural sciences and engineering. Recipients are selected by the funding agency.

**NSERC Vanier Scholarship**

The Natural Sciences and Engineering Research Council (NSERC) offers funding to support doctoral students undertaking research in natural sciences and engineering. Recipients are selected by the funding agency.

**SSHRC Canada Graduate Scholarship Master's Award**

The Social Sciences and Humanities Research Council (SSHRC) offers funding to support Master's students undertaking research in social sciences and humanities. The awards are made on the recommendation of the Faculty of Graduate and Postdoctoral Studies.

**SSHRC Doctoral Award**

The Social Sciences and Humanities Research Council (SSHRC) offers funding to support doctoral students undertaking research in social sciences and humanities. Recipients are selected by the funding agency.

**SSHRC Vanier Scholarship**

The Social Sciences and Humanities Research Council (SSHRC) offers funding to support doctoral students undertaking research in social sciences and humanities. Recipients are selected by the funding agency.